

Determinants of High-Growth Entrepreneurship

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Abstract

While economic growth has long been a goal for public policy, only recently have the microeconomic foundations been uncovered to reveal the key role played by the exceptional enterprises that constitute what has been referred to as constituting high growth firms. This is a research topic characterized by a paucity of theoretical and empirical research. Not much is actually known about high-growth firms, and even less is known about high-growth entrepreneurship. The purpose of this paper is to provide a review of the literature concerning the determinants of high-growth firms. Two specific types of determinants are considered. The first involves determinants which are specific to the firm. The second involves determinants which are specific to the location. The findings of this study suggest that high growth firms, while reflecting just a small share of the overall firm population, still manage to account for a considerable share of the employment created. What is perhaps more controversial and surprising is that recent evidence suggests that the high employment growth firms are not necessarily newly founded entrepreneurial startups, but rather tend to be larger and more mature firms.

Introduction

While economic growth has long been a goal for public policy, only recently have the microeconomic foundations been uncovered to reveal the key role played by the exceptional enterprises that constitute what has been referred to as constituting high growth firms. This is a research topic characterized by a paucity of theoretical and empirical research. Not much is actually known about high-growth firms, and even less is known about their determinants.

For example, Acs, Parsons and Tracy (2008, p. 6) made an appeal for more research uncovering the firm-specific characteristics of high-growth or high-impact firms, “high-impact firms play an especially important role in the process of job creation over time compared with either the plants of large existing firms or very small startups that tend not to grow. High-impact firms appear to be different from other firms. However, very little is known about where they come from. In other words, what are they before they become high-impact firms? Are they startups or are they non-growing enterprises that exist for years before they enter their growth phase?”

In terms of what type of firm actually constitutes being “high growth”, the OECD offers very specific and definitive guidelines, which are increasingly being adapted as the standard in the literature. In particular, the *OECD-Eurostat Manual on Business Demography Statistics* (2007) defines a “high-growth enterprise” as “All enterprises with average annualized growth greater than twenty percent per annum, over a three-year period, and with ten or more employees at the beginning of the observation period. Growth is thus measured by the number of employees and by turnover.”

The OECD definition of a high growth firm provides a contrast to the more traditional concept of a gazelle firm, which typically refers to “All enterprises up to five years old with average annualized growth greater than twenty percent per annum over a three-year period, and with ten or more employees at the beginning of the observation period.”

In the 2007 OECD study to analyze the impact of high growth firms on employment creation, the OECD found from country studies that high growth firms constitute between three percent and six percent of all firms with at least ten employees. In terms of turnover, the high growth firms account for between three and twelve percent of turnover. At the same time, the OECD (2007) also found that these high growth firms contribute to a large share of the employment created. The study also found that less than one percent of firms and less than two percent in terms of turnover is accounted by firms classified as gazelles. They reached the conclusion that high-growth firms can play a key role in addressing important policy issues such as reducing unemployment and creating jobs.

The purpose of this paper is to provide a review of the literature concerning the determinants of high-growth firms. Two specific types of determinants are considered. The first involves determinants which are specific to the firm. The second involves determinants which are specific to the location.

The following section examines what has been learned in the literature concerning the determinants of high-growth firms. This includes determinants at the firm level, and in particular firm-specific characteristics, as well as determinants that are at the locational level, and in particular spatially specific characteristics.

The third section considers the policy implications that are found in the literature. Finally, the fourth section provides conclusions. In particular, the findings of this study echoes the earlier OECD studies in that high growth firms, while reflecting just a small share of the overall firm population, still manage to account for a considerable share of the employment created. What is perhaps more controversial and surprising is that recent evidence suggests that the high employment growth firms are not necessarily newly founded entrepreneurial startups, but rather tend to be larger and more mature firms.

Determinants of High-Growth Entrepreneurship

Theoretical Frameworks

Gibrat's Law

Interest in and concern about high-growth firms has emanated more from public policy concerns than from pure academic concerns. Still, both theoretical insights coupled with some empirical knowledge can be found. The theoretical framework linking growth to firms dates back to what has been characterized in the economics literature as *Gibrat's Law*. The relationship between firm size is formalized by this literature by assuming that the present size of firm i in period t can be decomposed into the product of a "proportional effect" and the initial firm size

$$size_{it} = (1 + \epsilon_t) Size_{it-1}$$

Where $(1+\epsilon_t)$ denotes the proportional effect for firm in period t . Here the stochastic disturbance ϵ_t is assumed to be identically and independently distributed. The assumption underlying firm growth in the model characterizing Gibrat's Law is that growth is normally distributed and occurs randomly.

Of course, the main focus and concern of Gibrat's Law and the massive number of empirical studies that it has spawned is generally on the growth of firms more generally, and not necessarily on high-growth firms. Still, an important implication of the theoretical framework implicit in the Gibrat's

Law literature is that high employment growth firms, which would occupy the extreme tail of the distribution of firm growth, would not only be characterized by a relatively few number of firms from the overall population of enterprises, but would also be independent of firm-specific characteristics.

Knowledge Spillover Theory of Entrepreneurship

By contrast is the framework provided by the knowledge spillover theory of entrepreneurship, which focuses on how new knowledge can influence the cognitive decision making process inherent in the entrepreneurial decision to start a new firm (Audretsch, Keilbach and Lehmann, 2006; Acs, Braunerhjelm, Audretsch and Carlsson, 2009; Audretsch and Keilbach, 2007). According to this view, entrepreneurship is motivated by the opportunity afforded by new knowledge created but not completely exploited for commercialization in an incumbent organizational context. Because knowledge is inherently uncertain, asymmetric and associated with high costs of transactions, divergences emerge concerning the expected value of new ideas. Economic agents therefore have an incentive to leave an incumbent enterprise and start a new firm in an attempt to commercialize the perceived value of their knowledge. Entrepreneurship is the vehicle by which (the most radical) ideas are sometimes implemented and commercialized, and can serve as the conduit for the spillover of new knowledge from the incumbent organization where it is created to a newly founded firm where it is used for innovative activity and ultimately high growth.

Audretsch (1995) analyzes the factors that influence the rate of new firm startups. He finds that such startups are more likely in industries in which small firms account for a greater percentage of the industry's innovations. This suggests that firms are started to capitalize on distinctive knowledge about innovation that originates from sources outside of an industry's leaders. This initial condition of not just uncertainty, but greater degree of uncertainty vis-à-vis incumbent enterprises in the industry is captured in the theory of firm selection and industry evolution proposed by Jovanovic (1982). Jovanovic (1982) presents a model in which the new firms, which he terms *entrepreneurs*, face costs that are not only random but also differ across firms. A central feature of the model is that a new firm does not know what its cost function is, that is its relative efficiency, but rather discovers this through the process of learning from its actual post-entry performance. In particular, Jovanovic (1982) assumes that entrepreneurs are unsure about their ability to manage a new-firm startup and therefore their prospects for success. Although entrepreneurs may launch a new firm based on a vague sense of expected post-entry performance, they only discover their true ability -- in terms of managerial competence and of having based the firm on an idea that is viable on the market -- once their business is established. Those entrepreneurs who discover that their ability exceeds their expectations expand the scale of their business,

whereas those discovering that their post-entry performance is less than commensurate with their expectations will contract the scale of output and possibly exit from the industry. Thus, Jovanovic's model is a theory of *noisy selection*, where efficient firms grow and survive and inefficient firms decline and fail. The links between entrepreneurship on the one hand and growth and survival on the other have been found across a number of social science disciplines, including economics, sociology and regional studies.

Empirical evidence

Empirical Evidence Supporting Gibrat's Law

As the Caves (1998) and Sutton (1997) providing comprehensive review articles in the *Journal of Economic Literature* confirm, a plethora of studies have been accumulated testing the validity of the assumption underlying Gibrat's Law – that firm growth is a stochastic process and is randomly distributed across firms, and that it is independent of firm-specific characteristics such as firm size and firm age. In fact, this literature consists almost exclusively of attempts to link firm-specific characteristics, principally size and age, but also other characteristics, such as R&D, innovation and finance, to firm growth.

The series of survey articles by Sutton (1997), Caves (1998) and Geroski (1995) summarize the findings from a plethora of empirical studies examining the relationship between firm size and firm growth. The early studies were undertaken using data from the U.S. These studies (Mansfield, 1962) analyzed relatively large firms. There were two main reasons for the focus on larger enterprises. The first was pragmatic. Data sets were generally restricted to larger enterprises. The second was that the general focus was on larger firms as the driving force underlying economic performance. As Sutton (1997), Caves (1998) and Geroski (1995) emphasize, these early findings seem to provide considerable support for Gibrat's Law, in that there was virtually nothing found to be systematically linked to the firm that was related to the growth performance of the firm.

Empirical Evidence Identifying Firm Size, Age and Industry as Key Determinants of Firm Growth

As studies began to include a broader spectrum of firm size and age, the empirical evidence began to shift (Sutton, Caves, 1998 and Geroski, 1995). In particular, firm growth was found in most studies to be systematically related to certain firm-specific characteristics. For example, Hall, 1987; Dunne, Roberts and Samuelson, 1989; and Audretsch, 1995) established not only that the likelihood of a new entrant surviving is quite low, but that the likelihood of survival is positively related to firm size and age. A *stylized result* (Geroski, 1995) emerging from this literature is that, when a broad spectrum of firm sizes is included in samples of enterprises in the United States, smaller firms exhibit systematically higher growth

rates than their larger counterparts. The growth advantage of small and new firms vis-à-vis large enterprises has been shown to be even greater in high technology industries (Audretsch, 1995).

These so-called stylized results between firm size and age on the one hand, and growth and survival on the other hand were subsequently confirmed for a number of European countries. A wave of studies have confirmed these findings for different European countries, including Portugal (Mata, Portugal and Guimaraes, 1994; and Mata, 1994) and Germany (Wagner, 1994). Most studies have found results in the European context which are strikingly similar to what has been found in the North American context.

Harhoff and Stahl (1995) use a data base of around 11,000 firms in manufacturing, construction, trade, finance, and services to examine how the post-entry performance of German firms varies across different sectors, in terms of the likelihood of survival and growth. In particular, Harhoff and Stahl find evidence that the likelihood of survival is positively related to firm size. In their study, firm growth is negatively related to firm size. In addition, the likelihood of survival and growth rates differ systematically across different sectors of the economy.

The results of Harhoff and Stahl (1995) are not consistent with those found in earlier studies, according to the careful survey by Wagner (1992). After reviewing the most important studies, Wagner concludes that, "Studies using German data tend to show that firm size and firm growth are uncorrelated."

Wagner (2001 and 1994) tracked analyzed the performance of small (and large) firms prior to exit. He used a longitudinal data base identifying the pre-exit performance of cohorts of firms exiting in 1990, 1991 and 1992. One striking result he found was that more than half of the exiting firms (between 53 percent and 61 percent) were founded prior to 1979, making them over 11 years old. He also found that young firms, which were classified as being younger than five years old, accounted for about a quarter of all exits, and three-quarters of exiting businesses were from middle-aged firms. At the same time he found that the likelihood of survival increases with firm size.

Almus and Nerlinger (2000) also use a large panel data base to examine how the post-entry performance of new firms varies across sectors. In particular, they find that the growth rates of new firms tends to be greater in very high-tech industries than in high-tech industries and other manufacturing industries. This mirrors the results found in the North American context.

Using firm-level data from Italy, Audretsch, Santarelli and Vivarelli (1999) find that growth rates are negatively related to firm size. In addition, they find that the likelihood of survival is greater in the startup year than in the second year, but subsequently increases over time. Similarly, Bruederl and

Preisendoerfer (1998) examine a data base consisting of 1,700 new-firm startups in Germany and find that the subsequent performance, measured in terms of likelihood of survival and growth, is greater for those entrepreneurs that (1) participate in a network with other entrepreneurs, (2) receive active help from their spouse, and (3) receive emotional support from their spouse. In addition, they find that entrepreneurial success is positively influenced by the ethnic background which of the entrepreneur, educational background, type of work experience, and whether the entrepreneur already had entrepreneurial experience. Their most striking finding is that entrepreneurial success is the highest within the context of a network with other entrepreneurs. Thus, the Bruederl and Preisendoerfer (1998) study finds that social resources in terms of linkages with other entrepreneurs enhances the growth performance of the entrepreneurial firm.

Based on a panel data set consisting of firm-level observations, Scarpetta et al. (2002) provide evidence that there is a lower degree of firm turbulence, or what they call “churning” in Europe than in the U.S. In particular, they identify that the distinguishing features of European SMEs from their American counterparts is that they start up at a larger size, have a higher level of labor productivity, and a lower level of employment growth subsequent to entry.

Thus, while there is some ambiguity in the studies linking growth to firm-specific characteristics, a consistent and compelling set of results have emerged:

1. Growth rates are higher for smaller enterprises
2. Growth rates are higher for younger enterprises
3. Growth rates are even higher for small and young enterprises in knowledge-intensive industries

Interpretation of the Evidence

The relationship between firm age and (high) growth predicted by the knowledge spillover theory entrepreneurship is depicted in figure 1.

Entrepreneurship & Firm Growth

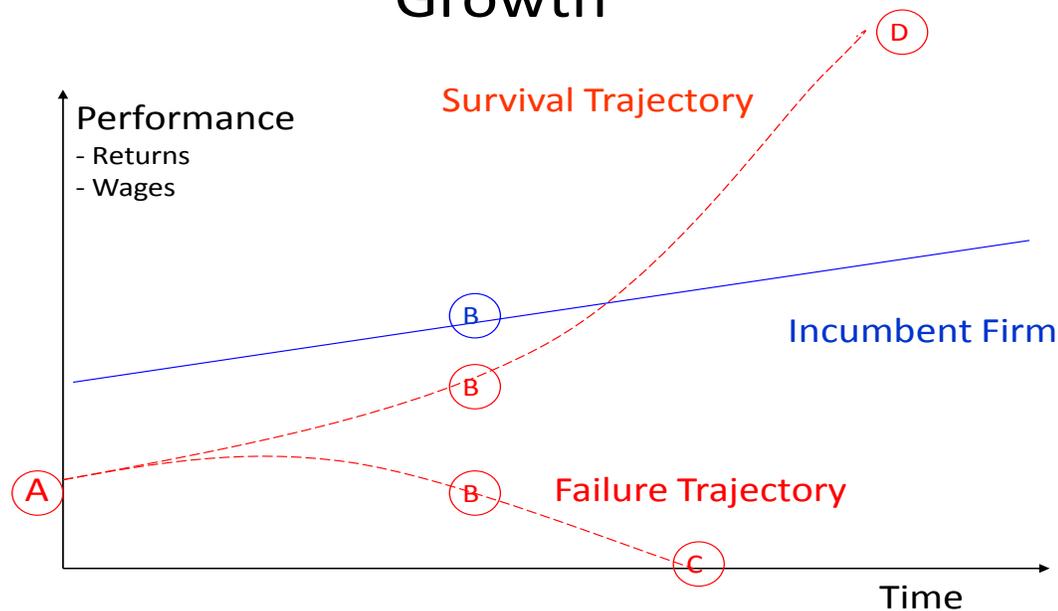


Figure 1
Entrepreneurship and Growth

The production of new knowledge and ideas in the context of an incumbent organization, such as the research and development lab of a large corporation, or the research laboratory at a university, creates knowledge embodied in an individual knowledge worker, or team of knowledge workers. If divergences in the expected value or outcome from this new knowledge lead to the decision by the incumbent firms not to commercialize the new knowledge, the economic agent could remain employed by an incumbent firm and expect to earn incremental additions to her income over time, as depicted by the positive, linear incumbent earnings profile.

Alternatively, as a result of her endowment of ideas and knowledge that is not being appropriated or rewarded within the context of the incumbent organization, the knowledge agent could reach the decision to start a new firm, which is represented by point A. Why would a rationale economic agent choose to settle for a lower return at point A than could be earned from a wage paid by an incumbent firm? Because of the expectation that there is some likelihood that the ideas upon which the firm is started will prove to be valuable, resulting in a growth of the firm and associated returns along the survival trajectory. As the evolutionary theories and systematic empirical evidence, shows, the likelihood of a new startup surviving is low. It is even lower for a knowledge-based startup. However, as discussed above, the

same literature has provided theoretical insights and compelling empirical evidence showing that those knowledge-based startups that do survive will actually experience higher growth rates.

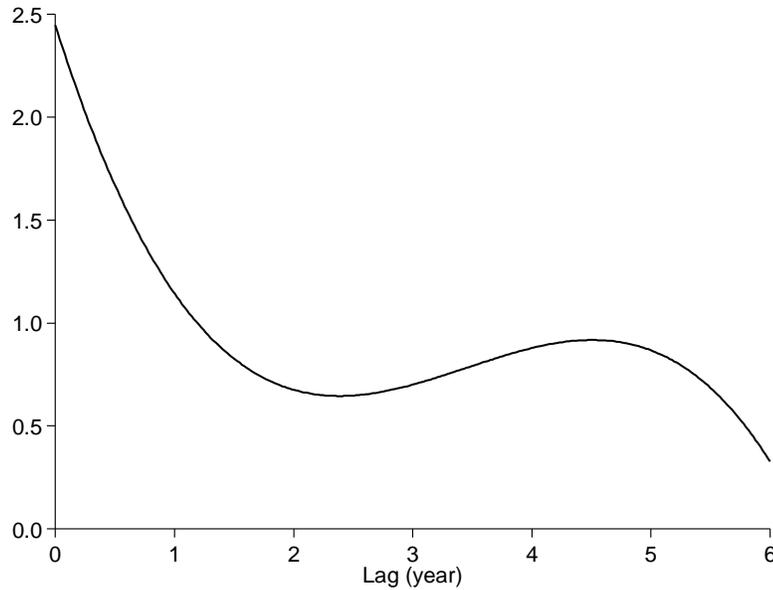
The likelihood that the new idea spawning the entrepreneurial startup is not compatible with market viability and sustainability is high. Thus, the evolutionary interpretation linking knowledge to entrepreneurship and ultimately economic growth suggests that the entrepreneurial act is to learn from the market about the viability and compatibility of a new idea that was rejected, or undervalued by incumbent organizations. The new startup serves as a conduit for knowledge spillovers from the source producing that knowledge to commercialization in a new firm.

The implications of the knowledge spillover theory of entrepreneurship for high employment growth firms is that high growth firms would not be expected to be independent of firm-specific characteristics. Rather, high growth firms would be expected to be systematically related to the firm-specific characteristics of size and age. In particular, high-growth firms would be expected to be younger and smaller when compared to the overall population of firms and their characteristics.

The Link to Job Creation

There is also considerable empirical evidence suggesting that new firm startups not only tend to constitute a large share of the high growth firms, but that they also generate a high share of employment. Considerable empirical evidence finds that new and young firms account for a high share of the new jobs. For example, a series of studies by Fritsch and Mueller (2004) using longitudinal data for Germany, and Mueller, van Stel and Storey (2008) using longitudinal data from the Netherlands, and Acs and Mueller (2008) using longitudinal data for the United States all find compelling evidence that a high share of the employment growth is accounted for by new firm startups. They also consider the employment impact of the new firm startups over a period of time subsequent to the foundation of the firm. As Figure 2 shows, the employment impact is high in the year in which the firm is founded and then decreases in subsequent years. What is important to observe is that the subsequent employment impact never becomes negative. Their results suggest that the temporal employment hits a minimum three when the firm is three years old and then subsequently increases.

Figure 2: Temporal Impact of Entrepreneurship on Employment Growth in the United States (Source: Acs and Mueller, 2007)



There is a considerable body of evidence supporting the systematic link between the firm-specific characteristics of firm size, and industry. In his pioneering work linking on job generation in the United States, David Birch (1981), placed a special emphasis on two particular firm-specific dimensions or characteristics – size and age. Analyzing one of the first comprehensive establishment level longitudinal data bases, his analyses revealed findings that at the time were remarkably startling, “Of all the net new jobs created in our sample of 5.6 million businesses between 1969 and 1976, two-thirds were created by firms with 20 or fewer employees (Birch, 1981, p. 7).” In particular, Birch (1981) found that firms with fewer than 100 employees created 82 percent of the jobs over the time period 1976 -1982. In terms of firm age, he found that a “distinguishing characteristic of job replacers is their youth. About 80 percent of the replacement jobs are created by establishments four years old or younger.” This led Birch to conclude that mature and large firms were not the major source of job creation in the United States, “Whatever they are doing, however, large firms are no longer the major providers of new jobs for Americans” (Birch, 1981, p. 8).

Characteristics of High Employment Growth Firms

In a 1994 study undertaken with James Medoff, Birch shifted his focus of analyses towards a small group of firms that exhibited high growth, and presumably accounted for the bulk of employment creation. The motivation of Birch and Medoff for this new focus on a relatively small share of firms in the

overall enterprise populations was that, “These gazelles move between small and large quickly—at various times in either direction—and to classify them by their size is to miss their unique characteristics: great innovation and rapid job growth” (Birch and Medoff, 1994, p. 163).

The findings of Birch and Medoff (1994) study suggested that less than five percent of the firms in the United States accounted for a much higher share of all new jobs. In fact, during the recession of 1988-1992, around 70 percent of all new jobs in the United States created by existing firms (rather than new startups) were accounted for by only four percent of the firms. This same four percent of the firms accounted for 60 percent of all new jobs in the entire U.S. economy. Not only were the gazelles highly concentrated among just a relatively small share of the total firm population, their size was also highly skewed. The mean size of a gazelle in the United States in 1993 was 61 workers. Another important finding was the diversity of industry contexts in which the gazelle firms were found. In fact, gazelles were found across all industry and sector contexts, with each industry exhibiting the same share of rapidly growing firms.

In a different study, Birch, Haggerty and Parsons (1995) found that all of the new employment in the American economy was attributable to gazelles. Their study analyzed records provided by Dun and Bradstreet for the period 1990-1994 and found that roughly three percent of the firm population is accounted for by gazelles.

Autio et al. (2000) undertook a study to analyze high growth firms in the context of Finland. Their study found that the high employment growth firms increased their employment by more than 400 percent between 1994 and 1997. They provided no analysis of firm specific characteristics, such as size and age.

Bruederl and Preisendoerfer (2000) use the Munich Founder data base to analyze the employment impact of new firm startups in Bavaria, Germany. The data base consists of firms founded in either 1985 or 1986. Interviews were conducted to identify those firm-specific factors most conducive to high employment growth. Their criteria for classifying a firm as being high employment growth was that the firm had to survive at least four years (until 1990), grow by at least 100 percent over the period, and experience an increase of employment by at least five employees over the time period.

Kirchhoff (1994) similarly found that high-growth firms contribute most of the employment creation in the United States. Kirchhoff analyzed a longitudinal data base consisting of firms established in 1977 and in 1978, which were tracked until 1984. His study found that three-quarters of the new

employment of a cohort over the initial six years came from only four percent of the firms included in the cohort, suggesting a highly skewed distribution of high employment growth firms.

Storey (1994) examined 14 different studies analyzing various aspects of high growth firms, of which 13 involved firms in the United Kingdom and one involved firms in the United States. The studies focused predominantly on the manufacturing sector. Most of the studies involved relatively small samples of firms, in that they were not at the census or broad, comprehensive level. Storey (1994, p. 19) summarized his findings that “approximately four percent of firms create approximately half the new jobs over a decade.”

Henrekson and Johansson (2010) similarly reach the conclusion that that employment growth is anything but distributed evenly across enterprises and that a small group of firms, which they also term as gazelles, account for the bulk of the job growth. In addition, Henrekson and Johansson point to the firm characteristics of size and age, and in particular small size and young age as key attributes associated with gazelles.

According to Henrekson and Johansson (2010, p. 1), “net employment growth rather is generated by a few rapidly growing firms—so-called gazelles—that are not necessarily small and young. Gazelles are found to be outstanding job creators. They create all or a large share of net new jobs. On average, gazelles are younger and smaller than other firms, but it is young age more than small size that is associated with rapid growth.”

New & Challenging Findings

Just as there is a line of research that seems to find consistent results that the firm-specific characteristics of young age and small size are linked to high employment growth firms, there is a different study that seems to have found exactly the opposite. In their important study, Acs, Parsons and Tracy (2008) analyze the American Corporate Statistical Library (ACSL), which was developed by the Corporate Research Board to analyze high impact entrepreneurship. Their data base spans a 12-year period, 1994-2006, and is derived from the DMI file from Dun & Bradstreet, the United States Bureau of Labor Statistics' Industry Occupation Mix, and the PUMS file from the United States Census Bureau. In principle, this data base tracks every establishment as it evolves from birth through maturity, to death or survival. In their study, Acs, Parsons and Tracy (2008) define a high-impact firm in terms of both employment and sales and if what they term as an “employment qualifier” has a value of at least two over a four-year period. The employment growth quantifier is defined as the product of a firm's absolute

change and percent change in employment. They also classify a firm as being high impact if its sales doubled over a four-year period.

Table 1 compares the measure of high-impact firms with that of the measure defined by Birch as constituting a gazelle. Under the criterion established by Birch, a firm is classified as being a gazelle if its sales doubles over a given time period. By contrast, a firm is classified as being high-impact by Acs, Parsons and Tracy (2008) if its sales double and its employment growth quantifier doubles over a four-year period.

Table 1: U.S. Gazelles and High-Impact Firms				
Number of Employees	Period	Number of Gazelles	Job Change	Revenue Change (\$1,000s)
1-19	1994-1998	309,160	3,018,440	\$577,533,025
	1998-2002	301,275	3,573,918	\$716,504,242
	2002-2006	283,308	2,883,475	\$589,072,471
20-499	1994-1998	43,342	3,014,683	\$762,963,829
	1998-2002	42,390	3,291,048	\$957,923,241
	2002-2006	39,617	2,130,682	\$1,014,653,361
500-plus	1994-1998	1,547	5,063,517	\$1,195,977,664
	1998-2002	1,665	4,515,417	\$1,841,396,607
	2002-2006	1,485	2,514,558	\$1,663,635,336
Total	1994-1998	354,049	11,096,640	\$2,536,474,518
	1998-2002	345,330	11,380,383	\$3,515,824,090
	2002-2006	324,410	7,528,715	\$3,267,361,168
Number of Employees	Period	Number of High-Impact Firms	Job Change	Revenue Change (\$1,000s)
1-19	1994-1998	327,397	3,170,729	\$346,038,292
	1998-2002	278,190	3,577,111	\$423,042,570
	2002-2006	359,289	4,041,099	\$425,041,975
20-499	1994-1998	23,464	2,788,969	\$503,059,203
	1998-2002	20,601	2,966,647	\$570,102,604
	2002-2006	16,523	2,001,835	\$549,674,434
500-plus	1994-1998	1,253	5,501,049	\$1,110,073,562
	1998-2002	1,182	5,192,558	\$1,657,759,197
	2002-2006	793	2,966,826	\$1,060,128,527
Total	1994-1998	352,114	11,460,747	\$1,959,171,057
	1998-2002	299,973	11,736,316	\$2,650,904,371
	2002-2006	376,605	9,009,760	\$2,034,844,936

Source: Corporate Research Board, American Corporate Statistical Library (2007), taken from Acs, Parsons and Tracy (2008)

In fact, as Table 1 shows, there is not a great difference between classifying firms according to the gazelle criterion and the high-impact criterion. The total number of firms classified as being gazelles

is 345,330 in the period between 1998 and 2002. The corresponding number of firm classified as being high impact is 299, 973. The gazelle firms are attributed with creating 11.4 million jobs between 1998 and 2002. Similarly, the high-impact firms are attributed with creating 11.7 million jobs over that same period.

The study also provides insights into particular firm-specific characteristics that are more conducive to being classified as a gazelle or high-impact firm. Most gazelles and high-impact firms are, in fact small. The greatest prevalence of gazelles and high-impact firms occurs in the smallest firm-size class, which includes firms with fewer than 19 employees. However, in terms of employment created, the greatest impact occurs from the largest firms.

In particular, Acs, Parsons and Tracy (2008) find that between 2002 and 2006 there were 376,605 high-impact firms in the United States. This was an increase from 299,973 high-impact firms between 1998 and 2002 and 352,114 high impact firms between 1994-1998.

In examining the age distribution, Acs, Parsons and Tracy (2008) find that the average age of high-impact firms is surprisingly high. Their study suggests that high-impact firms are considerably older than has been commonly thought in the policy debates and scholarly literature. For example, for the smallest high-impact firms, with fewer than twenty employees, the mean age is around 17 years old. High-impact firms with between twenty and 499 employees exhibit a mean age of 25 years. The large high-impact firms, with at least 500 employees, are an average of 34 years old.

New firms, which could be considered to be four years old or younger, are not typically classified as being high impact. In fact, such new firms accounted for less than three percent of all high-impact firms in the 1998-2002 period.

Thus, in terms of age, Acs, Parsons and Tracy (2008) find that the average or typical high-impact firm is not a new-firm startup. Rather, the mean age of high-impact firms in the United States is around 25 years old. This suggests that such high-impact firms have survived through their startup and “adolescent” phases prior to becoming classified as high impact.

Similarly, Acs, Parsons and Tracy (2008) find that over 97 percent of the smallest high-impact firms were older than four years, in that they were not founded during the previous four-year period. They also find that this rate goes down to 94 percent as firm size increases.

There is some persistence of the large high-impact firms across four-year time periods. Acs, Parsons and Tracy (2008) find that nearly one-quarter of the large high-impact firms were also classified

as being high-impact during the previous four-year period. These firms not only (at least) double their sales and revenue but also expand employment for at least eight years. Acs, Parsons and Tracy (2008) refer to these firms as being “super high-impact firms.

The death rate is only about three percent in subsequent periods if a firm has been classified as being a high-impact firm in a previous period (Acs, Parsons and Tracy, 2008). They also find that most high-impact firms persist in terms of at least some positive growth across four-year time periods.

There is no singular firm size typical of high impact firms. The mean size of high-impact micro (fewer than twenty employees) was three employees increasing to 16 employees over the 1998-2002 time period. Over that same time period, the mean size of small high-impact firms increased (between 20 and 499 employees) from 65 to 209. Similarly, the mean size of large high-impact firms (with at least 500 employees), increased from 3,648 to 8,041 employees (Acs, Parsons and Tracy, 2008).

Acs, Parsons and Tracy (2008) find that the high-impact firms account for almost the entire growth in employment in the U.S. economy over the 1994-2006 period. The same holds in terms of growth in revenue as well.

Of the new jobs created by the high-impact firms over the 12 year period, 58 percent were accounted for by small firms, defined as those enterprises with fewer than 500 employees. During the 1994-1998 period, small firms accounted for about one-half of the employment generated by high-impact firms, with large firms, defined as enterprises with 500 or more employees, accounting for the other half. The same was true for the 1998-2002 period (Acs, Parsons and Tracy, 2008).

Another interesting finding is that on average, only high-impact firms grow. Low-impact firms do not, on average, exhibit growth. In fact, virtually all of the employment losses in the U.S. economy over any of the occurred in large low-impact firms.

According to Acs, Parsons and Tracy (2008), high-impact firms can be found in every industry of the economy. While the distribution of high-impact firms across industries is not equal, in that some industries exhibit a higher share of high impact firms, they are not at all restricted to any particular sector or set of industries, such as high technology.

They also find that the super high-impact firms are more prevalent among large firms, with at least 500 employees, than for small firms. Their findings show that the persistence of large high impact firms between four-year periods is more than twice as great as for their smaller counterparts.

A 2008 study undertaken by the Department for Business Enterprise and Regulatory Reform (BERR) in the United Kingdom used the OECD definition for high growth firms and found that high growth firms contribute a disproportionate share of the employment growth in the United Kingdom (BERR, 2008). In particular, the empirical evidence suggests that between two to four percent of all firms account for most of the growth in employment.

The BERR study also finds that the high growth firms are not concentrated solely in a few sectors of the economy, such as the high-technology sector or the knowledge intensive sector. Rather, they are found in a broad range of sectors, spanning a diversity of economic contexts.

Characteristics of the Entrepreneur

There is a different strand of literature linking the growth performance of firms to characteristics of the entrepreneur. Entrepreneur specific characteristics have been linked to the performance of the firm, and in particular firm growth, in a number of studies. For example, Baum et al. (2001) and Baum and Locke (2004) consider the impact of a broad range of personality characteristics exhibited by the firm founder on firm growth. These studies have examined the relationship between entrepreneur characteristics including educational background, prior experience in the relevant industry, prior experience as an entrepreneur or working in an entrepreneurial startup, or experience as an employee in a high growth firm (Klepper, 2009 ; Agarwal et al., 2004). All of these characteristics have been consistently found to have a positive impact on firm growth, and in particular, the growth of new and small firms.

The BERR (2008) study also finds that high growth firms tend to have founding entrepreneurs and management teams with higher skill levels and educational attainment levels than their lower growth counterparts.

Vivek et al. (2009) examined characteristics of 549 founders of firms in aerospace and defense, computers, electronics, health care and services (computer services, engineering consultants, software and programming). Their study found that such entrepreneurs have a higher propensity to come from middle-class or upper-lower-class background, be highly educated, and have substantial experience.

Having previous experience in the industry, or even better, as an entrepreneur or else employed in an entrepreneurial startup has been found to greatly enhance the growth performance of entrepreneurial startups. Similarly, education and background experiences contribute to the growth performance of firms by enabling the entrepreneur to identify crucial sources of information and know-how. Those firms with entrepreneurs having such backgrounds and experience have been found to exhibit

systematically better growth performances than those without such entrepreneurial backgrounds and experiences.

Characteristics of Founding Teams

Some firms are, of course, started by teams of founders. Research has also found that certain characteristics of the founding team can influence the growth performance of firms. Team characteristics including the stability of the team members, their time together as a team, the heterogeneity of their background, and the size of the founding team have all been found to influence firm growth (Eisenhardt & Schoonhoven, 1990). The cohesiveness of teams plays a key role in influencing growth performance by facilitating the communication among team members. Similarly, larger teams are more conducive to specialization of tasks but at the cost of communication among team members.

Role of Gender

There is also empirical evidence that gender is a type of founding entrepreneur specific characteristic that influences the high growth performance of firms. In particular, the BERR (2008) study found that high-growth firms in both the United States and the United Kingdom have a strikingly high propensity to be founded by males. Only seven percent of the high growth firms in the United Kingdom and six percent of the high growth firms in the United States were founded by women or teams that included women.

Market Orientation

The market orientation of the firm may also influence its growth performance. An orientation towards international markets combined with prior international experience for the entrepreneur enhances the firm growth performance.

Access to Resources

The ability of a firm to access resources has also been found to influence its growth performance. The resource based view of the firm subscribes that it is the firm's capabilities in accessing and harnessing resources that enables it to achieve a sustained high performance (Barney, 1991; Penrose, 1959). According to the resource-based view of the firm, the competitive advantage of a firm, and ultimately its performance, is the result of the portfolio of resources it harnesses. This would also apply to a performance in terms of employment growth.

Human Capital

One key type of resource predominant in the literature on the resource based theory of the firm is human capital. According to Chandler and Hanks (1994), high human capital employees facilitate firm growth by enabling management and owners to implement their growth goals. Cardon (2003) explains why a young or new firm may be more dependent on human capital for growth than is an existing incumbent firm. According to Cardon (2003), a start-up may require more specific expertise and highly-skilled workers than does an established incumbent firm. In fact, the BERR (2008) study identifies high-growth firms in the United Kingdom as well as in the United States as having higher levels of human capital and skills than do lower growth firms.

Social Capital

A different type of resource involves access to social capital. In particular, the BERR (2008) study found that high-growth firms in both the United Kingdom and the United States have better access to social capital, in the form of networks, relationships, and other linkages with other firms, than do their lower growth counterparts. By culture, the BERR report means the social support of serial entrepreneurs. The report emphasizes that such serial entrepreneurs tend to develop the skills, experience and capital that are requisite to founding and managing high growth firms. This entrepreneurial social capital involves networks and relationships, or what in other contexts has been referred to as social capital. The highest growth firms also tend to be highly linked to other firms and institutions, in some cases through supply chains, in others through formal strategic alliances, and in still other cases through informal partnerships.

Financial Capital

There are compelling reasons why access to the resource of financial capital facilitates firm growth. Stiglitz and Weiss (1981) showed that the market for credit and finance is unlike other markets in that the price of the good, that is the interest rate, is not typically at a market equilibrating level. This means that credit is rationed. However, it is rationed in a way that tends to constrain young firms and small firms from opportunities to access the resource of finance. This is because of asymmetric information. As Petersen and Rajan (1994, p. 3) observe, “Small and young firms are most likely to face this kind of credit rationing. Most potential lenders have little information on the managerial capabilities or investment opportunities of such firms and are unlikely to be able to screen out poor credit risks or to have control over a borrower’s investments.” Faced with an inability to obtain sufficient information about young and small firms, the rationale choice for financial institutions is to ration lending to such small and new firms.

Similarly the BERR (2008) study finds that not only do high growth firms have superior access to finance, but the propensity for the highest growth firms in the United Kingdom to rely on venture capital is twice as high as their counterparts in the United States.

A large literature has identified the importance of lending relationships for small and new firms to compensate for their lack of credit history (Berger and Udell, 1998). This literature has identified that those firms accessing the resource of financial capital tend to exhibit higher growth rates (Audretsch, Keilbach and Lehmann, 2006).

Intellectual Property

There is also empirical evidence suggesting that access to intellectual property is associated with facilitating firm growth. In particular, the BERR (2008) study finds that high growth firms have a greater propensity to hold intellectual property and intangible assets, including trademarks, than do lower growth firms.

Locational Characteristics

The Research Hole

While there have been a number of studies explicitly focusing on those firm-specific characteristics that are conducive to high-growth firms, there is a paucity of research linking locational characteristics to high growth firms. In fact, there have not been very many studies undertaken focusing on the geography of firm growth, or relating firm growth more generally to characteristics specific to location. For example, of the hundreds of articles referred to in the exhaustive literature surveys on firm growth, published in the *Journal of Economic Literature* by Sutton (1997) and Caves (1998), virtually none of them ever consider the locational dimensions that might possibly influence firm growth. Similarly, while a large literature has emerged analyzing the geography of entrepreneurship, or more specifically linking startup activity to the characteristics of particular locations, very little exists linking locational characteristics to the geography of high-growth firms. Only few studies have been undertaken, such as Audretsch and Dohse (2004), which explicitly link the particular characteristics of a city or a region to the growth performance of firms.

The paucity of research concerned with the locational characteristics conducive to firm growth is striking, and reminiscent of the plea by Edwin Mansfield (1962, p. 1023) a half century ago for greater emphasis on identifying where firms come from, and how they survive and grow, “Because there have been so few econometric studies of the birth, growth and death of firms, we lack even crude answers to the following basic questions regarding the dynamic processes governing an industry’s structure. What

are the quantitative effects of various factors on the rates of entry and exit? How well can the growth of firms be represented by Gibrat's law of proportionate effect?"

As the Sutton (1997) and Caves (1998) literature reviews make clear, scholars resoundly responded to Mansfield's plea with a wave of studies uncovering not just the roles of firm entry and new-firm startups, but also what Audretsch (1995) has termed as the "post-entry performance of firms". The studies focusing on entrepreneurship did not neglect the spatial dimension. In fact, a large and robust literature has emerged focusing on the links between locational characteristics and entrepreneurial activity, most typically measured by regional startup rates or self-employment rates (Audretsch, Keilbach and Lehmann, 2005).

However, while a large literature concomitantly addressed the post-entry performance of firms by analyzing post-entry survival and growth, the geographic dimension of has been largely overlooked. This is a remarkable hole in the research in the literature, that begs for analysis.

Geographic Clusters

Still, much can be garnered from studies linking firm growth to one aspect related to locational characteristics. One key locational characteristic is the existence of an industry cluster at a particular location. According to Porter (1998), a concentration of industry activity in a geographic region affects firm performance because it introduces local competition which requires firms to innovate in order to remain competitive. Firms successful in innovating are more likely to survive while those unsuccessful are more likely to fail. Operating from a region with industry clustering, he argues, requires firms to be more innovative than might be true for firms operating from regions with less industry clustering.

Firms located in geographic regions with industry clustering have been found to exhibit higher rates of growth (Gilbert et al 2006). The growth opportunities for firms in such clusters are apparently considerable. For example, the spatial co-location of similar firms tends to enhance the demand for the firm's products. This enhanced demand facilitates the ability for new and smaller firms to leverage the brand name recognition of the region and cluster for the particular product. There is compelling empirical evidence showing that firms within a localized cluster are better able to harness this reputational advantage and leverage it into a higher growth performance (Gilbert et al 2006 and 2008).

Another way in which an industry cluster generates high growth firms is by providing greater access to both customers and prospective partners. Lechner and Dowling (2003) emphasize the growth opportunities generated by having partner firms located within close geographic proximity. In particular,

they highlight the key role that partners can contribute in enabling firms to meet their strategic objectives, especially in terms of innovative activity.

One reason why the growth performance of firms within a geographic cluster is better than those operating outside of a cluster is because of their access to knowledge spillovers. Knowledge spillovers are the direct or indirect transfer of knowledge from one party to another. As the byproduct of knowledge generated from the innovations activities of other firms in the same (Audretsch, 1995) or often times other industries (Jacobs, 1969), knowledge spillovers enhance firm growth because they represent knowledge that is new, even novel to the recipient firm. By accessing and absorbing knowledge spillovers, recipient firms can harness knowledge that is specific to a particular industry. For example, industry specific knowledge enables a firm to identify best practices in terms of technological and innovative activities that their counterparts are deploying, as well as the impact that such technological and innovative activity has on performance, including growth. Knowledge spillovers similarly enable firms to access state-of-the-art technological advances, as well as to access and compete in the most lucrative markets.

According to the knowledge spillover theory of entrepreneurship (Audretsch and Keilbach, 2005), entrepreneurial firms can serve as the conduit for the spill over of knowledge from the organization where that knowledge is created to a new firm where it is actually commercialized through innovative activity.

The impact of knowledge spillovers on the technological capabilities of firms operating within a cluster has been consistently found to be positive in most studies. Such enhanced technological capabilities can have a positive impact on firm growth. For example, Almeida (1996) provided compelling empirical evidence that foreign firms often located subsidiaries at a particular location in order to access the knowledge spillovers accruing from the industry cluster at that location. Geographic proximity is essential to accessing such knowledge spillovers, because as Audretsch and Feldman (1995) and Jaffe et al. (1993) show, the value of knowledge tends to decay as it diffuses across geographic space. Thus, firm location within close geographic proximity to firms engaged in similar types of economic activity may generate better access to knowledge spillovers than when the firm is located far away from such knowledge sources.

Almeida and Kogut (1999) show that the mobility of employees between firms is a key mechanism facilitating the spillover of knowledge across firms within a given region. Similarly, Lee, Miller, Hancock and Rowen (2000, p. 8) find that “collective learning, as tacit knowledge is conveyed and shared when professional employees move from one company to another...” ; “[t]he whole region gains as knowledge is spread throughout the community....” The implication of the spread of knowledge

within a geographic community is that even though knowledge spillovers can be accessed through the interaction of employees with their counterparts employed by other firms at conferences or more generally through social functions (Saxenian, 1990).

The transmission of such knowledge is enhanced by spatial proximity within the context of a cluster. In analyzing the networks embedded within the industrial clusters of Silicon Valley in California, Anna Lee Saxenian (1990, pp. 96-97) concludes that the communication between individuals facilitates the transmission of knowledge across agents, firms, and even industries, “It is not simply the concentration of skilled labor, suppliers and information that distinguish the region. A variety of regional institutions – including Stanford University, several trade associations and local business organizations, and a myriad of specialized consulting, market research, public relations and venture capital firms – provide technical, financial, and networking services which the region’s enterprises often cannot afford individually. These networks defy sectoral barriers: individuals move easily from semiconductor to disk drive firms or from computer to network makers. They move from established firms to startups (or vice versa) and even to market research or consulting firms, and from consulting firms back into startups. And they continue to meet at trade shows, industry conferences, and the scores of seminars, talks, and social activities organized by local business organizations and trade associations. In these forums, relationships are easily formed and maintained, technical and market information is exchanged, business contacts are established, and new enterprises are conceived... This decentralized and fluid environment also promotes the diffusion of intangible technological capabilities and understandings.”

Gilbert et al. (2008) examine the impact of being located within a cluster on growth for a sample of 127 newly founded firms. The new firm startups were located in a broad spectrum of geographic regions in the United States. Their empirical evidence suggests that firms exhibit a higher growth rate when they are located within a cluster than do their counterparts who do not benefit from location within a cluster.

In one of the few studies relating locational characteristics to the location of high-growth firms, Acs, Parsons and Tracy (2008) also find that high impact firms can be found in virtually every region, state, MSA and county in the United States. The share of all firms accounted for by high-impact firms in most geographic places varies between two to three percent.

They also consider the impact of being located within an agglomeration, in terms of population. In Table 2a the location of high-impact firms relative to the nearest metropolitan area is provided. Similarly, the location of low-impact firms is also shown in Table 2b to provide a benchmark.

Table 2a. High-Impact Firm Geographic Location						
Distance from Central Business District (Miles)	1994-1998		1998-2002		2002-2006	
	Number	Percent	Number	Percent	Number	Percent
In CBD	36,758	10.48	28,085	9.38	33,249	8.84
1-5	31,771	9.06	27,547	9.20	33,966	9.03
6-10	59,279	16.90	50,357	16.82	63,458	16.88
11-15	35,154	10.02	31,476	10.52	39,269	10.45
16-20	26,307	7.50	23,018	7.69	30,169	8.02
21-25	27,998	7.98	24,197	8.08	30,383	8.08
26-30	15,579	4.44	13,507	4.51	18,014	4.79
31-35	10,377	2.96	9,661	3.23	12,866	3.42
36-40	10,180	2.90	8,941	2.99	11,046	2.94
41 or more	14,432	4.12	15,004	5.01	19,515	5.19
Rural	82,840	23.62	67,549	22.57	84,008	22.35

Source: Corporate Research Board, American Corporate Statistical Library (2007), , taken from Acs, Parsons and Tracy (2008)

Table 2b. Low-Impact Firm Geographic Location						
Distance from Central Business District (Miles)	1994-1998		1998-2002		2002-2006	
	Number	Percent	Number	Percent	Number	Percent
In CBD	983,126	9.83	1,197,286	8.24	1,345,903	7.92
1-5	879,598	8.79	1,318,135	9.07	1,538,320	9.05
6-10	1,660,875	16.60	2,461,005	16.93	2,921,467	17.19
11-15	984,786	9.85	1,513,943	10.41	1,794,170	10.55
16-20	722,589	7.22	1,122,682	7.72	1,359,973	8.00
21-25	762,361	7.62	1,180,531	8.12	1,373,575	8.08
26-30	438,348	4.38	662,607	4.56	801,096	4.71
31-35	290,937	2.91	443,464	3.05	562,935	3.31
36-40	279,359	2.79	411,190	2.83	483,402	2.84
41 or more	434,649	4.35	714,863	4.92	877,225	5.16
Rural	2,566,109	25.65	3,513,281	24.16	3,941,502	23.19

Source: Corporate Research Board, American Corporate Statistical Library (2007), taken from Acs, Parsons and Tracy (2008)

There are four crucial points to be garnered from the analysis of the location of high-impact firms. The first point is that high-impact firms are not found exclusively in or near metropolitan areas or where there is an agglomeration. In fact, nearly one-quarter of the high-impact firms are found in rural areas outside of a metropolitan agglomeration.

The second point is that the attractiveness of metropolitan areas, or at least being located in the traditional business district has been decreasing over time. The share of high-impact firms located in the central business district declined over the entire twelve year period, from 10.5 percent to 8.8 percent.

The third point is that geography still plays an important role in the location of high-impact firms. In fact, the most prevalent location of high-impact firms is between six and fifteen miles from the central business district. Third, most high-impact firms are concentrated about 6 to 15 miles from the central business district. About 100,000 firms (close to one-third of the total) are in these concentric rings.

The fourth point is that there is no discernable difference in the geographic patterns between high-impact and low-impact firms.

Policy Implications

The extent to which market failure can be associated with high growth firms is influenced, to a great extent, on the underlying theoretical framework shaping the understanding and interpretation of the determinants of high-growth firms. According to the theoretical lens provided by the model of Gibrat's Law, high growth is a stochastic process and is not systematically related to any economic factors related to the firm, entrepreneur, region, or industry.

By contrast, implicit in the theoretical lens provided by the knowledge spillover theory of entrepreneurship is that high growth firms are associated with market failure. This is because of the key role that knowledge, new ideas, and innovation play in this framework. There are four types of market failure that may impede the emergence and development of high growth firms (Audretsch, Keilbach and Lehmann, 2005).

The first source of market failure involves network externalities. Network externalities occur when a firm's value is conditional on the geographic proximity of complementary firms, institutions and individuals. As Saxenian (1994) pointed out, local proximity is essential for accessing such complementary assets, which have the impact of enhancing the value of an entrepreneurial firm. Thus, this source of market failure involves the regional or geographic platform that has the potential to provide for interactions and networks. Contexts, or regions, with a paucity of entrepreneurial networks will be

burdened with a greater knowledge filter, or impediments to knowledge spillovers. The mandate for public policy is to facilitate such knowledge spillovers by enhancing network externalities.

The second source of market failure centers on knowledge externalities. Knowledge can serve as a public good, in that it is inherently non-excludable and non-exhaustible. Because local geographic proximity may be a requisite to accessing such knowledge spillovers, public policy has a direct role to play in promoting investments in knowledge that would provide the basis for starting a growing an entrepreneurial firm that develops into a high-growth firm. A paucity of knowledge in a region would reduce the likelihood of such entrepreneurial activity and ultimately the emergence of high-growth firms.

The third source of market failure involves the positive economic for potential high-growth firms when entrepreneurial firms based on innovative attempts fail. Both the high failure rates of new-firm startups and the even greater failure rates for entrepreneurial activity in knowledge-intensive and high-technology industries has been well documented (Caves, 1998; Audretsch, 1995). Such a high rate of failure is not surprising since knowledge activity has a greater degree of inherent uncertainty. However, the failure of such knowledge-based entrepreneurship does not imply that no value has been generated. Rather, ideas and new knowledge generated by failed firms and projects can be absorbed to the innovative activity fueling high-growth firms. In facilitating knowledge-based entrepreneurship, public policy also indirectly is helping fuel the development of high-growth firms.

The fourth source of market failure involves the demonstration effect emanating from knowledge-based entrepreneurial activity. This is a behavioral spillover and demonstrates to nascent entrepreneurs and other firms the viability of technology and knowledge-based entrepreneurial growth. This demonstration impact is likely to be greater in contexts or regions which have traditionally had a paucity of such knowledge-based entrepreneurship. The demonstration effect should induce subsequent knowledge-based entrepreneurship, from which high growth firms may emerge. Public policy can play a key role, particularly in regions and contexts with a paucity of such knowledge-based entrepreneurship, by facilitating such demonstration externalities.

The literature identifies a number of key policies to promote high growth firms. One important policy is to improve the business environment. A particular emphasis should be on mitigating impediments to growth, such as regulatory burdens and administrative red tape. In addition, disincentives to growth should be minimized. According to the Swedish Agency for Growth Policy Analysis (2010, p. 8), which carried out a thorough review of the impact of regulatory burdens on entrepreneurial growth, “There is strong evidence that a heavy regulatory burden negatively impacts new companies’ into the market and thereby contributes to reduced competitive pressure and less entrepreneurship.

Audretsch, Keilbach and Lehmann (2006) emphasize the importance of fostering entrepreneurship capital in promoting high growth companies. While the neoclassical tradition identified investment in *physical capital* as the driving factor of growth, the endogenous growth theory (Lucas 1988) put the emphasis on the process of the accumulation of knowledge, and hence the creation of *knowledge capital*. The concept of *social capital* (Putnam, 1993 and Coleman, 1988) can be considered as a further extension because it added a social component to those factors shaping economic growth and prosperity. According to Putnam (2000, p. 19),

“Whereas physical capital refers to physical objects and human capital refers to the properties of individuals, social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them. In that sense social capital is closely related to what some have called ‘civic virtue.’ The difference is that ‘social capital’ calls attention to the fact that civic virtue is most powerful when embedded in a sense network of reciprocal social relations. A society of many virtues but isolated individuals is not necessarily rich in social capital.”

Putnam also challenged the standard neoclassical growth model by arguing that social capital was also important in generating growth, “By analogy with notions of physical capital and human capital – tools and training that enhance individual productivity – social capital refers to features of social organization, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefits.”

A large and robust literature has emerged trying to link social capital to entrepreneurship (Aldrich and Martinez, 2010). According to this literature, entrepreneurial activity should be enhanced where investments in social capital are greater. However, while it was clear that Putnam was providing a link between social capital and economic welfare, this link did not directly involve entrepreneurship. The components of social capital Putnam emphasized the most included associational membership and public trust. While these may be essential for social and economic well being, it was not obvious that they involved entrepreneurship, per se.

Social capital and entrepreneurship capital are distinctive concepts that should not be confused. According to Putnam (2000, p. 19), “Social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them. In that sense social capital is closely related to what some have called ‘civic virtue.’ ...Social capital calls attention to the fact that civic virtue is most powerful when embedded in a sense network of reciprocal social relations...Social capital refers to features of social organization, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefits.”

Audretsch, Keilbach and Lehmann (2006) show that what has been called social capital in the entrepreneurship literature may actually be a more specific sub-component, which they refer to as constituting entrepreneurship capital. Entrepreneurship has typically been defined as an action, process, or activity. By entrepreneurship capital of an economy or a society Audretsch, Keilbach and Lehmann (2006) mean those institutions at the regional or local level that are conducive to entrepreneurial activity in general, but in the context of this paper, high growth firms. This involves a number of aspects such as social acceptance of entrepreneurial behavior but of course also individuals who are willing to deal with the risk of creating new firms and the activity of bankers and venture capital agents that are willing to share risks and benefits involved. Hence entrepreneurship capital reflects a number of different legal, institutional and social factors and forces. Taken together, these factors and forces constitute the entrepreneurship capital of an economy, which creates a capacity for entrepreneurial activity (Hofstede et. al., 2002) and may ultimately foster high growth entrepreneurship.

Audretsch, Keilbach and Lehmann (2006) distinguish entrepreneurship capital from social capital. Not all social capital may be conducive to entrepreneurial activity. Some types of social capital may be more focused on preserving the status quo and not necessarily directed at creating challenges to the status quo. By contrast, entrepreneurship capital could be considered to constitute one particular subset of social capital. While social capital may have various impacts on entrepreneurship, depending on the specific orientation, entrepreneurship capital, by its very definition, will have a positive impact on entrepreneurial activity. Thus, an important and crucial area for policy is the promotion of entrepreneurship capital.

Another important policy is to promote small- and medium-sized enterprises (SMEs). The promotion of SMEs can involve a number of different policy dimensions. One dimension involves the provision of favorable tax treatments to SMES but especially startups and micro enterprises OECD, 2010). As the knowledge spillover theory of entrepreneurship suggests, important new innovations that are typically overlooked or rejected by existing incumbent companies become commercialized when an entrepreneur starts a new company (Acs et al., 2009; Audretsch and Keilbach, 2007). A different dimension involves the promotion of investment activities in SMEs to foster their productivity. In addition, support can be provided to SMEs for accessing requisite consulting services, specialized technologies, and obtaining information and expertise. Finally, SME's may benefit from assistance in accessing international markets. This can help facilitate their rapid growth.

Another policy area to promote high growth firms is to support training and the enhancement of human capital. Such training can include the development of managerial skills to successfully manage rapidly growing firms.

The provision of finance is also a key area where policy can help to promote high-growth firms. As Gompers and Lerner (2010) point out, entrepreneurial firms often face constraints in terms of their ability to access finance. According to Gompers and Lerner (2010, p. 183), “Entrepreneurial firms that are characterized by significant intangible assets, expect years of negative earnings, and have uncertain prospects are unlikely to receive bank loans or other debt financing.” Public programs, such as the *Small Business Innovation Research* (SBIR) program in the United States can enable firms to cross what has been characterized as the “valley of death”, or the gap in funding between the startup phase and after the entrepreneurial firm has a proven record of high growth and can attract equity funding.

Conclusions

High growth firms have been consistently found in the literature to contribute a large share of the employment creation within OECD countries. The promotion of such high growth firms therefore plays a potentially important role in developing policies to reduce unemployment and foster economic growth.

In order to formulate policy to promote high growth firms, those factors that are conducive to generating such high growth firms need to be identified. This paper has reviewed the extant literature attempting to identify the determinants of high growth firms. The studies focusing on the determinants of high-growth firms are almost exclusively concerned with firm-specific determinants. Unfortunately there is a paucity of research concerned with locational determinants of high growth firms.

The studies concerned with firm-specific characteristics have identified three key characteristics that are linked to firm growth. These are firm size, firm age, and the industry within which the firm operates. Small firms, young and new firms, and firms in knowledge-based and technology based industries tend to exhibit higher rates of growth.

However, when it comes to high-growth firms, especially in terms of employment, the results are strikingly different. Instead, those high-growth firms accounting for most of the employment growth tend to be larger and more mature. In addition, they tend not to be concentrated within any particular type of industry or sector.

Reconciling the disparities between the studies focusing on growth and high-growth entrepreneurship is not obvious. One obvious reconciliation is that they involve different types of economic phenomena and therefore different types of firms. A different type of reconciliation is that most

of the high-growth studies have been undertaken since the beginning of the current century, and perhaps with contemporary globalization, the growth patterns of firms have changed. Still another reconciliation may be that the two findings are perhaps not so disparate. The high growth firm studies typically do not identify the actual source of that growth. To the extent that mergers and acquisitions are involved, it may be that the growth generated by larger and more mature firms is accounted for by acquisitions and mergers with smaller and younger firms.

Little is known about the geography of high growth firms. While they are not concentrated in any particular region or at any special location and tend to be diffused across geographic space, there is compelling evidence suggesting that they tend to benefit from being located in geographic clusters and agglomerations. Future research needs to explicitly focus on unraveling the particular geographic attributes that are most conducive to high growth firms.

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