

Market behavior and survival of entrepreneurial firms – how do rookies compete?

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Abstract

In the literatures on entrepreneurship and management, there is considerable discussion about the process through which firms gather a competitive advantage. Over time, firms collect resources that feed these advantages and fundamentally change the way they compete. This paper will propose hypotheses explaining differences between the way that firms with different resource stocks invest in an industry and ultimately, survive in that industry. Surprisingly, data from the competitive local exchange telecommunications industry does not show that large and small firms are substantially different from each other in their investment patterns. Instead, it suggests that entrepreneurial firms and established firms differ in their investment behavior, and it may be that the entrepreneurial firms are the ones who engage in real options reasoning. However, the data does suggest that entrepreneurial firms exit at a higher rate than established over time.

Although whole fields of management research advocate the importance of entrepreneurial firms for market development, there are few researchers examining the nature of entrepreneurial market entry. Other market behavior antecedents such as public and private firms (O'Brien, Folta, & Johnson, 2003; Pollock & Rindova, 2003), early market entrants versus late entrants (Lieberman & Montgomery, 1988, 1998; Shepherd, 1997), and the differences between large firms and small firms (Barringer & Bluedorn, 1999) have received considerable attention while the origin of the firm has not. Considering the breadth of research on this topic and the central location of history and path dependency in the resource based-view makes the oversight of entrepreneurial entry and investment all the more glaring (see Huyghebaert & De Gucht, 2004 for a notable exception).

The importance of history and the “path dependent” nature of strategy and performance are increasingly central to research on strategy (Phillips, 2002). Indeed, the resource-based view, a central theory in management research, argues that the resources which form the basis of competitive advantage, can only be developed through prolonged investment (Dierickx & Cool, 1989). However, although research suggests the importance of resource differences between individual firms, no study to date has tried to test for the existence of these differences by examining investment and performance differences between entrepreneurial (*de novo*) start-ups and firms who invest in a new industry while maintaining an investment in an existing industry (*de alio* start ups).

Often, when we discuss new market entrants, we are discussing entrepreneurial, *de novo* firms. However, very often new markets are populated not only with entrepreneurial firms but with entrants supported by firms established in other industries (*de alio*). Research suggests that a firm’s history, be it entrepreneurial or otherwise, should have an important effect on its strategy

and subsequent performance. Some research shows that entrepreneurial firms tend to persist in markets longer than other firms, despite poor relative performance (Gimeno, Folta, Cooper, & Woo, 1997). Other research suggests that entrepreneurial firms are quite likely to quickly fail after entering a new industry (Huyghebaert & De Gucht, 2004). In short, studies show that there should be differences between entrepreneurial firms and other kinds of firms. However, there has been no serious research, to date, that uses the existence of *de novo* and *de alio* market entrants to examine the influence of heterogeneous resource stocks on entry and investment behavior.

To remedy the paucity of research in this area, this study will hypothesize and examine the antecedents and consequences of strategic differences between firms in the competitive local exchange carrier industry (CLEC, pronounced “C-lek”) market in the United States. This was a very competitive industry following the passage of the Telecommunications Act of 1996, and the industry experienced massive amounts of new firm entry. Similar to the airline industry following deregulation, the CLEC entrants utilized diverse strategies derived from unique origins. We suggest that start-up entrants with no preexisting organization or links with established firms (*de novo firms*) should have different tendencies regarding market entry when compared to firms establishing a subsidiary in a new industry using existing organization and funding (*de alio firms*). The different resource stocks and structural differences inherent in these kinds of firms should lead to different strategies. Secondly we hypothesize that, in this hypercompetitive environment, existing theory implies that entrepreneurial firms should show different survival likelihoods from *de alio* entrants.

This study will begin by examining the market investment patterns of *de novo* and *de alio* firms in this market. Differences in resource stock and competitive position should lead to different investment patterns over time. The second set of hypotheses will suggest why these

resource differences should lead to different survival likelihoods in *de alio* entrants. The importance of industry context will be discussed before the methods and results.

Strategy Differences

Firm resources are the sources of competitive advantage (Wernerfelt, 1984). Barney (1991) describes a strategic resource as any profit-generating resource that is rare, difficult to imitate and valuable. According to Barney, resources include any specific physical assets a firm owns as well as the knowledge held by its employees. Firms gather resources in the strategic factor markets, and they maintain these assets through investment (Dierickx & Cool, 1989). Because capacity investments are lumpy (i.e. it is often not possible to buy exactly the amount of capacity required for a certain need), any particular investment is liable to leave a certain portion of capacity underutilized. Firms expand into new markets when their existing supply of excess resources matches the demands of these new markets (Barney, 1991; Penrose, 1959). Excess resources often lead to *de alio* entry.

How these resource stocks influence the behavior of firms is less clear. Standard theory suggests that the larger a firm is, the more it will try to use its resource stocks to expand into new markets. This finding, while supported in research (Markides & Williamson, 1996), does not provide managers or practitioners much prescriptive support. To truly understand the nature of resources, researchers must consider the firm's historical context as well as its resource endowment (Penrose, 1959; Wernerfelt, 1984). Because resources must be developed over time, research into resources ignores a fundamental component of developing competitive advantage when it ignores historical differences. However, we are making progress. Prior research has examined the market behavior of firms who are classified as "entrepreneurial" and those firms

who can be classified as “small.” The difference between a small firm and an entrepreneurial one is an often-confused distinction, but a very important one for the development of a theory of entrepreneurship (Dess et al., 2003).

Small firms are those with small market positions and a limited resource collection. Entrepreneurial firms, defined in this study consistent with Shane and Venkataraman (2000), are those with market positions in emerging markets and primarily concerned with exploiting new technologies and opportunities. We will look at entrepreneurial start-ups in the emerging CLEC industry to separate the behaviors of entrepreneurial firms from their established rivals. First, this study will develop the expected differences between the market positions of large and small firms. Then, it will suggest differences between firms based on their origin, be it entrepreneurial or established.

Size. The diverse behaviors that derive from different firm sizes are a very popular area in strategy research. Small firms can use their market position to expand in unpredictable directions, and these competitive moves may be unpublicized and disguised from their competitors (Chen & Hambrick, 1995). Large firms tend to ignore the strategic moves of small competitors if the large firms view the small firms as fringe competitors. In addition, industry publications do not tend to report the competitive actions of small competitors, so their price changes, market entries and other competitive tactics are costly for larger firms to observe. As a result, large firms may pursue strategies independent of their smaller competitors.

Dean, Brown, and Bamford (1998), found that whereas large firms take market action based on individual market conditions, small firms tend to take action that is unrelated to specific market conditions such as past industry profitability and excess capacity. Small firms are also less likely to consider the dynamics of competition in an industry or its level of

technological development before they enter. Their nimbleness and small exposure mean that they do not need to generate as large a revenue base to be successful. Large firms, on the other hand, tend to match their behaviors to industry conditions.

However, consistent with research on entry barriers, Dean et al. (1998) did find that smaller firms were less likely to enter markets that required large fixed costs. Small firms are less likely to enter an industry that requires a substantial initial investment, perhaps only because they are unable to gather the required funding. Although small firms tend to rely less on the formal decision making that characterizes the decision process of large firms, they are more hidebound to financial restrictions than their large competitors. This finding implies that small firms should be less willing to expand existing investments than larger firms.

Hypothesis 1: Small firms will expand less aggressively than other firms.

History. Regardless of a firm's size, its culture and history can have a critical influence on its behavior. Entrepreneurial entrants (*de novo*) and those entrants who have established positions in other industries (*de alio*) have different resource stocks and should display different strategies for market behavior. History shapes a firm's decision process. Research has highlighted three components of the market entry decision that are influenced by a firm's history.

The first way history shapes strategic outcomes is through organizational structure. Firms without complex structures or a history of complex decision making, such as entrepreneurial firms, are more likely to have centralized decision making. The decision-processes within the firm are more likely to be dominated by the individual entrepreneur, making the firm better able to respond to competitive moves by competitors. Although, entrepreneurial firms will tend to

lack the strategic foresight of firms with more diverse decisions making structures (Hambrick, Cho, & Chen, 1996).

In contrast, decision making in established firms requires a more consensus-based approach (Eisenhardt & Zbaracki, 1992). Even if the firm is operated autonomously, the good of the whole organization is often an important decision requirement in established firms, even for autonomously-operated profit-centers.

Secondly, firms led by entrepreneurs engage in different types of market action than their established competitors. Entrepreneurs are often viewed as aggressive and are likely to engage in risky behavior. Typically they may feel that they can control the outcomes of their actions through force of will alone, and these individual differences create differences in the structure of the organization and the market strategies of the firms. Entrepreneurial firms, if successful, initiate actions to which competitors must then respond, introduce new products and services quickly, and seek to compete vigorously (Barringer & Bluedorn, 1999).

Finally, in addition to different market actions, entrepreneurs face a fundamentally different risk/reward set than managers in established firms. *De alio* firm managers often have career prospects within the larger firm, if their venture succeeds (Yin & Zajac, 2004). These managers have an incentive to not ruin their future career, a task that might interfere with the task of making a new business work. In contrast, the entrepreneur is solely dependent on his or her success within the market for career progression; there is no corporate ladder, up or down. In short, the managers in these firms face a completely different risk profile in addition to operating within completely different cultures and decision structures. The structural, personal and incentive differences between *de novo* and *de alio* firms implies that entrepreneurial firms will engage in more expansion and risk taking than established firms.

Hypothesis 2: De novo firms will expand more aggressively than other firms.

Interactions. Thus, this study theoretically separates new entrants based on entrant size and history. In many ways, the forces that operate within the firms that fall into these classifications are countervailing. A firm with a large market presence will have an incentive to act aggressively irregardless of its origin – the fact that it entered the market with such a large investment signals its intention to continue expansion.

Entrepreneurial firms, on the hand, enter an industry to gather market share and create wealth for their founders. Although many entrepreneurial firms are small in the beginning, they seek ways to expand their market share and grow. Entrepreneurs prefer swift expansion, a force that is only enhanced by the competitive pressure exerted by larger firms. The smaller a *de novo* entrant is in comparison to its rivals, the faster it will need to expand in order to close the competitive gap with its competition. The third hypothesis suggests that small, entrepreneurial firms would, all else equal, prefer to use their nimbleness and entrepreneurialism to expand.

Hypothesis 3: Small, de novo firms will expand more aggressively than established entrants.

Whereas small, entrepreneurial firms will tend to expand as quickly as possible, established firms who enter a market with a small investment display a different motivation. For these firms, expanding and grabbing market share is not an important part of their business plan. Instead, these firms are displaying logic more consistent with the reasoning developed in real options reasoning (McGrath, Ferrier, & Mendelow, 2004). In a real options approach, a firm will enter a market and begin to gather information about the characteristics of the market. Only after the

structure of the market or the characteristics of the markets competitors change will the small, established entrant take an aggressive action to expand its market position.

We suggest that firms who enter using real options logic will persist in this strategy until some event changes the market characteristics enough for them to enter the market with a competitive action. In any given period, *de alio* firms who entered small should prefer to stay small until some major event prompts them to expand aggressively.

Hypothesis 4: Small, de alio entrants will expand less aggressively than other established entrants.

Performance Differences

The strategic differences that arise from a firm's size and history should result in performance heterogeneity. Authors investigating firm size have shown its importance to firms engaged in scale-competition. When engaged in scale-based competition, firms significantly smaller than competitors are more likely to fail (Dobrev & Carroll, 2003). Dobrev and Carroll (2003) carefully examined the importance of how closely a firm's strategy matches that of other firms, but they do not look at the importance of a firm's history when predicting its survival. A firm's history is one of the primary determinates of its resource endowment (Dierickx & Cool, 1989).

The RBV implies that established firms have more experience and resources to utilize on the variety of problems that arise in highly competitive industries. Resources drive competitive advantages and these advantages lead to superior performance. The connection between different firm resources and different performance levels is one of the few established findings surrounding the RBV. Maijor and Van Witteloostuijn (1996) showed the importance of

differentiated resources within the stable Dutch accounting industry. As the firms in their study aged, their resources developed and brought them more and more success as competitors had difficulty copying their resource base.

Dierickx and Cool (1989) observed that resource stocks require prolonged investment. Because resources take a long time to develop and are difficult to imitate, the application of these initial resource pools to a new industry should give established firms a competitive advantage compared to start-up firms. Changing market conditions make existing resources obsolete; *de novo* firms should be unable to replicate the established firm's diverse resource pool swiftly enough to meet market demands. (Cohen & Levinthal, 1990; Zollo & Winter, 2002). The RBV implies that a highly competitive, changing market with many new entrants should lead to a competitive advantage for established firms. In addition, entrepreneurial start-ups will be disadvantaged the more complex the environment, as creditors begin to worry about agency problems (Huyghebaert & De Gucht, 2004).

In summary, extant RBV theory suggests that *de alio* entrants will have a competitive advantage over *de novo* because the established entrants have large pools of managerial talent and physical resources to draw from. As the environment becomes more complex and unpredictable, do novo firms will be unable to develop enough resources to meet the market's needs and will fail.

Hypothesis 5: De alio will perform better than de novo firms in hypercompetitive industries.

Although there is a very strong case that established firms will outperform *de novo* entrants, there is an equally compelling argument that *de novo* firms, who are unencumbered by

resource stocks, should be the most successful in new markets. *De novo* firms are nimble and more capable of adjusting to changes in an industry's competitive dynamics (Hill & Rothaermel, 2003). The importance of changing and adapting to the specific characteristics of a market was most famously examined by Richard D'Aveni (1994; 1995), who coined the term "hypercompetition." In a hypercompetitive environment, the product life cycle is incredibly short, and firms compete through small competitive actions that are often unpredictable and difficult to adjust to. A firm who cannot quickly adjust to its rivals' competitive actions is doomed to fail.

In hypercompetition, firms must respond quickly to changes in the environment, and firms are required to make these changes more frequently. D'Aveni (1994) and other researchers (e.g. Ferrier, Smith, & Grimm, 1999; Ilinitch, D'Aveni, & Lewin, 1996) have noted the expansion of hypercompetition throughout the economy. Radical changes in markets make it difficult for established firms to compete. In order to survive, *de alio* entrants must have internal systems for recognizing and adjusting to market changes. The increased competition within hypercompetitive environments force firms to make quicker decisions. Because the number of competitors increases as an industry becomes hypercompetitive, the ability of managers to predict the industry structure declines and ultimately managers simply cannot predict the industry's direction at all. It becomes critical in these environments for the firm to make strategic decisions quickly (Eisenhardt, 1989). *De novo* firms can be expected to outperform established firms in hypercompetitive environments for three reasons.

First, *de novo* firms possess higher decision speed. Eisenhardt (1989) examined a competitive industry and found that the decision process alone drove the success and failure of individual firms. From her case studies, she showed that firms that take longer to make a

decision are often the ones that fail in extremely competitive markets. Other researchers have shown that when decision processes begin to focus solely on individual aspects of an organization and begin to ignore other relevant information from within the organization, the firm's performance begins to deteriorate (Langley, Mintzberg, Pitcher, Posada, & Saintmacary, 1995). The more information that managers in hypercompetitive industries try to incorporate in their decision, the better the firm will perform. Unfortunately, the presence of a complicated resource base will slow decision making because managers are forced to consider the complexity of the organization along with the complexity of the environment (Wally & Baum, 1994). Larger resource stocks imply more complex decision making and thus a slower process.

Secondly, *de novo* firms should out-perform because *de novo* firms have no history or resources. Research into managerial decision making suggests that past success in a related field can lead to bad decision making and failure in new environments (Audia, Locke, & Smith, 2000; Miller & Shamsie, 2001). The success that managers achieved in their native industry gives managers a limited perspective on the applicability of their former strategies on a related market (Leonard-Barton, 1992). Their success leads them to fall into the trap of using heuristics to make decisions (Levinthal & March, 1993). Heuristic decision making leads to simple analysis of complex problems leading managers to miss important aspects of decisions.

Finally, Miller (1993) described how success in an industry not only can lead to managerial heuristic decision making, but might also lead to an organizational structure that cannot deal with the complexities of different environments. The organization becomes structured around the department or division within the organization most responsible for past success. So, following success, it is not only the managers who become blind to new opportunities and threats but the entire organizational structure. "Simple" structures restrict the

information used by the top management team in deciding on new strategic directions, and it is only by reorganizing the firm and explicitly recognizing the importance of diverse management input that the firm succeeds. Langley *et al.* (1995) found that when firms evolve into simple structures, their survival is jeopardized. In short, the more complex the organization becomes the more difficult it becomes for managers to make effective decisions, a problem which ultimately threatens the firm's survival. As the environment becomes more turbulent, the resource stocks that once brought competitive advantage begin to narrow decision complexity and bring failure. Without appropriate procedures, the bureaucratic structure used to manage resources slows decision-making and causes failure in the market (Dean & Sharfman, 1996). Because of the complexity involved in making decisions and the likelihood of a simple structure within an established firm, established firms will be slower to respond to the market than *de novo* firms (Wally & Baum, 1994). *De alio* firms will tend to seek answers within while *de novo* firms will be more likely to seek new solutions in complex markets.

In short, in new markets, *de novo* firms are blessed with the ability to respond to market conditions much faster than their established rivals. In a hypercompetitive industry, high decision speed *is* competitive advantage because resources cannot be developed quickly enough to meet the demands of the market.

Although *de novo* firms do not have resources, it is exactly the ability to make a quick decision that imbues *de novo* firms with competitive advantage. The lack of history in *de novo* firms gives their managers a freedom of action that is not enjoyed by managers of established firms. Regardless of how autonomous individual units are within an established organization, the dominant logic of the organization and the necessity of some kind of financial and operational consistency between divisions decreases the decision speed and performance of established firms

compared with *de novo* rivals who have no such necessity. Within the context of a hypercompetitive market, considering strategic decision making research in concert with the RBV suggests:

Hypothesis 6: De novo firms will perform better than established firms in hypercompetitive industries.

We expect that, in contrast to the assumption that all firms undertake similar growth strategies in their industries; their strategies are actually more subtle. Some firms actually do not try to grow in their markets; instead, they simply try not to get behind. Still other firms try to lock in a comprehensive market position through aggressive investment while others intentionally try to avoid over expanding in preparation for an aggressive entry at a later point in time.

Industry context

To test these predictions, this study examined the CLEC industry in the U.S. When examining the competitive behaviors of *de novo* and *de alio* entrants, it is important to examine the industry conditions of the sample. The CLEC industry during the period under consideration was extraordinarily competitive with firms entering constantly throughout the period. Each entrant seemed to have a different entry strategy and their influence created significant turbulence during the study time. This study uses the changing industry conditions to control for the available resource stocks within the sample by assuming that the hypercompetition prevented *de novo* and *de alio* entrants from accumulating *new* resource stocks over the period.

The CLEC industry began with the development of the competitive access providers (CAPs), companies that provided high-speed telecommunications services in competition with Bell Operating Companies (BOCs)¹ – the so-called “baby bells” formed by the break-up of

AT&T – and other incumbent local exchange companies. In the late 1970s, the Port Authority of New York City developed the concept of a high-speed telecommunications network that would compete with New York Telephone, the New York BOC. In partnership with Merrill Lynch and Western Union, the Port Authority formed Teleport Communications Group (Teleport) as an entrepreneurial venture in 1983 and began signing up customers in 1984. Teleport offered satellite uplink services, access to long distance companies such as AT&T, and data networking. Customers could obtain such services from New York Telephone, but customers often viewed Teleport's technologies as distinctive from New York Telephone's network because Teleport provided features and reliability that New York Telephone could not match. Customers valued Teleport's reliability because the large Wall Street firms that Teleport targeted could lose millions of dollars if they lost their communications services (Tomlinson, 2000).

Teleport's success in New York led the company to expand into other cities and to the development of the CAP industry. Within four years, there were eleven CAPs operating in ten U.S. cities. By 1993, there were thirty CAPs. The industry attracted entrepreneurs, such as Teleport, as well as established firms operating in such far flung industries as cable television, electric utilities and long distance telephony. Early CAPs were largely specialized to serving commercial customers who were willing to pay a premium for reliable service and who wanted an alternative to incumbent local exchange companies for access to long distance companies, such as AT&T.²

Also in the early 1990s, Teleport's customers began asking it to handle all of their telecommunications needs, including local telephone service, a service traditionally provided by monopoly incumbent local exchange companies, such as New York Telephone (now Verizon). Teleport complied with these customers' requests and in 1994 became the first competitive local

exchange carrier (CLEC) by offering local telecommunications service in New York, Boston, and Chicago to compete with the incumbent BOCs serving those cities.³ This entry constituted a new form of telecommunications where the traditional local exchange company would not be handling all phone calls made within the local telephone calling area assigned in the AT&T divestiture in 1984 (Tomlinson, 2000).

By the mid 1990s, regulatory policy in the U.S. began catching up with the development of the CLEC business. Some states began lifting legal barriers to CLECs offering local telephone service and culminating when Congress passed the 1996 Telecommunications Act. Among other things, the act made competition in most all telecommunications markets a national policy.⁴

The act provides three methods of CLEC entry for local telephone service. Some CLECs use more than one method. Entrants can build their own facility-based network, lease portions of an incumbent local exchange company's network, or buy an incumbent's services and resell them.⁵ The 1996 Act requires incumbents and entrants to interconnect their networks to exchange calls. Exchanging calls between competing networks is necessary for customers of one company to be able to call customers of another company.

For CLECs, long distance companies, and incumbent local exchange companies, the essential trade-off in the act is that the BOCs and GTE were permitted to offer long distance service in exchange for giving up their local monopolies. GTE (which eventually merged with Bell Atlantic to become Verizon) was permitted to offer long distance immediately upon passage of the act. The BOC's could not provide long distance to customers in their traditional geographic markets until they satisfied certain preconditions, specifically, a 14-point checklist of

items that Congress determined were essential to opening the BOCs' local monopoly markets to competition.

The passage of the act, strong investor interest in the information and communications sectors, and excitement about a new, competitive telecommunications market instigated a rapid expansion of the CLEC industry. The sector grew to 96 firms in June of 1997, to 129 firms by December 1997, and to 212 firms by the end of 1998 (FCC, 2004). In the two years following the act, the industry had grown nearly eight fold even though certification by state and local governments could take upwards of six months. Despite this CLEC growth and the 14-point checklist, BOCs continued for some time to hold the dominant market positions in almost every major market throughout the country.

There is evidence that some incumbent local exchange companies made entry difficult for CLEC firms. The FCC levied with over \$423 million dollars in fines against BOCs and other incumbents for failure to comply with rules on market entry (McDermott, 2002). Regulatory policies, designed to encourage CLEC entry, also encouraged incumbents to protect their traditional markets. Even though the act established a national framework for local telecommunications competition, the act gave state public utility commissions the power to establish state-specific rules and prices for CLECs to interconnect with and use incumbents' facilities. Giving states this authority meant that rules were different from state to state, which caused CLECs to follow different entry strategies across states. Nevertheless, over time CLECs expanded into most major markets with a broad selection of new and established firms to try their hand at the CLEC industry. Among the established firms, cable, electric utility, and long distance firms all tried to enter. These firms were all experienced at developing telecommunications infrastructure and participating in at least some of the regulatory processes.

Certainly, different firms were better at some qualities of competition than others, but most firms had the qualities that lead to success in their prior markets. Most of these firms had experience in a regulated environment and were in industries that required the development of infrastructure before any revenue could be generated. For example, the established Western Union guided entrepreneurial Teleport through regulatory approval in New York while MCI, a long-time long distance company, developed CLEC business in numerous states. Networks could be expensive to establish because all new CLEC providers had to either build their own network or develop their own business arrangements with the incumbent local exchange company. In short, although there certainly were some differences between the established firms, this paper ignores the individual differences between the entering established firms because the important distinction between the firms is in the stock of resources that established firms brought to the market. The diversity of the entrants suggests that firms were actively searching for ways to apply their existing resources stocks to this industry.

The *de novo* firms in the CLEC industries derived from a diverse entrepreneurial base. Notable entrants came from such diverse industries as satellite communications and building construction (Level 3)⁶. They acquired capital from banks, the stock market, and venture capital firms. This market explosion coincided with the beginning of the stock market run-up of the large 1990's, and CLEC firms found capital easy to acquire (McDermott, 2002). In the early days of the industry, investors pressured the new firms to quickly expand their networks into multiple cities. There was massive need for market growth and massive capital to finance it.

The industry could easily be characterized as hypercompetitive because of the need for growth and aggressive market entry to succeed. Strategies between firms were incredibly different with some firms pursuing new markets and some competing in existing markets. The

entrants into the market could be characterized into two main groups, those who were derived from established firms and those who were fresh, entrepreneurial start-ups.

Sample

Data for this study was drawn from consultant reports generated by New Paradigm Research Group. These reports provide basic biographical information on the firms they cover as well as detailed operational and financial data. While it is possible that the reports we used to do not capture every firm within the industry, they do capture a large, representative sample of the various types of firms within this industry. Our reports cover every significant CLEC from small firms in Minnesota to major operators such as AT&T. We used data on 343 firms involved in the CLEC industry between 1988 and 2004. In total, this was 4186 potential firm-years of data.

Independent variables. This study is fundamentally interested with the behavior of entrepreneurial entrants compared to *de alio* entrants. However, the nature of an entrepreneurial firm is not easily defined. Although there are many different distinctions we could have used, we coded firms as either entrepreneurial or not by assigned a dichotomous variable that assumes a value of “1” if a firm is entrepreneurial and “0” otherwise. A firm in our study was classified as *de novo* if it was begun with no funding from an established industry competitor and its chief executive was also its founder. All firms in this sample were classified as either *de novo* or *de alio* entrants. If the company, although entrepreneurial for some portion of the analysis period, under went a management change, it was no longer considered an entrepreneurial company. Figure 1 displays a sample list of the firms in our sample classified as established or entrepreneurial.

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 Insert Figure 1 about here

Firm size, an important consideration in a networked industry such as this, was dealt with through the use of two different sets of variables. First, we created a dummy variable for small and large firms. A firm was characterized as small if it was in the first quartile with regards to the number of switches it possessed in any given year. Similarly, large firms existed in the upper quartile.

Our second set of size measures employed a continuous measure developed by Dobrev and Carroll (2003). The variable D was designed to capture the relative competitive pressure exerted by larger firms on the focal firm. For example, a firm who has fewer switches than a larger rival will be under stronger competitive pressure. As a firm becomes smaller compared to its rivals, this measure increases exponentially. Dobrev and Carroll (2003) chose the following functional form because it closely matches the traditional size economies curve, although any convex exponential curve will display similar results.

$$D_{it} = \sum_{S_{jt} > S_{it}} \left(\frac{S_{it} - S_{\min}}{S_{jt} - S_{\min}} \right)^{1/4}$$

Where:

- S represents the number of switches a firm possess in any given year
- S_{\min} is the smallest competitor in the market
- S_{jt} is a larger competitor j 's capacity in any given year t

We used this variable to measure the extent of the competitive pressure exerted on a firm by its larger rivals in two different dimensions. Because switches are the primary unit of

capacity in this industry, the first relationship examined was the pressure exerted by rivals who had more switches. The second competitive pressure examined was that exerted by firms who were in more markets. The measure does not simultaneously adjust for both the depth and breadth side of market entry, so we will analyze the two dimensions separately. This measure increases the smaller a firm becomes relative to its rivals, so its interpretation in the models below is opposite that of the dichotomous size variables.

Control Variables. There are many exogenous factors that contribute to the expansion of firms in this industry. Unfortunately, not all firms in this population are public and as such do not necessarily list all information that would immediately appear important. However, research in the entrepreneurial field suggests that controlling for only a few characteristics of the firm will enable us to reasonably isolate the variance we are interested in explaining.

Since our study uses the firm's size as an independent variable to explain behavior, we did not employ it as a control. However, it is important to point out that the size of a firm's network is closely related to its employee count as well. Additional research has shown the employee count of a firm highly related to the level of venture capital a firm receives, irrespective of its revenues (Davila, Foster, & Gupta, 2003). We have excluded these variables because they are endogenous the number of switches and the number of markets a firm enters, and are in effect controlling for the outside funding of a firm by controlling for its size.

We also controlled for the number of acquisitions a firm made during the prior year and whether or not the CEO changed in the prior year.

Analytical Methodology

Expansion decision.

Using the consulting reports as a source, we had 4186 potential firm-years of data. However, the panel was very unbalanced. Of these 4186 potential firm-years, we had data on 1242 firm-years. The unbalanced nature of the panel and the need to control for serial correlation within the data restricted our sample in the regression models to 637 firm-year data points. The reduction in the sample size comes from the need to have three years of data for each firm. All explanatory variables in the regressions described below is lagged one year and the analysis technique required at least two more years of data in order to estimate the autocorrelation.

Using the consulting reports analyzed for the survival analysis, we also looked at the tendency of firms to expand into new markets. Two dependent variables were used in this analysis. The first, market growth, signifies the tendency of the firm to expand into new markets as a percentage of its existing base. For instance, a firm that expanded into one new market beyond its existing base of two markets would show a larger increase in this market growth number than a firm who expanded into one new market from its base of 100. The second dependent variable is a simple count of new markets the firm enters in a period. This variable is a count, but it assumes a negative value when a firm retrenches. So, if a firm closed its operations in two markets in one year, the variable would take on a value of negative two.

Because these variables are not pure counts, they are treated as continuous in the analyses. Because we have unbalanced panel data with a continuous dependent variable, we employed a panel regression through the use of the “xtgls” procedure in STATA 8.0. This generalized least squares estimation for panel regression enables us to employ a very conservative assumption regarding the correlation matrix on the variables across the panel. Analyses were run assuming that each panel had a different variance (panel heteroskedasticity)

and that there was a one-period autoregressive structure in the data. Thus, we estimated an autocorrelation and a different variance parameter for each panel. Other methods of panel regression do not allow for explicitly assuming cross-sectional heteroskedasticity (cross-panel correlation is not possible because of our unbalanced panel) and unique autocorrelations for each panel. While we have not been as conservative as possible concerning the correlation structure of our panel, we have tried to control for the regression assumption violations inherent in our sample. Our procedure derives from Aitken (1935) and is adapted for use when the covariance structure is unknown (Green, 2000). To ensure that our assumptions were valid, we used Wooldridge's (2002) test of autocorrelation and a modified Wald test for panel (groupwise) heteroskedasticity (Baum, 2001; Green, 2000). Our tests indicated that we needed to control for autocorrelation ($F(1,139) = 49.35, p < 0.01$) and heteroskedasticity ($\chi^2(205) = 4.1 \times 10^{42}, < 0.001$).

Survival Analysis

As discussed over, the unbalanced panel nature of data restricted our final sampled. Of these 4186 potential firm-years, we had data on 1242 firm-years. Many firms did not enter the dataset until a few years after they entered the industry and most dropped out of the dataset a few years prior to bankruptcy. In order to fill in the blank observations for survival analysis, we assumed that firms started with zero physical assets. We then interpolated between the initial year and the first year of our observation to find the missing early results.

Similarly, the survival analysis sample depended on the particular failure event we analyzed. Because survival analysis depends critically on failure events, we needed to generate non-significant data for the firms that fell out of the consulting reports several years prior to

bankruptcy. These later data points were held constant at their last observed level for the period between falling out of the dataset and industry exit. This is consistent with other studies that used survival analysis, and enables us only to test our hypotheses regarding the origin of the firms in the sample. These calculations left us with 1562 firm-year observations. Because several firms in our data disappear in later years, the existence or failure of all firms in the dataset was verified using a search of Factiva and the world-wide web. Several firms were also contacted by telephone to verify their continued existence.

Dependent variable. As with many papers in management research, this paper will use performance as its dependent variable. However, because this industry experienced a massive wave of bankruptcies and because of anecdotal evidence of pervasive accounting fraud during this period, use of a continuous performance measure, such as accounting performance, introduces the possibility of comparing firms who reported revenues honestly against those who did not. Generally, accounting fraud is an unobservable event, and this study will avoid controlling for this event by using a dichotomous and observable variable as a performance measure.

Because all firms in this sample, whether *de alio* or *de novo*, are required to file documentation with the Federal Communications Commission regarding the businesses they gather revenue from, it is possible to determine when a firm decided to exit this industry. A firm who discontinues operations in the CLEC industry will be considered to have “failed” in this study. There were 63 failures in our dataset during the study period. In addition, 47 firms were acquired. Consistent with the work of Carroll and Hannan (2000), bankruptcies were treated as exits by the firm while mergers and acquisitions were not. Although mergers in this particular industry during this particular time probably represent the purchase of a distressed firm (and

consequently failure), the two kinds of exit are treated differently within this study because of their fundamentally different cause and effect. In addition, anecdotal evidence suggests that some firms were created with the expressed intent to sell their operations following market entry. If a firm was merged into a different firm, the merged firm's observations were treated as right-censored. As discussed earlier, it was necessary to input data for the last few years of a firm's existence if it stopped self-reporting in the consulting reports prior to its final failure. We introduce a third failure event in this study of a firm dropping out of the dataset to ensure consistency of our data.

To explore the survival likelihoods of competitive telecommunications firms, this study employed event history analysis (Strang & Tuma, 1993). Although event history analysis (also known as duration modeling) has only recently become popular with management researchers, many authors have found it to be a powerful and useful tool in explaining time dependent organizational outcomes (e.g. Barnett, 1990; Shen & Cannella, 2002; Westphal & Zajac, 1998). Using event history analysis allows this study to control for the covariates described above while modeling differences in the likelihood of failure between established and *de novo* firms. Although a dynamic logistic regression also describes relationships between survival and failure, within the context of this study's question, event history analysis is more appropriate because it explicitly considers the firm's duration in the analysis of the firm's probability of survival in the current period. Event history also allows the researcher to control for unobserved heterogeneity within a company (Stata, 2003). We conducted analysis in STATA 8.0 because this software program allows estimation of monotonic and nonmonotonic failure rate functions with time-varying covariates. STATA has the additional advantage of including information about firms

who did not fail within the sample period in the parameter estimates by considering their cumulative survival time within the sample period (Stata, 2003).

The results of an event history analysis are critically dependent on the researcher's assumptions regarding the distribution of the "event" over time. Different assumptions about the failure rate imply different assumptions about the error terms in the model, implying that an incorrect specification can lead to incorrect inference from the model. As such, describing the failure function is one of the most difficult decisions in event history analysis. This study employed a log-normal distribution assumption, as our dataset was not full enough to employ the more conservative generalized gamma distribution. The lognormal has acceptable properties for this model, and the Akaike information criterion indicated this was the best distribution for these data (Akaike, 1974; Stata, 2003). The functional forms of the model are:

$$S(t) = 1 - \Phi\left(\frac{\ln t - \mu}{\sigma}\right)$$

$$f(t) = \frac{1}{t\sigma\sqrt{2\pi}} e^{\left(\frac{-1^2}{2\sigma^2} \left(\frac{\ln t - \mu}{\sigma}\right)^2\right)}$$

Where:

- $\Phi(\cdot)$ is the standardized normal distribution
- $\mu_j = x_j\beta$ where β is the parameter of interest
- The standard deviation of σ is an ancillary parameter which is estimated from the data

Because this model does not explicitly deal with time-varying covariates, STATA maximizes the full maximum likelihood function. The full model uses observations that failed in any time t to

estimate $f(t)$ conditional on the entry time, t_0 . Any observation that did not fail contributes to $S(t)$ also conditional on the entry time. As a result, all available data will be used to estimate the parameters of interest, β .

The log-likelihood function has the form:

$$\ln L = \sum_{j=1}^U \ln \left(\prod_{i=1}^N f(t_{0j}, \theta | t_{0j}) \right) + \sum_{j=U+1}^N \ln \left(\prod_{i=1}^N f(t_{0j}, \theta | t_{0j}) \right)$$

Results

Table 1 contains correlations and descriptive statistics for the data. These correlations are adjusted for firm and year effects to represent the fixed-effect adjusted relationship between individual data points. It is important to note from this table that market growth, the percentage expansion in a year, and the physical count of new markets are closely related, although not highly enough to indicate that, they are measuring the same construct (Schwab, 1980).

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 Insert Table 1 and 2 about here

Table 2 displays the results of analysis on the market expansion decision. Model 1 through 4 display the market growth regressions, and 5 through 8 display the new markets per year regressions. To examine Hypothesis 1, we looked at Model 5 through 8, as the percent of market growth is the most relevant for explaining propensity for expansion. These figures suggest that small firms are more inclined to expand regardless of their origin, a finding which contradicts Hypothesis 1. Model 5 & 6 show that small firms grow between 6% and 16% more than an average competitor in any year. These findings are also supported by the positive and significant coefficients on the competitive pressure measures in Model 7 & 8.

Models 1 through 4 show that small firms do not enter as many markets, but this is to be expected considering their small base. We did not examine Models 1 through 4 for this analysis because we feel that a firm is more aggressive when it expands at 20% over a 3 market base than 2% over a 200 market base. Therefore, we conclude that Hypothesis 1 is not supported. Small firms, depending how they are measured, appear more aggressive than rivals.

Results from Model 1, 4 and 6 suggest that entrepreneurial firms are more likely to expand their market positions. This coefficient is not significant in other models. So we offer mixed support for Hypothesis 2, entrepreneurial firms tend to display differences in their expansion decision from established firms in this industry. Regardless of size, entrepreneurial firms seem more likely to expand their market position, but many of our models failed to achieve significant results.

Hypothesis 3, the notion that small entrepreneurial firms expand more aggressively is not supported. We find that small, *de novo* firms in this industry are more likely expand in Model 2 while Model 4 suggests small, entrepreneurial firms are less likely to expand. Similarly, Model 6 and 8 also show that small, entrepreneurial firms engage in less aggressive market growth than established rivals. Similarly, entrepreneurial firms are less responsive to competitive pressure from other competitors. Small, entrepreneurial firms expand into new markets more aggressively, but they tend to be more reserved when embarking on aggressive strategies to expand their market base.

Hypothesis 4 suggested that small, established firms are using real options logic. Because established firms are the base case in our model, we examined the coefficient for small firms in Model 2, 4, 6, and 8 to find their expansion likelihood. Model 2 suggests that small firms are not as likely to enter new markets, a finding that is consistent with their small market base.

However, model 4, 6, and 8 all suggest that *de alio* firms are actually quite likely to expand their industry presence or capacity. This is not consistent with the logic of real options reasoning which suggests firms who enter a market with a small market presence do so in order to learn about the market rather than capture market share. These results suggest that while a portion of *de alio* entrants enter the market with an intent to stay small and learn from other firms in the industry, most tend to expand aggressively following their entry. Thus, we find do not support for the real options logic of Hypothesis 4, although it is qualified by model 2.

We also find support for the findings of Dean et al (1998). The largest 25% of the firms in the industry are more likely to expand their investment in any given year. Large firms tend to expand much more aggressively than an average firm in this sample does. On average, large firms enter 5 more markets per year with large, entrepreneurial firms entering as many as 3.9 more markets per year than average firms. In addition large firms grow 3% more than other firms while large, *de alio* entrants tend to expand as much as 5% more than an average firm. Large firms tend to enter more markets and expand more.

In addition, a change in firm leadership in the year prior to the focal year tended to increase firm expansion. Similarly, acquiring a rival firm, necessarily, increased its expansion.

Firms expanded more rapidly the further they got behind their rivals. If competitors had more capacity than a competitor in year t-1, the firm is more likely to expand into new markets the following year. Entrepreneurial firms are less responsive to these pressures than established firms, they tend to be less aggressive. Similarly, firms enter comparably more markets than competitors the further behind their largest competitors they became.

Table 3 details the survival analyses. Listed in this table are the three failure events of interest in this study: dropping out of the dataset, exiting the industry, and acquisition. Because

competitive pressure is highly related, within firms, to the dichotomous variables indicating firm size, they are not included in the models together. Table 3 shows that our dichotomous variables for size are unrelated to a firm leaving the industry. Interestingly, entrepreneurial firms are more likely to stop reporting on their activities to the independent consulting firm, are more likely to exit the industry and are more likely to be acquired. However, their propensity for all these actions is largely unrelated with their size or their market presence. Entrepreneurial firms seem to be seeking a way to exit the industry. The consistent differences between entrepreneurial entrants and established entrants suggest strong support for hypothesis 5 but not for hypothesis 6. Entrepreneurial firms, despite their lack of bureaucratic structure in a highly competitive industry, tend to fail more frequently regardless of their market position, investment, or size.

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Insert Table 3 about here
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Discussion

This study has tried to use a firm's resource stocks to control for its behavior in new markets. The existence of heterogeneous resource stocks implies heterogeneity in firm market behavior. This study separated firms entering a highly competitive industry into different groups based on their resource stocks and relative investment size. The results presented do not support most of the current thinking in market investment and entrepreneurial market behavior.

First, entrepreneurial firms in this industry tended to exit sooner than their established rivals. Other research into entrepreneurial firms suggests that the *de novo* firms entering a new industry, such as our sample, should have in fact exited *after* established firms (Gimeno et al., 1997). Current research suggests that entrepreneurial firms should persist in new markets longer

than established rivals. Our findings are consistent with Huyghebaert and Van de Gucht (2004) who found that entrepreneurial firms are susceptible to competitive actions of incumbents. Our findings further that result by showing *de alio* entrants are less prone to exit markets than the *de novo* firms which Huyghebaert and Van de Gucht (2004) focused on.

Secondly, this study found some support for other research suggesting that entrepreneurial firms were more aggressive in their market positioning than established rivals. *De novo* firms tended to enter more new markets and expand their market base aggressively. Interestingly, smaller *de novo* firms showed a tendency to expand *less* aggressively than those firms with an average investment level. Consistent with Dean et al. (Dean et al., 1998), we found that large, established firms tended to expand most aggressively.

To more clearly define the differences that emerge from firm size, we used two different measures of size. The first, a dichotomous measure, was consistent with other research and the second, a continuous measure, is a more recent development. We found that small firms do tend to expand less aggressively, but their tendency to expand increases the greater the distance between them and competitors. These measures also showed that the *de novo* firms in our sample were much less inclined to respond to “competitive pressure” than established firms, suggesting a different logic for these two kinds of firms.

Finally, we found some support for real options logic. Established, small entrants tended to not enter new markets as rapidly as other firms. However, small, *de novo* entrants tended to expand at the slowest rate, although this might be caused by a lack of capital funding. However, the fact that large as well as small entrepreneurial entrants were less likely to expand suggests that firms these firms may have been engaged in strategic behavior.

We suggest that established firms entered this industry with the intent of not falling behind the other established firms who entered this industry. The CLEC market became a place for established firms to simply stake another foothold and hold off competitors rather than an opportunity for growth. Because they were not as concerned with earning profits in the new market, they were not as concerned with using a real options approach to learn about the market. Instead, the CLEC industry became a place where the need to learn about the industry was obviated by the need to maintain competitive parity. As a result, firm investments in this new industry could be viewed as a necessary extension to investments in the current industry. The need to maintain parity may also imply that established firms stayed in this industry longer than entrepreneurial firms did because they were even less concerned about profitability than entrepreneurial firms. The question for real options research becomes, “When is an entry an option?”

Entrepreneurial firms in this industry seemed to be the ones most closely following a “wait and see” or real options logic, and they were also the ones who ultimately failed. We suggest that markets characterized by intense competition and radical innovation are not markets where firms CAN use real options. By definition, there is nothing in these markets to learn about, because what is learned becomes quickly outdated. Instead, firms who enter these markets thrust ahead without considerable investigation simply because their competitors are doing the same. Real options strategies and organizational learning were replaced with a herd mentality and the need to maintain competitive positioning. Intense competitive pressure lead firms to expand their market position at levels consistent with attempting to avoid falling behind rivals.

These expansions did nothing to secure the ultimate survival of the firms, as their survival could ultimately be predicted based on their origin. The historical resource stocks with which firms entered this dynamic industry predicted their survival more accurately than the stocks they accumulated within the industry, a finding in support of the resource based view.

The most obvious critique of this paper is the period it uses for analysis. This particular period of the telecommunications industry was an intensely competitive time. The stock market was exploding, venture capitalists were investing heavily, and equipment manufacturers were offering major subsidies to market entrants. It may have been that exuberance of the time created a situation where existing theories should no longer apply, although no research to date suggests otherwise. Similarly, the investment climate of the time was an outlier, or it is not a relevant context for analysis. This paper disagrees and shows that existing theories did seem to breakdown during this period. The *de alio* firms persisted while their more nimble *de novo* rivals failed. Size and investment had no influence on the likelihood of survival, although relative size had a complex effect on investment behavior, suggesting that the strategy individual firms pursued had little to do with their ultimate survival. This paper suggests an important point of view for entrepreneurship research and market behavior research in general.

Conclusion

This study has looked for differences in the competitive behaviors and performance of entrepreneurial entrants versus established entrants in a highly competitive industry that sprang up overnight following a congressional action. The results of the study suggest that firms do not always follow a coordinated plan of investment, such as those predicted by real options logic. Instead, many firms simply enter, invest, and hope for the best. Using an ample dataset of the

industry at the time, this study has shown differences between the investment patterns of entrepreneurial firms and established firms as well as resulting performance differences. Our findings suggest that different resources stocks do result in behavior and performance heterogeneity, just not in the way that current theory suggests.

Table 1 – Summary statistics and correlations

	Mean	Std. Dev.	Correlations											
			1	2	3	4	5	6	7	8	9	10		
1 Acquisition	0.027	0.148												
2 CEO Change	0.053	0.178	0.017											
3 Competitive pressure from capacity	4.117	7.304	-0.008	0.074										
4 Competitive pressure from market presence	0.004	0.026	-0.028	0.150*	0.195*									
5 Entrepreneurial Firm	0.516	0.103	-0.048	-0.578*	-0.043	-0.229*								
6 Large Firm	0.105	0.219	0.134*	0.209*	0.020	0.212*	-0.027							
7 Large, Entrepreneurial firm	0.049	0.161	0.123*	-0.062	0.025	0.099*	0.107*	0.731*						
8 Market Growth	0.385	1.735	0.193*	0.065	0.232*	0.139*	-0.174*	0.170*	0.029					
9 New markets per year	1.353	8.194	0.204*	0.046	0.083*	0.229*	-0.175*	0.130*	0.036	0.725*				
10 Small Firm	0.047	0.155	0.000	0.076*	0.487*	0.000	0.000	0.000	0.000	0.066	0.016			
11 Small, Entrepreneurial firm	0.018	0.095	0.000	0.000	0.318*	0.000	0.000	0.000	0.000	0.036	0.012	0.612*		

- * : p<0.05

Table 2 – Analysis of expansion actions

	New markets per year				Market Growth			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Entrepreneurial Firm	0.530*	0.272	0.040	0.212†	0.143	0.208**	-0.018	-0.003
	(0.224)	(0.326)	(0.098)	(0.128)	(0.095)	(0.1)	(0.024)	(0.027)
Small Firm	-0.630**	-2.158**			0.060*	0.162*		
	(0.168)	(0.441)			(0.025)	(0.063)		
Large Firm	5.025**	3.990**			0.034	0.073		
	(0.524)	(0.893)			(0.07)	(0.167)		
Small, Entrepreneurial		3.211**				-0.177*		
		(0.567)				(0.075)		
Large, Entrepreneurial		0.953				-0.083		
		(1.082)				(0.173)		
Competitive pressure from capacity			0.006†	0.002			0.021**	0.017**
			(0.003)	(0.006)			(0.003)	(0.003)
Competitive pressure from market presence			41.051**	66.217**			8.245**	8.485**
			(4.404)	(13.407)			(0.563)	(1.011)
Entrepreneurial * Competitive pressure from capacity				0.042**				0.011†
				(0.009)				(0.006)
Entrepreneurial * Competitive pressure from market presence				-72.038**				-9.492**
				(13.567)				(1.587)
CEO Change	2.740**	2.883**	0.422	0.288	1.120**	1.180**	0.335**	0.316**
	(0.245)	(0.092)	(0.282)	(0.177)	(0.15)	(0.148)	(0.069)	(0.074)
Aquired a firm	1.909†	1.435	13.665**	14.636**	0.494**	0.572**	1.493**	1.489**
	(1.136)	(1.066)	(1.016)	(0.695)	(0.166)	(0.152)	(0.432)	(0.434)
Constant	0.672**	1.189**	0.187**	0.207**	0.291**	0.278**	0.049**	0.051**
	(0.142)	(0.17)	(0.049)	(0.037)	(0.061)	(0.059)	(0.008)	(0.01)
LL	-2408.090	-2478.304	-971.397	-995.670	-1240.96	-1243.741	-522.9254	-511.4078
X2	270.390**	1124.850**	286.310**	667.980**	97.270**	155.500**	420.390**	175.850**
Firms	196	196	164	164	196	196	164	164
N	937	937	637	637	937	937	637	637

• Standard Errors listed in parathesis below coefficient
p<0.01 ***
p<0.05 **
p<0.1 †

Table 3 – Failure analysis

Failure Event:	Dropped out of dataset		Exited Industry		Acquisition	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Entrepreneurial Firm	-0.17 † (0.092)	-0.12 (0.168)	-0.398 ** (0.194)	-0.461 ** (0.211)	-0.39 ** (0.194)	-0.458 ** (0.211)
Large Firm	-0.117 (0.1)		0.711 (0.433)		0.703 (0.434)	
Small Firm	-0.085 (0.118)		0.364 (0.411)		0.361 (0.412)	
Small, Entrepreneurial firm	-0.137 (0.164)		3.378 (212.893)		3.380 (214.496)	
Employee count		-0.04 (0.018)	0.007 (0.027)	0.019 (0.029)	0.006 (0.027)	0.018 (0.029)
Censored observation	-0.320 (0.301)	-0.31 (0.596)	0.325 (0.52)	0.337 (0.56)		
CEO Change	-0.135 (0.14)	-0.23 (0.359)	3.307 (195.497)	3.989 (938.886)	3.313 (197.186)	3.987 (945.893)
Competitive pressure from capacity		-0.01 *** (0.003)		0.005 (0.007)		0.005 (0.007)
Competitive pressure from market presence		0.99 (2.637)		145.362 (9243.376)		145.307 (9416.525)
Constant		2.33 (0.275)	2.912 *** (0.276)	2.868 (0.288)	2.933 (0.277)	2.881 (0.289)
/ln_sig	-0.680 *** (0.059)	-0.32 *** (0.11)	-0.170 (0.143)	-0.130 (0.157)	-0.167 (0.144)	-0.129 (0.157)
sigma	0.506 (0.03)	0.73 (0.08)	0.844 (0.121)	0.878 (0.138)	0.846 (0.122)	0.879 (0.138)
Log likelihood	-164.6175	-95.26871	-102.68	-95.34	-102.88093	-95.536338
Firm Years	951	465	1528	1038	1528	1038
X2	14.71 **	13.87 **	18.92 ***	11.47 †	18.51 ***	11.09 **

*** p<.01

- Standard Error are listed in parentheses below the coefficients

Figure 1
Sample firms divided as entrepreneurial or established

Entrepreneurial	Established
Convergent Communications, Inc. Eagle Communications Intermedia Communications of Florida Novus Telecom RCN Corporation XO Communications	Bay Ring Communications Focal Communications Sigeom Teligent, LLC Texas.net Time Warner Communications

References Cited

- Aitken, A. C. 1935. On Least Squares and Linear Combinations of Observations. *Proceedings of the Royal Statistical Society*, 55: 42-48.
- Audia, P. G., Locke, E. A., & Smith, K. G. 2000. The Paradox of Success: An Archival and a Laboratory Study of Strategic Persistence Following Radical Environmental Change. *Academy of Management Journal*, 43(5): 837-853.
- Barney, J. 1991. Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1): 99-120.
- Barringer, B. R. & Bluedorn, A. C. 1999. The Relationship between Corporate Entrepreneurship and Strategic Management. *Strategic Management Journal*, 20(5): 421-444.
- Baum, C. 2001. Residual Diagnostics. *The Stata Journal*, 1(1): 101-104.
- Chen, M. J. & Hambrick, D. C. 1995. Speed, Stealth, and Selective Attack - How Small Firms Differ from Large Firms in Competitive Behavior. *Academy of Management Journal*, 38(2): 453-482.
- Cohen, W. M. & Levinthal, D. A. 1990. Absorptive-Capacity - a New Perspective on Learning and Innovation. *Administrative Science Quarterly*, 35(1): 128-152.
- D'Aveni, R. A. 1994. *Hypercompetition : Managing the Dynamics of Strategic Maneuvering*. New York: The Free Press.
- D'Aveni, R. A. 1995. *Hypercompetitive Rivalries : Competing in Highly Dynamic Environments*. New York: Free Press.
- Dean, J. W. & Sharfman, M. P. 1996. Does Decision Process Matter? A Study of Strategic Decision Making Effectiveness. *Academy of Management Journal*, 39(2): 368-396.
- Dean, T. J., Brown, R. L., & Bamford, C. E. 1998. Differences in Large and Small Firm Responses to Environmental Context: Strategic Implications from a Comparative Analysis of Business Formations. *Strategic Management Journal*, 19(8): 709-728.
- Dierickx, I. & Cool, K. 1989. Asset Stock Accumulation and Sustainability of Competitive Advantage. *Management Science*, 35(12): 1504-1511.
- Dobrev, S. D. & Carroll, G. R. 2003. Size (and Competition) among Organizations: Modeling Scale-Based Selection among Automobile Producers in Four Major Countries, 1885-1981. *Strategic Management Journal*, 24(6): 541-558.

- Eisenhardt, K. M. 1989. Making Fast Strategic Decisions in High-Velocity Environments. *Academy of Management Journal*, 32(3): 543-576.
- Eisenhardt, K. M. & Zbaracki, M. J. 1992. Strategic Decision-Making. *Strategic Management Journal*, 13: 17-37.
- FCC. 2004. Local Telephone Competition and Broadband Deployment.
- Ferrier, W. J., Smith, K. G., & Grimm, C. M. 1999. The Role of Competitive Action in Market Share Erosion and Industry Dethronement: A Study of Industry Leaders and Challengers. *Academy of Management Journal*, 42(4): 372-388.
- Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. 1997. Survival of the Fittest? Entrepreneurial Human Capital and the Persistence of Underperforming Firms. *Administrative Science Quarterly*, 42(4): 750-783.
- Green, W. H. 2000. *Econometric Analysis*. Upper Saddle River, New Jersey: Prentice Hall.
- Hambrick, D. C., Cho, T. S., & Chen, M. J. 1996. The Influence of Top Management Team Heterogeneity on Firms' Competitive Moves. *Administrative Science Quarterly*, 41(4): 659-684.
- Hill, C. W. L. & Rothaermel, F. T. 2003. The Performance of Incumbent Firms in the Face of Radical Technological Innovation. *Academy of Management Review*, 28(2): 257-274.
- Huyghebaert, N. & De Gucht, L. M. V. 2004. Incumbent Strategic Behavior in Financial Markets and the Exit of Entrepreneurial Start-Ups. *Strategic Management Journal*, 25(7): 669-688.
- Ilinitch, A. Y., DAveni, R. A., & Lewin, A. Y. 1996. New Organizational Forms and Strategies for Managing in Hypercompetitive Environments. *Organization Science*, 7(3): 211-220.
- Langley, A., Mintzberg, H., Pitcher, P., Posada, E., & Saintmacary, J. 1995. Opening up Decision-Making - the View from the Black Stool. *Organization Science*, 6(3): 260-279.
- Leonard-Barton, D. 1992. Core Capabilities and Core Rigidities - a Paradox in Managing New Product Development. *Strategic Management Journal*, 13: 111-125.
- Levinthal, D. A. & March, J. G. 1993. The Myopia of Learning. *Strategic Management Journal*, 14: 95-112.
- Lieberman, M. B. & Montgomery, D. B. 1988. First-Mover Advantages. *Strategic Management Journal*, 9: 41-58.
- Lieberman, M. B. & Montgomery, D. B. 1998. First-Mover (Dis)Advantages: Retrospective and Link with the Resource-Based View. *Strategic Management Journal*, 19(12): 1111-1125.

- Maijor, S. & Van Witteloostuijn, A. 1996. An Empirical Test of the Resource-Based Theory: Strategic Regulation in the Dutch Audit Industry. *Strategic Management Journal*, 17(7): 549-569.
- Markides, C. C. & Williamson, P. J. 1996. Corporate Diversification and Organizational Structure: A Resource-Based View. *Academy of Management Journal*, 39(2): 340-367.
- McDermott, M. F. 2002. *Clec : Telecom Act 1996 : An Insider's Look at the Rise and Fall of Local Exchange Competition*. Rockport, ME: Penobscot Press.
- Miller, D. 1993. The Architecture of Simplicity. *Academy of Management Review*, 18(1): 116-138.
- Miller, D. & Shamsie, J. 2001. Learning across the Life Cycle: Experimentation and Performance among the Hollywood Studio Heads. *Strategic Management Journal*, 22(8): 725-745.
- O'Brien, J. P., Folta, T. B., & Johnson, D. R. 2003. A Real Options Perspective on Entrepreneurial Entry in the Face of Uncertainty. *Managerial and Decision Economics*, 24(8): 515-533.
- Penrose, E. T. 1959. *The Theory of the Growth of the Firm*. New York,: Wiley.
- Phillips, D. J. 2002. A Genealogical Approach to Organizational Life or Chances: The Parent-Progeny Transfer among Silicon Valley Law Firms, 1946-1996. *Administrative Science Quarterly*, 47(3): 474-506.
- Pollock, T. G. & Rindova, V. P. 2003. Media Legitimation Effects in the Market for Initial Public Offerings. *Academy of Management Journal*, 46(5): 631-642.
- Schwab, D. P. 1980. Construct Validity in Organizational Behavior. In L. L. Cummings & B. M. Staw (Eds.), *Research in Organizational Behavior*, Vol. 2: 3-43. Greenwich, CT: JAI Press.
- Shepherd, D. A. 1997. New Venture Entry Strategy: To Pioneer or Not to Pioneer. Paper presented at the Academy of Management Proceedings.
- Strang, D. & Tuma, N. B. 1993. Spatial and Temporal Heterogeneity in-Diffusion. *American Journal of Sociology*, 99(3): 614-639.
- Wally, S. & Baum, J. R. 1994. Personal and Structural Determinants of the Pace of Strategic Decision-Making. *Academy of Management Journal*, 37(4): 932-956.
- Wernerfelt, B. 1984. A Resource-Based View of the Firm. *Strategic Management Journal*, 5(2): 171-180.

Wooldridge, J. M. 2002. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, Mass.: MIT Press.

Yin, X. L. & Zajac, E. J. 2004. The Strategy/Governance Structure Fit Relationship: Theory and Evidence in Franchising Arrangements. *Strategic Management Journal*, 25(4): 365-383.

Zollo, M. & Winter, S. G. 2002. Deliberate Learning and the Evolution of Dynamic Capabilities. *Organization Science*, 13(3): 339-351.

¹ BOCs are also called Regional Bell Operating Companies (RBOCs) when referring to the regional holding company. For example, the RBOC NYNEX owned the BOC New York Telephone.

² Early in the development of the industry, this was known as “bypass” because the customers were able to bypass the monopoly local exchange companies. Regulations by the FCC and state public utility commissions kept the local exchange companies prices for long distance access well above the economic cost of providing the access (Jamison, 1995).

³ In this context “switched” means that customers can dial one another by dialing (or pressing) telephone numbers.

⁴ See Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (codified as amended in scattered sections of 15, 18, & 47 U.S.C.).

⁵ Traditional voice telecommunications networks consist of lines and switches. Lines either connect customers to the network or connect switches in the network. Switches route calls between customers. Switches are of two types: local switches (also called central offices) that customers connect to and that switch local calls, and long distance switches (also called tandem or toll offices) that route long distance calls from one local switch to another.

⁶ Level 3 began as a subsidiary of Peter Kiewit Sons, a 114-year-old construction, mining, information services, and communications company.