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Rethinking Growth: Differential Impact of Large Absolute vs Relative Expansion in De Novo Ventures

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Abstract

By considering how in many industries an augmentation in production capacity is necessary to bring about significant growth in sales or eventual profit, this study adds an important footnote to prevailing theories of firm survival and competitiveness in strategic management. First, it distinguishes between attempts for new ventures to grow their production from the outcome of their expansions. Second, this study delineates the role of large absolute versus relative growths in production and their differential implications on young, de novo ventures: the former being conducive to firm survival while the latter being detrimental to it. This prediction is supported empirically by ten years of archival data from the intra-European passenger airline industry. In particular, many young firms would survive longer over the medium- to long-term if their relative growth is achieved at a lower but more sustainable rate.

Key Words

De novo ventures; expansion; growth strategy; survival; mortality; new firms.

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1. Introduction

High growth is indisputably revered by businesses and academics alike, and is the prime objective of many businesses – including new ventures (Birch, 1981; Barringer et al., 2005).

Behind the associated glamour and hopes, however, have practitioners and scholars considered that many attempts to increase production to accommodate a high-growth trajectory can in fact increase the odds of firm failure? Penrose (1959) was among the first scholars to theorize such a possibility. Prior to this study, however, there has not been an empirical test for Penrose's predictions, possibly because of the near-impossibility of large firms growing without engaging in mergers or acquisitions that confound the organic rate of growth. Nevertheless, some scholars describe qualitatively how rapid growth is in fact difficult to achieve (Hambrick and Crozier, 1985; Nicholls-Nixon, 2005) and, when accomplished, is not necessarily associated with profit (Markman and Gartner, 2002; Davidsson et al., 2009). While much debate on high growth centers on its relationship (or lack thereof) with profitability (Roper, 1999; Davidsson et al., 2009), there is little work examining the role of large expansions in a short period of time, i.e., 'growth spurts', that may presage what is considered high growth by practitioners and academics. Through the context of young, de novo ventures, the empirical part of this study represents a first attempt in indirectly test Penrose's (1959) hypothesis.

Existing theoretical perspectives can lead to conflicting predictions on these rapid expansions, and there is no agreement on the most appropriate measure of growth, or the implications of different growth measures. Even less is understood on the impact of such growth spurts for young, de novo ventures that lack the scale and entrenched market positions of their incumbent competitors. For instance, the industry-analytical framework of Porter (1980) explains the sustainability of profits through direct and indirect competition, and views profit differences between competitors as a result of different market positioning and business volume. The resource-based view (e.g., Wernerfelt, 1984; Barney, 1997) is concerned with how firms possess valuable bundles of resources and are able to produce products of value to customers. In other words, growth, if achieved, is a natural by-product of the strategy or resource bundles of a firm vis-à-vis its competitors. The issue of whether investment in production capacity would necessarily result in commensurate growth and therefore higher survival odds is bypassed in studies based on these frameworks. For small, young de novo ventures, investments in production capacity in anticipation of a large increase in customer response can otherwise be committed to bring about more explorative discoveries, and therefore warrant more attention that the literature has devoted so far.

In this study, large expansions of production capacity and the associated commitment are viewed as important decisions for firms, and their impact on firm survival is analyzed. There is a range of possible antecedents for companies to undertake large expansions in production capacity, from a risk-taking behavior in view of poor prior performance (Singh, 1986; Palmer and Wiseman, 1999) to a mimetic aspiration (Schneider, 1992: 1053), or from sheer overconfidence (Hayward et al., 2003) to blind-sightedness (Zajac and Bazerman, 1991). In spite of the wide range of underlying reasons, the antecedents leading firms to expand rapidly generally are not based on the economics of the industry, nor do they take into account the constraints of the focal firm on growth. As a result, it is understandable that whenever a firm decides to undertake large expansions in production (to be implemented in a relatively short time frame) – whatever the underlying reasons, the constraints of the focal firm and the different unfavorable scenarios of such expansions are likely not well considered, and hence negative performance can result.

In this study, large expansions in production – necessitating sizable commitments in augmenting production capacity – in both absolute and relative terms are analyzed, and these are shown to have differential impacts on survival, thus producing a more nuanced perspective on growth. This study focuses on organic growth, producing more of the same or similar products, and only includes few instances of acquisitions of firms in the same industry with similar assets. This approach provides a clinical perspective on firm growth.

This study makes two important contributions to the literature of firm growth, and especially new venture growth. First, it distinguishes between attempts for new ventures to grow their production from the outcome of their expansions. Previous studies often take sales – a result of a particular expansion decision – as synonymous to *attempts* of growth, and may therefore lead to misguided recommendations for business managers. Second, this study delineates the role of large relative versus absolute growths in production, and their implications for young, de novo ventures. Past studies (e.g., Delmar et al., 2003; Acs et al., 2008) have focused on describing how there can be alternate definitions of high growths, but stop short of discussing their different implications on new ventures. As industry-specific characteristics have been shown to significantly impact the choices of growth versus profitability in firms (Sexton, Pricer and Nenide, 2000; Markman and Gartner, 2002), this study empirically investigates the differential impact spurts of relative and absolute growth on a population of de novo new ventures in a single industry – allowing many industry-specific competitive characteristics to act as effective controls. The findings shows that while short growth spurts in terms of large absolute production increases are conducive to venture survival, growth spurts in terms of large relative production increases are not. This resolves some conflicting theoretical predictions as well as empirical findings on the impact of growth on new ventures, and argues for a more careful treatment of the concept of growth.

This study focuses on the growth of young, de novo ventures because although the pursuit of economic opportunity in the form of new ventures arguably represents the most fundamental and well-written entrepreneurial behavior (Shane and Venkataraman, 2000), few new ventures actually survive (Cabral and Mata, 2003). As described by Geroski (1991: 436), 'small-scale, de novo entry seems to be relatively common in most industries, but these small-scale, de novo ventures generally have a rather short life expectancy'. About 40% of all new business are thought to fail within their first year of operation (Timmons, 1990), over 50% fail within 18 months (Quinn and Cameron, 1983), and even fewer survive till their fourth or fifth anniversary (Mata and Portugal, 1994).

The empirical data for this study is drawn from a 10-year (1986-2005) experience of organic expansions in *de novo* ventures in the intra-European airline industry – one where planned production information is available via archival records and industry participants have relatively comparable access to the underlying technologies of aircraft and computer reservation systems. All de novo ventures are tracked since their inaugural market entry until either they exit the industry or the end of the study period.

2. Literature review and theory development

Many studies have been conducted on high growth with the implicit assumption that it is a desirable goal for young firms and entrepreneurs alike (Acs et al., 2008; Kim, 2008). Some scholars even credit young, high-growing firms for their important contribution to employment generation (e.g., Birch, 1981). A close examination on these studies highlights several issues that are easily confounded on the topic of growth, especially for young, new ventures. These are discussed in this section. Studies in finance over the decades have concluded how acquisitions of or mergers with companies in strategically unrelated industries do not result in long-term economic benefits for the growing firms. This study focuses on organic growth, producing more of the same or similar products, and only includes few instances of acquisitions of firms in the same industry with similar assets.

Moreover, this study focuses on de novo ventures in their early years of development. The dearth of mergers and acquisition events in these firms provides a more clinical treatment of growth than other settings. As explained below, the ventures included in the empirical analysis had on average only 2.7 years of operation. This contrasts with significantly older firms being included in the surveys of previous studies (e.g., a mean of 9.5 years in Markman and Gartner, 2002; many firms older than 9 years in Davidsson et al., 2009).

Above all, the empirical setting of this study is a set of large and rapid expansions undertaken by young ventures, in a mature, slow-growing industry. The fact that these firms chose to undertake large, rapid expansions instead of slower expansions over longer horizons may point to an underlying reason that portends poor performance: poor prior performance (Singh, 1986; Palmer and Wiseman, 1999), mimetic aspiration to peers (Schneider, 1992: 1053), or strategic blind-sightedness (Zajac and Bazerman, 1991). While it may difficult to determine which of these reasons is the underlying cause in hindsight, the fact that a large, rapid expansion is chosen means that one of these reasons may be an underlying cause, and therefore negative performance may ensue after the expansion.

On the contrary, a healthy, resourceful firm wishing to capitalize on rising demand and grow rapidly always has an alternative to do so in slower, more constrained manner. Thus the choice of larger expansion to be implemented in a shorter amount of time may be a result of sheer overconfidence in the management (Hayward et al., 2003), which may foreshadow negative performance. We acknowledge that it is almost impossible to determine in hindsight the precise underlying motivation for large, rapid expansions. Nevertheless, the concrete investment and commitment to expand production can be unambiguously observed, that itself may portend poor performance.[1]

2.1 Large Expansion as Strategic Decision versus Sales or Profit as Outcome

Arguably the most important issue on the topic of growth is the measurement of growth itself. Most studies of organizational growth, or on growing firms, rely on sales revenue as a base measure of growth (see review by Gilbert et al., 2006), and many cite its use because profit measures are not available (e.g. Autio, et al., 2000). In very few studies are other base measures of growth used: employee size in Audretsch (1995) and Caves (1998), the number of production outlets in Shane (1996), or a combination involving the value of fixed equipment assets in Audia and Greve (2008).

It is important to recognize that these different base measures of growth can in fact be cast under two categories. Growth measures based on employee size, the number of production units or a combination involving the value of fixed assets represent a commitment by firms to increase their production capacity to accommodate anticipated growth in production and hopefully sales and profit. As a result, these base measures represent an important executive decision for these firms to increase their capacity of production, either for similar products or in search of novel ones. In the event of increases in production outlets (where there are often considerable sunk costs involved) and in fixed equipment assets (where the cost of a buy-and-sell transaction can be significant), the focal firms must think hard on their anticipated level of growth in sales in not just the immediate horizon but also the medium- to long-term. While these commitments may in turn represent a response to increasing sales and that these commitments

[1] In fact, even poorly performing firms have been documented under some circumstances to choose a small expansion over large expansion (Desai, 2008).

can be reversed to some extent in the future, they do represent a definitive level of confidence the focal firms have in their future performance. Ghemawat (1991) interprets strategy through its manifestation in a few largely irreversible investment commitments that must be made under uncertainty. In this view, the rate at which production is to be expanded is an integral part of the growth strategy of de novo new ventures. Moreover, large expansions in production capacity can either significantly lower unit costs of production or extend customer reach for the focal firms, and therefore have strategic implications.

Investing in large production expansion, via increases in employees, production units or fixed equipment, does not guarantee a corresponding increase in sales. Scholars have noted how expansion in production capacity is inherently a risky decision because the future responses of customers are uncertain (March and Shapira 1987, Palmer and Wiseman 1999, Ruefli *et al* 1999). Even investments in equipment upgrades or employee additions can backfire if environmental changes depress the market served (Audia and Greve, 2006). In other words, while the decision to augment production capacity can be implemented within reasonable control by a focal firm, customers' responses to it are much harder to predict.

In this regard, sales revenue – which measures how customers respond to firms' production, and profits – which measure how the focal firms fare in their capacity for future investments, should be treated as measures of outcome to firms' expansion decisions. Consistent with this line of thought, Shane (1996) noted that at least in the franchising industry, capacity growth has been found to be a more robust measure of growth than growth in sales, assets or employment. More importantly, investments in production capacity in industries with non-trivial marginal costs of production necessarily predate large increases in sales (but the latter does not always follow the former). This is in line with the finding in Davidsson et al. (2009) that low-sales-growth but high-profitability firms likely become high-sales-growth firms in subsequent periods, possibly as they invest their retained profits to augment production capacity.

As a large growth in sales in many industries is necessarily preceded by investment in augmenting production capacity, and customer response is generally difficult to predict, it is understandable how growth in sales does not in general correspond to growth in profitability. This is consistent with the findings of previous studies: some show a positive correlation between the two (Cox, Camp and Ensley, 2002; Cowling, 2004), some show no correlations (Shuman and Seeger, 1986) or only weakly positive ones (Markman and Gartner, 2002), while others show negative correlations (Manu, 1993; Steffens et al., 2009; Davidsson et al., 2009). In particular, Davidsson et al. (2009) qualified by stressing how high-sales-growth but low-profitability firms likely exhibit lower sales growth in subsequent periods. This is likely because the high growth in sales revenue represents on average only a mediocre scenario of customer response in view of the significant sunk investment in augmenting production capacity.

The prevailing discussion emphasizes how investment in significantly increasing production capacity may or may not be met with commensurate increases in customer response. In most industries, production capacity is not always fully utilized, and hence marginal increases in production may not entail significant investment from the focal firm. Large increases in production, however, especially those implemented in short periods of time, are expected to impact firm performance via fixed investments in increasing production capacity.

2.2 Large Absolute versus Relative Expansion in Production

The preceding discussion suggests that large increases in production, especially those implemented rapidly, likely have some significant impact on firm performance. A valid question is how such production expansions can be determined, i.e., what constitutes a ‘large’ expansion.

Scholars studying firm growth have relied on both relative and absolute measures of growth, more often on the former than on the latter. For instance, Davidsson et al. (2009) and Steffens et al. (2009) both use a relative measure based on annual sales growth for established firms: change in sales from the previous year to the current year as a percent over the sales from the previous year. Likewise, Zahra (1993), and Peters and Brush (1996) compare the relative growth in employment in new ventures.

For small, young firms, a large increase in the absolute size of production is most likely simultaneously a large increase in relative terms. Indeed, in the empirical analysis of growth in franchises (Shane, 1996) and 'hyper'-growing firms (Markman and Gartner, 2002), the use of either absolute or relative measures was reported to have produced qualitatively similar results. Eisenhardt and Schoonhoven (1990), and Bamford et al. (2004) argue that since any firms at founding has zero sales, the absolute sales in a subsequent year also represents the absolute amount of total growth in sales for that particular firm since founding.

Obviously, an emphasis on large absolute increases in production favors large firms, while an emphasis on large relative increases in production (i.e., in percentages) favors small firms. In view of the different growth measures, Delmar et al. (2003) used multiple criteria to define high-growth firms from a large Swedish sample of firms: including absolute growth in employment, relative growth in employment, absolute growth in sales and relative growth in sales. Delmar et al. (2003) found that, contrary to conventional wisdom but consistent with the preceding discussion, relative growth in sales is generally not correlated to other growth measures. The simultaneous use of multiple growth criteria in that study acknowledges how firms can be classified as exhibiting 'high-growth' by being in the top 10% in any one of these criteria. However, Delmar et al. (2003) stop short of explaining how different growth patterns may impact firm performance in the longer term. Based on several theoretical perspectives from economics and strategic management, we argue that a large, rapid expansion in production has different impact on the survival of de novo ventures, depending on whether it is in absolute or relative terms.

2.2.1 Factors Favoring Large, Rapid Expansion in Production

The reverence to growth, particularly a large, rapid expansion in production, by academics and businesses alike can be traced to at least two reasons linking such expansions to enhanced firm performance – scale economies and external legitimacy. First, de novo industry entrants by definition are usually only a small fraction in size of their established incumbents. The presence of scale economies alone puts de novo entrants at a severe disadvantage through their high unit cost of production. A large scale-up in production would therefore reduce the gap in unit cost differentials between a de novo venture and its established incumbents, rendering the former more cost-competitive. Such cost competitiveness is important in firm performance in industries with significant economies of scale or density, like banks and airlines (e.g., Gillen et al., 1990). Meanwhile, a large increase in production allows step-changes in the unit cost of providing complementary services like marketing and sales-support (Hariharan and Brush, 1999).

Second, institutional theorists note that the liabilities of newness (Singh et al., 1986) and adolescence (Brüderl and Schüssler, 1990) attend de novo new ventures as they by definition have not established the social acceptance, or legitimacy, required for various stakeholders to confer trust and resources. A ramp-up in production signals reasonably acceptable prior progress, and confidence in the future – in turn helping new ventures quickly gain legitimacy (Zimmerman and Zeitz, 2002; Delmar and Shane, 2004).

Note that both the scale economies and external legitimacy arguments favor large, rapid expansions in production. However, there is no specific reason why, assuming that the expansion is well executed, a large relative expansion in production may be favored over a large absolute expansion in production, or vice versa, other than for the fact that for a given absolute magnitude of expansion, the relative impact on a smaller firm would be greater than that of a larger firm.

2.2.2 Factors Impeding Large, Rapid Expansion in Production

In the discussion so far, uncertainty in customer response is a main driver for firms not to undertake large increases in production. Certainly an unexpectedly favorable customer response would exert a larger, positive impact a small firm than a larger firm, and the reverse would be true for an unexpectedly unfavorable response. Customer response depends on the macroeconomic climate and competitors' actions, and it is difficult to predict a priori.

Even if customer response is within expectations (and entrepreneurs themselves can be overconfident on their expectations, as per Hayward et al., 2006), there is a managerial reason why large, rapid expansion in production can worsen firm performance. This reason, concerning how an expanding firm requires increased systemization in its managerial oversight, was first proposed in the seminal work of Penrose (1959).

Penrose (1959) reasoned that in a growing firm, some of the pre-existing management team must be allocated to hiring and training newcomers. This means that any intended expansion of managerial capacity necessarily takes away time and resources that would otherwise be used on existing production. As a result, 'if a firm deliberately or inadvertently expands its organization more rapidly than the individuals in the expanding organization can obtain the experience with each other and with the firm that is necessary for the effective operation of the group, the efficiency of the firm will suffer' (Penrose, 1959: 47).

While no empirical test on Penrose's (1959) hypothesis has been reported to date, recent scholars have provided anecdotal evidence in support of her argument. Hambrick and Crozier (1985) highlight numerous challenges to a growing venture, while Fombrun and Wally (1989) document how small firms experience managerial stresses and strains during surges in growth. Nicholls-Nixon (2005) describes how these stresses and strains related to growth spurts translate into performance problems.

Penrose's (1959) argument is that there exists an optimal rate of expansion for firms, and that this limit is determined by how fast new managerial recruits can be trained up to speed. By definition, each manager oversees an aspect, or a portion, of the entire business of a firm. In many industries, this translates into one manager overseeing at least several operational staff members (in-house or out-sourced to third-parties) and their associated processes. If a large growth relative to the previous period is undertaken, each manager on average is expected to shoulder a much larger size of the business than before. This is where Penrose's (1959) notion of the growth constraint of managerial capacity comes into play: a large increase over a short time frame in the size of business to be supervised by the existing managers (perhaps in association with new, still inexperienced recruits) potentially translates into lower managerial effectiveness.

For small, young firms, a large absolute increase in capacity from one period to another is usually also a large relative growth. The former (a large absolute increase in capacity) would not lead to the latter (relative growth) only if the firm size is already large prior to the expansion. If the large absolute increase in expansion is not a result of mergers or acquisitions, the focal firm would require more operational staff members to be recruited to complete pre-determined procedures. Since the relative increase in production would be small in this situation, each manager would on average be required to increase its oversight scope only marginally. As a result, the Penrosean constraint may not be reached, i.e., firm performance may not be appreciably affected in a negative manner.

If the large absolute increase in expansion results from mergers or acquisitions, managers from the constituent firms should be able to carry on their duties until their relevant portion of operations are integrated. In the likely event that some duplicate operations are eliminated, these managers may de facto see a reduction in their responsibilities. The Penrosean constraint would also not be reached in this case. In other words, the Penrosean constraint, together with its performance-detrimental effects, applies only in a large relative expansion in production undertaken in a short period of time (given sufficiently long horizons, all managerial recruits can be properly trained and brought up to speed).

2.3 Summarizing Hypotheses

The preceding discussion shows how the main factors linking large (and rapid) production expansions to positive changes in performance – scale economies and external legitimacy – apply for both large absolute and relative increases in production. However, Penrose's (1959) argument shows that large relative increases in production more likely lead to performance deteriorations than large absolute increases in production (that are not simultaneously large relative increases). While the exact magnitude of these conflicting influences is not known, it is reasonable to conjecture that large absolute increases in production more likely lead to performance improvement than large relative increases in production. It is also likely that large relative increases in production lead to performance deteriorations.

For large, diversified incumbents, performance deteriorations in one subsidiary may be cross-subsidized through performance improvements in another subsidiary. This study focuses on young, de novo ventures – ones that are too young to be owners of several businesses in different industries. Moreover, the focus on de novo ventures, instead of de alio ventures – spin-outs or diversifying entrants of established incumbents of the same industry, allows for a more clinical setting to study growth than a multi-industry setting. By definition, de novo ventures lack prior industry experience and deep pockets from a parent company in the same industry. As a result, poor performance can easily push these ventures to the brink of failure. As explained below, the high cost of regulatory approval in setting up a new airline means that casual entries into and exits out of the industry are unlikely to be compensated by a short duration of operation. As such, firm exits are generally a reliable indicator of poor performance (more details on this in the next section). In view of the high mortality of de novo ventures in general, a sustained survival is itself an important performance benchmark.

In practice, de novo ventures in their early years are virtually all privately held. Information on the financial performance of these firms is therefore difficult to systematically and accurately collect. In contrast, firm exit or survival is far easier to observe. As a result, the following hypotheses are phrased using firm failure as an indication of poor performance:

H1: De novo ventures undertaking large, rapid absolute increases in their production result in lower odds of firm failure than other de novo ventures.

H2: De novo ventures undertaking large, rapid relative increases in their production result in higher odds of firm failure than other de novo ventures.

3. Data and Methodology

In fact, past studies have shown that industry characteristics have an important effect on firm-growth rates and profitability (McDougall et al., 1994; Sexton, Pricer and Nenide, 2000; Markman and Gartner, 2002). As a result, this study draws on data from one industry – that of the intra-European passenger air transport – for empirical data. Both established incumbents and new airline ventures have reasonably equitable access to airplane and information system technologies that are integral to the industry, and their lack of direct involvement in these areas means that technological innovation affects all players relatively equally. As explained below, this industry has detailed archival records on production (in terms of scheduled flight operations, frequency and seat capacity) as well as on specific geographical markets. Furthermore, this setting is part of a recent trend of single-industry studies that aim to maximize fine-grained insights on firm-level strategies while minimizing recollection and survivorship biases (Cassar and Craig, 2009), including Bamford et al. (2004), and Fuentelsaz and Gómez (2006).

3.1 Intra-European Passenger Airline Industry

The liberalization and integration of the air transport industry within the EU stimulated many de novo new ventures. In 1993 the European Commission granted full pricing freedom within the EU, and permitted any airline of an EU member country to fly any intra-EU country route from 1997[2] (without requiring the carrier to start or end the route in its home country). These measures applied to all economic decisions (pricing, capacity, routing, service levels, marketing programs, etc.), but airlines are still subject to the accreditation of airworthiness, aircraft operations, maintenance and safety-related standards. It is this high cost of regulatory approval in setting up a new airline venture that makes casual entries into and exits out of the industry prohibitively expensive if they are to be supported by only a short duration of actual operation, even though an operating venture can freely enter into and exit from individual city-pair markets.

[2] At several primary airports, the extent of entry is constrained by the airport capacity. In this analysis, we consider all primary and secondary airports serving a major city as one geographical point.

The economics of this industry is typical of capital-intensive, mature industries such as heavy manufacturing and banking, in that there is a natural incentive for firms to rapidly grow in size and operational intensity to achieve lower unit costs (Gillen *et al*., 1990), even though the 'product' is perishable. In terms of operating cost, the marginal cost of flying (fuel, flight crew, etc.) is significant compared with the ownership cost of an airplane (depreciation, interest, etc.), so airlines must still be fairly confident of the expected customer response for any expanded operation to be economically viable. A recent study of U.S. airline costs (there is no equivalent data for European airlines) shows that the marginal cost of flying constitutes from about two-thirds (for low-cost carriers) to three-quarters (for traditional network carriers) of the total cost of operating airplanes in 2005 (Tsoukalas, Belobaba and Swelbar, 2008). This portion of marginal cost is significantly lower for the trucking industry, with the driver salary and fuel constituting between a half and two-thirds of the cost of operating trucks in Canada and the U.S. in 2005 (Transport Canada 2005).

Many new airline ventures in Europe do not facilitate flight connections. This, combined with the relatively diffused route networks in Europe (unlike concentrated hub-and-spoke route networks in the US) permits a reasonable link between the provision of non-stop services and the underlying demand of the air travel market (Reynolds-Feighan, 2001).[3]

The Official Airline Guide (OAG) is the authoritative compilation of airline schedules worldwide. Data from the OAG, corroborated by reports in industry publications such as Air Transport World and Airline Business, were used in the analysis. The schedules of operating flights[4] within the EU were collected quarterly (third week of February, May, August and November to avoid major holidays) from 1996 through 2005 (a total of 10 years). The year of

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[3] Some new airlines explicitly require passengers to retrieve their baggage after every flight segment.
[4] These excludes 'code-share' agreements under which one carrier buys and sells seats on the flights operated by another carrier. Also, helicopter operations were excluded.

1996 included new ventures founded to take advantage of the liberalization the following year, while 2005 preceded the subsequent run-up in oil prices. Initially, there were few entries in the intra-European airline industry, but the entry activity accelerated from 1997.

In this study, de novo ventures are defined as firms with no predecessor operating in the industry, and that they market, operate and are financed independently of other such entities. These ventures exhibit substantial differences in resource endowments, strategic choice and performance from established incumbents or even diversifying entrants (Shrader and Simon, 1997; Hariharan and Brush, 1999; Ganco and Agarwal, 2009). Those firms that were created from a merged, divested, restructured entity were eliminated. Regional ‘feeder airlines’ that rely heavily on their mainline carrier for marketing (e.g. “code-sharing”) were also removed from the data, as were airlines primarily focusing on the inter-continental (not intra-European) market.

The OAG records provide detailed information on the production schedule of each airline venture, including the geographical markets entered or withdrawn throughout the years. They do not contain passenger statistics or biographical profiles of the management. There is also no information on how many airplanes an airline venture operates. Large absolute increases in scheduled flight activities may be associated with an expanded airplane fleet, but a new airplane joining an airline venture does not necessarily result in increased flight activities as it can also be used as a spare when others undergo maintenance.

Since virtually all of the new ventures were privately held in their early years, no information on their financial performance is publicly. In all, 132 de novo airline ventures were identified in the study period as having operated for at least two consecutive quarters (for quarterly expansions to be computed), and in aggregate totaling 1,295 venture-quarters of growth measures (this means that a total of 1,295 + 132 = 1,427 quarters of level data are collected, on average 10.8 quarters per airline venture). At inception, the average de novo airline started with 2,400 passenger seats per week, equivalent to about 3 daily departures with a 128-seat Boeing 737-300 airplane.

Anecdotally, the phenomenal growth of SkyEurope, a de novo budget airline based in Slovakia that placed an order of 26 jets in only its fifth year of operation (a very rapid expansion by any means), has been described by industry analysts as ‘fairly chaotic’ (Carney, 2007; Cienski, 2009). Within two years of this big capacity order, SkyEurope halted all operations in the midst of mounting debt. People Express airline in the U.S. followed a similar fate decades earlier (Gudmundsson, 1998).

The magnified view on the experience of de novo new ventures in the airline industry adopted complements existing studies specific to this industry. Specifically, previous studies in airline competition have focused on the competition among established firms (e.g., Oum et al., 1993), competition between new entrants versus established incumbents (e.g., Windle and Dresner, 1999), or the competition between strategic alliances (Lazzarini, 2007).

3.2 Dependent Variable: Firm Failures

Continued survival in a high-mortality environment is both a reasonable performance benchmark as well as a practically feasible one for data collection, since virtually all de novo firms are privately held in their early years. In studying the continued survival of the airline ventures, however, it is important to note that the schedules of many defunct airline ventures show no signs of intended route withdrawals right up to the last quarter of service. This implies that the continued operation of a scheduled city-pair service may bear little correlation to the underlying profitability of that market. Firm exits are therefore a more appropriate measure of negative performance for de novo ventures than their withdrawals from specific markets.

Among the de novo airlines studied, several have been acquired by established incumbents (traditional 'flag-carriers') or another de novo airline. In all of these cases, the former route network of the acquired carrier underwent significant reduction upon being integrated to that of the acquirer, and hence the exits can be deemed 'failures'. For instance, after Nordic East Airlink was acquired by Finnair in 2003, its route network was completely overhauled. After transferring some operation to another Finnair subsidiary, the original Nordic East Airlink was wound down in a bankruptcy proceeding. As such, Nordic East Airlink is deemed in this study to have 'closed' and 'exited' the industry upon being acquired by Finnair. In one case, two de novo airlines were merged together (Aegean and Cronus in 2001), with their joint names used for a subsequent year or so. However, a closer examination shows that the former route network of the smaller venture (Cronus) was significantly reduced upon the integration of the two airlines, and as a result, the latter was deemed to have 'failed' at the merger.

Using firm exit as the dependent variable, the proportional hazard model of Cox (1972) can be used. In this model, the hazard function, λ, of a venture *i* failing after time *t* takes on this functional form:

$$\lambda(t_i) = e^{-\beta' \mathbf{x}_i} \lambda_0(t_i) \qquad \ldots [1]$$

where $\mathbf{x}_i$ represents a vector of independent variables and controls for entity *i*,

$\boldsymbol{\beta}$ represents a vector of coefficients (to be estimated) corresponding to $\mathbf{x}_i$, and

λ_0 represents a baseline hazard that describes the probability that a firm, having survived until period t_i, and not yet censored, would exit in period t_i.

Given a discrete time interval T_j and a corresponding set of firms that have not yet exited prior to this time (i.e., risk set j), the probability that a firm exists at the end of T_j given that exactly one individual exits at this time is given by:

$$\text{Prob}\,[t = T_j \mid \text{risk set}_j] = \frac{e^{\beta' X_i}}{\sum_{riskset_j} e^{\beta' X_i}} \qquad \ldots [2]$$

In this way, new ventures that have been right censored, i.e., still surviving at the end of the data collection period, can still contribute information to the analysis up to the point they are censored (thus making full use of such information).

The regression coefficients are interpreted as the probability of a failure (a hazard rate) given the impact of the variable, holding all else constant. A negative coefficient means that the variable is conducive to survival (i.e., positive performance), and a positive coefficient indicates that the variable increases the probability of failure (i.e., negative performance).

3.3 Large, Rapid Expansions of Production as Independent Variables

Hypotheses 1 and 2 require large, rapid expansions of production to be identified. Earlier studies have set absolute cut-offs to define what constitutes high growth. For instance, A 3-year compound annual sales growth of 80% was used by Barringer et al. (2005), while a 15% annual growth in employment by the (U.S.) National Commission on Entrepreneurship (2001) to define a high-growth firm. Delmar et al. (2003) note it is difficult to set these cut-offs, and advocate the use of relative benchmarks – a firm needs to be the top 10% in one or more measures of growth (absolute or relative growth in sales revenue, employment, etc.). However, in the study by Delmar et al. (2003), the top 10% criterion translated into 41% of all the sampled firms being labeled ‘high-growth’. In this study, a more conservative relative cut-off, a top 5% criterion is used.

An important issue on how large, rapid expansion in production can be identified is the frequency at which production is measured. Many empirical studies on growth are focused on arriving at a smoothed, 'sustained' measure of growth. For instance, Weinzimmer et al. (1998) recommend multiple-period assessment of size, and using the regression beta-weight as the measure of a firm's growth rate. The study of 'growth spurts' based on a finer, more frequent measurement of firm size is often a neglected issue in the growth literature.

Past studies (e.g. Davidsson et al., 2009; Steffens et al., 2009; Delmar et al, 2003) on growth have invariably relied on annual measures of growth, absolute or relative, with some relying on multi-year measures (e.g., Bamford et al., 2004). Delmar et al. (2003) used multiple criteria to short-list high-growth firms, and then described them in different clusters. In a number of these clusters, growth oscillates from one year to another. Even for the cluster of 'steady sales growers', the growth pattern is not even, with a high-growth year punctuating several years of low growths, and similarly uneven growth is also observed for the cluster of 'super relative growers' – firms that 'most consistently appear as high-growth firms across different growth criteria' (Delmar et al., 2003: 204). As such, it is important that a frequent measurement of production be taken to reveal any sizable oscillations in growth rates. Meanwhile, the frequency at which to take the snapshots of production should be meaningful such that sizable increases in production would necessarily point to an investment in augmenting production capacity, instead of merely augmenting marginal production with existing capacity.

For the intra-European passenger airline industry, quarterly surveys of production (in seats in scheduled departures per week) are taken – this allows for a finer scale than a yearly measurement but is still meaningful for that industry. As suggested earlier, the top 5% of all absolute quarterly increases in production was noted, and likewise for the top 5% of all relative quarterly increases in production. Hypotheses 1 and 2 require us to identify the venture-quarters after a particular airline venture has reached a top 5% absolute or relative increase in production. Using the subscript *i* to denote a specific venture and subscript *t* a specific quarter, the following variables are used for this purpose:

$AbsExp_{i,t}$ – equals to 1 if venture *i* undergoes in quarter *t* (from *t* - 1 to *t*) a production expansion that is within the 95th percentile (top 5%) among all venture-quarters in absolute terms (i.e., seats in scheduled departures per week) or if $AbsExp_{i,t-1} = 1$, and zero otherwise.

$RelExp_{i,t}$ – equals to 1 if venture *i* undergoes in quarter *t* (from *t* - 1 to *t*) a production expansion that is within the 95th percentile (top 5%) among all venture-quarters in relative terms (i.e., percent changes in seat from quarter *t*-1 to *t*, based on quarter *t*-1) or if $RelExp_{i,t-1} = 1$, and zero otherwise.

As expected, there are more airline ventures with $RelExp_{i,t} = 1$ than with $AbsExp_{i,t} = 1$ (respectively 49 versus 23 airline ventures), since the latter is concentrated on fewer and generally larger airline ventures. This means that respectively 37% and 17% of the airline ventures are considered to have exhibited large expansions in relative or absolute terms – higher than the top 10% criterion used in prior studies. The cut-off point for the 95th percentile of absolute large expansions in production is 7,495 seats per week, equivalent to over 4 daily return flights by a 128-seat Boeing 737-300 aircraft. The cut-off point for the 95th percentile of relative large expansions in production is a 144% increase (i.e., weekly capacity in quarter *t* is at least 244% of that in quarter *t* -1). In particular, this is beyond the usual seasonal adjustments in schedules observed in the data. The correlation between the quarterly changes in seat production and a second series based on a cumulative three-quarter or four-quarter average is above +0.7, meaning that the large expansions identified are generally not negated by equally large reductions in capacity (i.e., much of the increase in capacity is sustained over time).

If the quarterly growth rate of 144% (the 95th percentile cut-off for relative large expansions) occurs no more than once a year and assuming there is zero growth in other quarters of the year, the growth in production – if matched in the growth in demand – would be in line with the average annual growth of 159% reported among the 95 ‘high-growth’ firms examined in Fombrun and Wally (1989). A total of 24 large relative expansions in production occurred in the first year of operation for the airline ventures, 16 in the second, and 12 in the third. In terms of large absolute expansions, 25 occurred in the first year, 17 in the second and 12 in the third. Only 13 airline ventures are simultaneously considered to have undertaken both large relative and absolute expansions in production. None of the large relative expansions were due to acquisitions or mergers, although two large absolute expansions can be traced to the operational integration of acquired or merged carriers in similar markets. Adding an additional control in these few instances does not qualitatively change the result, and does not produce a statistically significant coefficient for this control either.

3.4 Control Variables

A host of variables are used as controls in the regression analysis in addition to the two key independent variables. These are discussed in this section.

Several large-scale studies have confirmed a statistically significant link between inaugural capacity and venture survival, at least for low-technology industries or for the growth stage of the industry (Caves, 1998; Agarwal and Audretsch, 2001). Hence a variable representing the inaugural size of production is included:

$LnInaug_{i,t}$ – denotes the natural logarithm of the weekly passenger seat capacity (by departures) of venture *i* in its inaugural quarter of operation. The logarithmic transformation converts a non-normally distributed variable to a normally distributed one.

In addition to the variable $LnInaug_{i,t}$, three variables trace the quarterly change in production capacity (that may or may not be deemed 'large'):

$ChgRel_{i,t}$ – denotes the ratio of weekly seat capacity in quarter *t* to that in quarter *t* -1.

$ChgPos_{i,t}$ – denotes the natural logarithm of the absolute increase in weekly seat capacity from quarter *t* – 1 to that in quarter *t*, or zero if there is no increase.

$ChgNeg_{i,t}$ – denotes the natural logarithm of the absolute decrease in weekly seat capacity from quarter *t* – 1 to that in quarter *t*, or zero if there is no decrease.

Empirical studies on new ventures have also emphasized the liabilities of newness (e.g., Singh et al, 1986) and adolescence (Brüderl and Schüssler, 1990) – meaning that the survival probability of a 'baseline' venture may depend on the age of the venture. To allow for age-dependent differentials on exit hazards, several dummy variables are used to denote the age of a de novo venture. The variables $Age1_{i,t}$, $Age2_{i,t}$, $Age3_{i,t}$, and $Age4_{i,t}$ equal 1 if venture *i* is in its first, second, third or fourth year of operation respectively, and zero otherwise.

Moreover, several other control variables are used:

$IntlSeat_{i,t}$ – denotes the proportion of weekly seat capacity (by departures) of venture *i* in the inaugural quarter that involves an international non-stop city-pair route (one that crosses an international boundary). This variable is added in the control since previous studies have suggested that those new ventures that internationalize early may have a greater capacity for faster growth than others (e.g., Autio et al., 2000).

$Route_{i,t}$ – denotes the number of non-stop city pair markets served by venture *i* in quarter *t*.

$HHI_{i,t}$ – denotes the Herfindahl-Hirschmann Index (HHI) of the city-pair markets served by venture *i* in quarter *t*. If venture *i* serves more than one city-pair market, this variable captures the seat-weighted HHI of all such city-pair markets. Scheduled flights to/from multiple airports that serve the same metropolitan region are aggregated to that specific metropolitan region.

$Lowcost_{i,t}$ – equals 1 if venture *i* describes itself as a low-cost or budget airline, corroborated by the views of the industry in publications such as Airline Business and Air Transport World, and 0 otherwise.[5]

Dummy variables $France_{i,t}$, $Germany_{i,t}$,$Greece_{i,t}$, $Italy_{i,t}$, $Spain_{i,t}$, $Sweden_{i,t}$ and the $UK_{i,t}$ equal 1 if the city with the largest departure seat capacity in the network of entrant *i* is in France, Germany, Greece, Italy, Spain, Sweden or the UK respectively, and 0 otherwise – 75% of the de novo airlines have their largest operational base (by weekly seat capacity) in these countries.

Since each observation represents a venture-quarter, it is subject to economic forces that are specific to a season and to specific calendar years. Dummy variables $Feb_{i,t}$, $Aug_{i,t}$ and $Nov_{i,t}$ equal to 1 if *t* is in February (first quarter), August (third quarter) and November (fourth quarter) respectively, and 0 otherwise. In other words, May (second quarter) – a traditional shoulder season – is the reference. These three variables are collectively referred to as the seasonal dummy variables. The dummy variable $9899_{i,t}$ equals 1 if *t* is in 1998 or 1999, and 0 otherwise. Likewise, the dummy variables $0001_{i,t}$, $0203_{i,t}$ and $0405_{i,t}$ equal 1 if *t* is in 2000-2001, 2002-2003, or 2004-2005 respectively, and 0 otherwise. Table 1 shows the means, standard deviations, and correlations for all variables used in the regression analysis.

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[5] Among the *de novo* airlines surveyed, only one (Fairlines) reported a high-service (differentiated) market position. The estimated coefficient of a dummy variable representing this airline was not statistically significant, and not included in the reported results.

4. Results

Table 2 shows the estimation results of Equation 2. In Model 1, only the control variables are included. In this model, the estimated coefficients for the control variables are not statistically significant except for the variable $HHI_{i,t}$, showing how de novo airline ventures operating in concentrated markets (high HHI's) generally have lower failure odds than others. In particular, the estimated coefficients for venture age, calendar years, country and seasons are not significant in this and subsequent models.

Model 2 includes all the control variables in Model 1, and adds the variable $RelExp_{i,t}$ to denote instances of large, relative expansions in production. The estimated coefficient for control variable $Route_{i,t}$ is now also statistically significant ($\alpha < 0.10$), and its negative sign means that an airline venture serving a large number of non-stop city-pair markets has lower odds of firm failure than other ventures, suggesting perhaps that any entry-retaliatory actions in one particular market is unlikely to on its own bankrupt the new venture. The estimated coefficient for $RelExp_{i,t}$ is positive and statistically significant ($\alpha < 0.01$), meaning that large, relative expansions in production significantly increase the odds of firm exit (i.e., failure). This lends support to Hypothesis 2.

Model 3 includes all the variables in Model 2, and adds the variable $AbsExp_{i,t}$ to denote instances of large, absolute expansions in production. The estimated coefficient for $ChgPos_{i,t}$ is negative and marginally significant ($\alpha < 0.10$), suggesting that those small (not in the top 5%) increases in production still contribute to lowering the odds of firm failure. The estimated coefficient for $AbsExp_{i,t}$ is negative and marginally significant ($\alpha < 0.10$), meaning that large, absolute expansions in production likely reduce the odds of firm exit (i.e., failure). This lends support to Hypothesis 1. In particular, the absolute magnitude in the estimated coefficient of $AbsExp_{i,t}$ (at 0.782) is far higher than that of $ChgPos_{i,t}$ (at 0.097), implying that the failure-avoidance impact of a large, absolute increase in production is far greater than of smaller ones.

Separately, all the variables analyzed in Model 3 were included in an ordinary least-square (OLS) regression. This produced a largest variance inflation factor of 4.654, which according to DeMaris (2004: 228), was not indicative of multicollinearity problems.

5. Discussion and Conclusion

By considering how in many industries an augmentation in production capacity is necessary to bring about significant growth in sales or eventual profit, this study adds an important footnote to prevailing theories of firm survival and competitiveness in strategic management. An increase in production necessarily involves some exploitative activities in the commoditization of the products involved. Especially to young or small firms, investments in production capacity can instead be made in anticipation of more explorative discoveries. There is therefore an inherent conflict between the two choices. Adopting the process view of how investment in production capacity must predate significant increases in sales in many industries, this very investment therefore becomes an important strategic decision in its own right, especially for resource-constrained de novo ventures.

As a consequence of this process view, it is natural that attempts or orientations to expand production do not necessarily lead to actual sales growth, which in turn may or may not lead to profit growth. In so doing, this study explains how ambiguous results previously reported between growth in sales and growth in profit can make sense, since the underlying investment in augmenting production is not reported. This approach advocates caution on studies that selects firms based on their materialized high sales or profit growth – since this procedure would necessarily introduce a selection bias. For instance, a study investigating factors that drive firms towards high growths may find that a growth mindset is widely adopted among the high-growth firms, and the same mindset is absent in most low-growth firms. This conclusion would of course be expected, since by construction, high-growth firms would have had to adopt a growth mindset to invest in production expansion in the first place. Those firms not adopting such an expansion plan would result in only marginal growth in best. Since some firms undertaking a significant production expansion plan may only achieve low sales growth, examining low-growth firms would certainly reveal that few of them had adopted a growth mindset to begin with.

By carefully delineating the differential impacts of large absolute versus relative expansion in production, this study resolves an important conflict in the theoretical literature about the impact of growth on firm performance. In particular, while large absolute increases in production likely reduce firm failure risks by reducing unit cost and increasing external legitimacy, large relative increases in production executed in a short period of time increase firm failure risks. This contributes directly to the high mortality rates observed for de novo ventures. This latter result is probably the first indirect test of Penrose's (1959) notion of managerial constraints in growth – what matters here is the high rate of relative increases, and complements a host of studies on this issue, including Davidsson et al. (2009), and Markman and Gartner (2002). In addition, this result is consistent with the view of Steffens et al. (2009) that high-profit, high-growth status among young firms is often 'indicative not of competent management, but of luck' (p.141). In other words, many young firms would survive better over the medium- to long-term if their growth is achieved at a lower but more sustainable rate.

The single-industry setting of the empirical analysis allows a detailed list of control variables to be used. The chosen industry, the intra-European scheduled passenger airline industry, allows individual geographical markets to be carefully delineated, and reasonably precise competitive pressures to be included in the analysis. In particular, while the augmentation in aircraft fleet may be irreversible in the duration of their leases or amortization tenures for their associated ventures, investment of production in specific markets is mostly reversible. As such, the impact of capacity signaling or first-mover advantage in terms of capacity commitments in the market-level is smaller in this industry than say, fixed assets such as chemical plants or oil refinery.

Furthermore, the focus of this study on de novo ventures adds to the emerging body of literature on small, entrepreneurial firms. As commented by Michael, Storey and Thomas (2002: 52), 'if we take out our large firm administrative management toolkit and apply it to the entrepreneurial firm there is a major risk of it being inappropriate'. In view of the high mortality rate faced by small, entrepreneurial firms, but how a small number of them eventually grew to be large corporate giants, this emerging body of work can be hugely informative for academics and scholars alike.

Table 1. Means, Standard Deviations, and Correlations

V	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	0.06	0.25																												
2	0.18	5.40	-06																											
3	0.30	0.51	05	18																										
4	7.23	1.58	-04	49	-30																									
5	0.41	5.40	-02	01	10	-10																								
6	2.76	3.59	-10	25	10	24	14																							
7	1.84	3.10	02	09	04	17	-08	-46																						
8	0.77	0.22	-05	-35	08	-53	-02	-19	-07																					
9	7.34	12.23	-07	45	00	38	00	34	06	-21																				
10	0.39	0.44	-02	12	12	06	-01	02	03	-16	07																			
11	0.37	0.48	-01	-18	-22	01	-01	-04	-08	-03	-17	03																		
12	0.24	0.43	05	-03	-02	01	05	-04	-02	03	-07	03	-43																	
13	0.15	0.36	-02	01	12	-04	-02	01	04	02	01	01	-32	-24																
14	0.10	0.30	00	05	09	-02	-02	01	06	00	03	-01	-25	-19	-14															
15	0.11	0.31	-07	46	04	32	00	26	04	-26	42	26	-05	02	05	-01														
16	0.05	0.21	02	-10	08	-09	01	-02	02	13	-04	08	02	04	03	-02	-08													
17	0.16	0.36	01	-17	05	-17	-01	-05	-06	14	-11	-18	-02	-04	-01	00	-15	-09												
18	0.05	0.23	03	20	-13	28	-01	07	08	-33	11	00	01	01	-01	-01	-08	-05	-10											
19	0.19	0.39	02	07	06	14	-02	00	10	-01	-01	-21	-01	-02	-03	-01	-17	-11	-21	-12										
20	0.04	0.20	02	00	-02	08	00	-02	-05	-18	-01	-05	09	06	-05	-07	-07	-05	-09	-05	-10									
21	0.11	0.32	01	-15	02	-21	07	-10	-05	11	-14	-21	01	00	02	04	-12	-08	-15	-09	-17	-07								
22	0.16	0.37	-05	11	-18	14	-02	10	-08	-09	23	-04	-04	01	03	-03	41	-10	-19	-10	-21	-09	-15							
23	0.24	0.43	04	-03	-02	-01	-03	-06	-02	02	-04	-02	01	-01	-01	00	-01	-01	00	01	01	00	00	-01						
24	0.26	0.44	02	01	-01	01	-02	03	-09	00	03	01	01	00	01	-01	00	00	01	-01	-01	00	00	00	-33					
25	0.26	0.44	-05	02	01	01	-01	-02	11	-01	00	00	-02	01	00	-01	01	00	-01	-01	00	05	-01	01	-34	-35				
26	0.16	0.37	00	-14	-04	-05	-02	-02	-04	-02	-09	-04	02	14	10	-13	-02	06	08	-02	10	-02	-07	-03	-01	00	-01			
27	0.20	0.40	02	01	-05	01	-01	-06	-01	01	-08	-07	-07	04	01	12	-12	-05	04	13	04	-11	05	-02	01	-01	-01	-22		
28	0.27	0.44	-02	-01	03	-06	-01	-02	01	09	-04	-03	00	-08	-04	05	-03	-04	-04	-03	00	07	07	00	00	00	01	-27	-30	
29	0.30	0.46	00	17	08	13	03	09	04	-05	22	13	-12	-02	01	00	11	01	-08	-04	-13	-07	-01	03	02	-01	-03	-29	-33	-39

n = 1295

Decimal places omitted for correlations: e.g., -06 = -0.06. Legend: V – Variables; M –Means; SD – Standard Deviations; 1 – Exit (failure), 2 – AbsExp, 3 – RelExp, 4 – LnInaug, 5 – ChgRel, 6 – ChgPos, 7 – ChgNeg, 8 – HHI, 9 – Route, 10 – IntlSeat, 11 – Age1, 12 – Age2, 13 – Age3, 14 – Age4, 15 – LowCost, 16 – France, 17 – Germany, 18 – Greece, 19 – Italy, 20 – Spain, 21 – Sweden, 22 – UK, 23 – Feb, 24 – Aug, 25 – Nov, 26 – 9899, 27 – 0001, 28 – 0203, 29 – 0405.

Table 2. Results of Exit Hazard Regression Analysis for *de Novo* Ventures

Variables	Model 1	Model 2	Model 3
Intercept	0.224	-0.859	-0.995
	(1.165)	(1.225)	(1.238)
Controls			
LnInaug	-0.128	-0.022	0.035
	(0.096)	(0.103)	(0.110)
ChgRel	-0.164	-0.263	-0.252
	(0.243)	(0.255)	(0.255)
ChgPos	-0.083	-0.085	-0.097
	(0.055)	(0.055)	(0.056)†
ChgNeg	-0.020	-0.038	-0.045
	(0.044)	(0.044)	(0.045)
Route	-0.057	-0.068	-0.060
	(0.033)	(0.034)*	(0.034)†
HHI	-1.732	-1.556	-1.679
	(0.620)**	(0.618)*	(0.626)**
IntlSeat	-0.227	-0.293	-0.336
	(0.318)	(0.324)	(0.322)
Lowcost	-0.811	-0.974	-0.764
	(0.809)	(0.815)	(0.816)
Age1	-0.089	0.182	0.070
	(0.426)	(0.441)	(0.445)
Age2	0.4378	0.607	0.525
	(0.422)	(0.429)	(0.432)
Age3	-0.010	0.032	-0.053
	(0.487)	(0.493)	(0.494)
Age4	0.135	0.214	0.113
	(0.511)	(0.517)	(0.520)
France	0.444	0.337	0.204
	(0.555)	(0.562)	(0.570)
Germany	0.074	-0.027	-0.186
	(0.428)	(0.440)	(0.452)
Greece	0.700	0.793	0.714
	(0.581)	(0.585)	(0.580)
Italy	0.410	0.271	0.204
	(0.415)	(0.424)	(0.420)
Spain	0.161	0.093	-0.022
	(0.598)	(0.608)	(0.612)
Sweden	-0.147	-0.190	-0.315
	(0.475)	(0.479)	(0.483)
UK	-0.170	-0.018	-0.148
	(0.486)	(0.495)	(0.497)
Feb	0.144 (0.319)	0.130 (0.321)	0.123 (0.321)
Aug	0.125 (0.321)	0.133 (0.323)	0.146 (0.324)
Nov	-0.432 (0.358)	-0.433 (0.528)	-0.431 (0.360)
9899	-0.446 (0.546)	-0.454 (0.546)	-0.451 (0.548)
0001	-0.289 (0.542)	-0.357 (0.544)	-0.276 (0.548)
0203	-0.292 (0.523)	-0.371 (0.527)	-0.319 (0.529)
0405	-0.064 (0.526)	-0.133 (0.528)	-0.107 (0.530)
Main Effect			
RelExp	-	0.809**	0.978**
		(0.296)	(0.313)
AbsExp	-	-	-0.782
			(0.465)†
-2 Log Likelihood	578.081	570.726	567.672
Difference (χ^2)	-	From Model 1:**	From Model 2: †

n = 1295; standard deviations in parentheses
† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

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