Do alliances provide effective entry into a new line of business? Evidence from direct vs. sequential entry in the global aerospace industry (1944-2000)

Louis MULOTTE
Doctorant
HEC School of Management, Paris
Département Stratégie et Politique d'Entreprise
78351 JOUY-EN-JOSAS cedex
email: mulottel@hec.fr

Pierre DUSSAUGE
Professeur
HEC School of Management, Paris
Département Stratégie et Politique d'Entreprise
78351 JOUY-EN-JOSAS cedex
email: dussauge@hec.fr

Résumé : Both researchers and practitioners have long argued that firms can use alliances as a means to more easily enter new businesses or new markets. Indeed, alliances can provide access to necessary but difficult-to-trade resources and thus help the entering firm gather all the resources required to operate in the targeted business. Other authors, however have emphasized the downsides of alliances: they provide only incomplete access to the targeted resources, they create a dependence on partners, they are difficult and costly to manage and, finally, entail a sharing of profits. This leads many firms to choose to enter new business areas directly, without previously forming any sort of partnership with incumbents. In this broad context, we will address two sets of questions: (i) what factors drive newcomers to choose between entering alone vs. forming alliances in order to enter a new business area? (ii) how do these entry strategies influence subsequent success and survival in the new area of business. Drawing upon the resource-based view, we develop arguments suggesting that entry strategy is influenced by firm capabilities. We predict that entry through alliances, while allowing weaker firms to overcome entry barriers, does not result in superior long-term performance. We test our predictions on a sample of firms that have eventually established a stand-alone presence in the aerospace industry through sequential vs. direct entry and, with two-stage treatment models, we assess their post-entry performance accounting for the endogeneity of their entry strategy choice.

Mots - clefs : *entrée dans un secteur, alliance, développement interne, performance, théorie de la ressource*

Both researchers and practitioners have long argued that firms can use alliances as a means to more easily enter new businesses (Ingham and Thompson, 1994; Mitchell and Singh, 1992) or new markets (Kogut and Singh 1988; Hennart, 1991; Hennart and Reddy, 1997; Barkema and Vermeulen, 1998; Chang and Rosenzweig, 2001; Makino and Neupert, 2000). Indeed, alliances with business or market incumbents can provide access to necessary but difficult-to-trade resources and thus help the entering firm gather all the resources required to operate in the targeted business (Hamel, 1991; Simonin, 1999; Mitchell and Singh, 1996; Anand and Khanna, 2000; Inkpen, 2000). Other authors however have emphasized the downsides of alliances: they provide only incomplete access to the resources, they create a dependence on partners, they are difficult and costly to manage and, finally, entail a sharing of profits (Hamel, Doz and Prahalad, 1989; Balakrishnan and Koza, 1993; Park and Russo, 1996). This leads many firms to choose to enter new business areas directly, without previously forming any sort of partnership with incumbents. In this broad context, we will address two sets of questions: (i) what factors drive newcomers to choose between entering alone vs. forming alliances in order to enter a new business area? (ii) how do these entry strategies influence subsequent success and survival in the new area of business.

Drawing upon the resource-based view, we develop arguments suggesting that entry strategy is influenced by firm capabilities, with weaker firms selecting entry through alliances, and stronger competitors favoring direct entry. This logic leads us to predict that entry through alliances, while allowing firms to overcome entry barriers, is unlikely to result in superior post-entry performance. We test our predictions on a sample of firms entering a new business line in the aerospace industry through sequential vs. direct entry. We examined post-entry success by measuring the performance of autonomously developed products in the new business line as well as firm survival in this new business line, simultaneously taking into account entry strategy and factors driving entry strategy choice.

BACKGROUND

Entry mode choice has been studied extensively in the strategic management and international business literatures over the last 20 years. Drawing primarily upon transaction cost theory and the resource-based view, these studies have identified factors that influence the choice of one entry mode over another. This literature focuses on two types of entry: entry into new geographic markets and entry into new business areas. Scholars have

categorized entry modes in several different ways. One approach has been to distinguish between greenfield entry and acquisitions (Hennart and Park, 1993; Barkema and Vermeulen 1998; Brouthers and Brouthers, 2000; Chang and Rosenzweig, 2001). Greenfield entry (also termed de novo or start-up entry, or internal development) occurs when a firm sets up a new operation in the targeted domain by allocating and bundling elementary resources, such as employees, capital, technology, etc. (Barkema and Vermeulen, 1998). Acquisition entails the purchase of an existing operation in which the required resources have already been combined by the previous owner. By thus "buying" its way into the new business area, the entering firm can avoid undertaking the long, complicated and risky process of effectively bundling all necessary resources to operate in the targeted business, but generally must pay a high price for this. In this respect, acquisition is more a change of ownership than a real "entry" resulting in the emergence of a new venture in the targeted business area. Our focus being on entry defined as the creation of a new operation, we have chosen to exclude acquisitive entry from the scope of this research.

Other studies focus on ownership of the operation in the targeted domain by distinguishing between wholly-owned operations and joint ownership, shared with a partner (Hennart, 1991; Makino and Neupert, 2000; Brouthers, 2002). A further refinement has been to identify various levels of joint ownership and distinguish between minority, equally owned or majority joint ventures (Barkema and Vermeulen, 1998). There is a fairly broad consensus on the fact that firms favor wholly-owned entry when expansion takes place in highly related domains. In the case of international expansion, this leads to choosing wholly-owned entry when host and home country are culturally and institutionally similar (Hennart, 1991; Hennart and Park, 1993; Hennart and Reddy, 1997; Barkema and Vermeulen, 1998; Brouthers and Brouthers, 2000; Makino and Neupert, 2000; Chang and Rosenzweig, 2001). In the case of diversification, firms tend to favor entering on their own, i.e. through wholly-owned investments when the resource gap between existing and targeted activities is small (Ingham and Thompson, 1994; Chang and Singh, 1999). In partial contradiction with this, Mitchell and Singh (1992) found that stronger competitors are more likely to use pre-entry alliances when considering diversification into a new emerging technical sub-field of their industry. In doing this, Mitchell and Singh shift the definition of what is considered wholly-owned vs. jointly owned operations. Contrary to most prior studies, they do not focus on ownership of the business unit carrying out the new activity, but on the governance of the

considered operation: they contrast firms collaborating in the new area before fully entering to firms that do not.

Most of studies on entry strategies focus on the first foothold established in the new business area. Thus, when examining factors that favor the choice of one entry strategy over another, most scholars have compared firms entering on their own directly and, consequently, that seek to establish a permanent and autonomous presence in the business, to firms forming an alliance in the new business, whether this alliance eventually results in a permanent stand-alone presence or not. In doing so, they do not distinguish between alliances formed as a first step into a new business in which a permanent and autonomous presence is sought, and alliances formed to implement a one-shot project or aimed at lasting as long as the firm's presence in the considered business. Mitchell and Singh (1992) are among the few who explicitly addressed this issue and explored factors favoring the use of pre-entry alliances by firms that later undertook standalone entry into emerging technical sub-fields of their industry. In line with this approach, our study specifically aims at exploring the effectiveness of alliances as entry mechanisms; therefore, we focus on firms that have achieved a stand-alone presence in the targeted business and consider those factors that led them to enter on their own or through pre-entry alliances.

In addition to the entry mode choice literature, another stream of research has investigated the influence of entry mode choice on the subsequent performance in the newly entered domain (Simmonds, 1990; Li and Guisinger, 1991; Woodcock, Beamish and Makino, 1994; Pan and Chi, 1999; Delios and Beamish, 2001; Vermeulen and Barkema, 2001; Brouthers, 2002; Vermeulen and Barkema, 2002). When examining international expansion, most of this research has found no significant influence of the degree of ownership on performance (Delios and Beamish, 2001; Vermeulen and Barkema, 2002). When significant results are found, they are contradictory: Vermeulen and Barkema (2001) as well as Pan and Chi (1999) found that partial ownership led to greater performance than full ownership. On the contrary, Woodcock, Beamish and Makino (1994) as well as Brouthers (2002) found empirical evidence that wholly owned operations outperformed equity joint ventures. In the research on firm diversification, the primary focus has been the influence of expansion mode choice (acquisition vs. greenfield) on performance, with very little attention paid to the influence of total vs. partial ownership on performance.

More recently, scholars have suggested that the ambiguity surrounding the influence of entry mode on performance was due to the endogeneity of mode choice (Shaver, 1998; Hamilton and Nickerson, 2003). Building on this approach, Brouthers (2002) and Brouthers, Brouthers and Werner (2003) found that the positive influence of entering a new market through wholly owned ventures on performance became insignificant when accounting for endogeneity; in other words, those factors that lead firms to choose one entry mode over another also have a direct influence on performance. Overall, this suggests that entry through partial ownership makes it easier to compensate for firm weaknesses or to overcome high entry barriers, but that entry mode itself does not significantly influence performance. Those studies that have accounted for endogeneity focus on international expansion; to the best of our knowledge, the possible endogeneity of entry mode choices in the case of new business entry remains a largely unexplored issue.

In addition, as was the case with the literature on determinants of entry mode choice, these studies on the impact of entry mode on performance have compared the success and survival of wholly owned operations to that of joint ventures in the targeted domain, without verifying that all considered joint ventures eventually led to full entry, i.e. stand-alone presence in the new business area. In this respect, they do not examine to what extent entry through alliance enables firms to subsequently compete effectively in the targeted domain, but rather compare the performance of joint ventures and stand-alone operations.

Our own research aims at extending prior findings on the use and effectiveness of alliances as mechanisms for entry into new business domains. Building upon results from the international business and diversification literatures, and drawing on the resource-based view, we propose that alliances are a means used by weaker competitors to overcome entry barriers, but that the use of pre-entry alliances, while creating a short-term advantage, does not positively affect long-term performance.

HYPOTHESES DEVELOPMENT

While alliances are often used as an entry mechanism, not all firms forming alliances in a new domain necessarily aim at ultimately setting up stand-alone operations in the new business. Therefore, unlike most previous work on entry strategies, we adopted a more restrictive definition of entry. We define entry as the proven ability to operate on a stand-alone basis in the new business area and thus consider “entry” as having taken place only

once a firm operates on its own in the targeted business. In other words, the alliance itself is defined as an entry device but its formation is not an "entry". Rather, entry occurs when a firm starts operating in the targeted business outside the scope of the alliance and often after dissolution of the alliance. Some firms might choose to continue collaborating on all new products, and would then never achieve "entry" according to our definition. We consider two possible entry strategies: we define sequential entry as creating an independent presence in a new business area after having cooperated to establish an initial foothold in the targeted business; in contrast, direct entry occurs when a firm's first venture into the new business is carried out on its own, without prior cooperation with another firm.

In defining sequential entry, we consider alliances to cover both the joint ownership of the business unit (i.e. the formation of an equity joint venture) and the joint operation of activities in the new business line (e.g. joint R&D, product development, manufacturing and/or marketing, licensing, franchising, etc.), even when they are carried out through business units which are wholly owned by each partner firm. In doing so, we are consistent with the definition of alliances used by Mitchell and Singh (1996) or by Dussauge, Garrette and Mitchell (2000 and 2004).

Based on these definitions, we now turn to our main arguments and the formulation of two sets of hypotheses, on the factors that drive the choice of entry strategies on the one hand, on the influence of entry strategy on subsequent success and survival in the new business on the other hand.

First, on the choice of entry strategies, the existing literature offers contradictory views. On the one hand, a resource-based approach suggests that firms form alliances when they lack necessary resources (Hennart, 1991; Makino and Neupert, 2000). On the other hand, researchers in the social network theory tradition (Gulati, 1995; Gulati, 1999, Gulati and Gargiulo, 1999; Walker, Kogut and Shan, 1997) have suggested that firms form alliances when they are presented with attractive opportunities to collaborate and that these opportunities rest on the strength of their prior ties to potential partners. Ahuja (2000) has pushed this debate further by arguing that alliance formation is driven by both sets of factors, which he summarized as inducements and opportunities. In other words, firms most likely to form alliances lack some of the resources required to compete successfully while possessing attributes that make them attractive as partners. This suggests a curvilinear inverted U-shaped relationship between a firm's resource endowment and its likelihood to participate in

alliances. Ahuja's arguments, however, are developed in the case of alliances between incumbent firms. In the somewhat different context of entry strategies, we would expect firms with too few resources to make them attractive as partners to not enter at all. Contrary to the results reported by Ahuja, we do not expect firms with limited resources to use direct entry, because they are unable to find potential partners, but rather to drop out of the population of entering firms. When considering entry into a new business area, all entering firms lack experience in the targeted line of business. However, these entering firms differ in their ability to mobilize the necessary resources. In formulating our hypotheses, and following Amit and Schoemaker (1993), Teece and Pisano (1994) and Capron, Dussauge and Mitchell (1998) we consider three main types of resources: (i) technical and production resources, (ii) marketing and sales resources and (iii) financial and other generic resources.

We define technical and production resources as those resources required for the development and manufacturing of an adequate performance product in the considered business line. Firms entering a new business domain differ in the technical and production resources required for doing so that they possess. Some firms entering the new line of business have nevertheless previously been present in the same industry while others enter the industry by entering the considered business line. We expect firms that have greater presence in other business domains of the same industry to possess technical resources, i.e. know how as well as assets, that they can easily redeploy to facilitate entry into the targeted business line. In contrast, newcomers to the industry lack such redeployable technical and production resources and are thus more likely to seek additional resources from potential partners. Hence the following hypothesis:

H1a: The greater a firm's presence in an industry, the more likely it will choose a direct entry strategy over a sequential entry strategy to expand into new lines of business in the same industry

We define marketing and sales resources as those resources required to secure adequate sales volumes for a new product. Firms with a larger market base to which they have a privileged access can expect to break-even more easily than firms with a smaller market base. Consequently, firms with a smaller potential market are more likely to use pre-entry alliances in order to share the risk related to the new product launch or to reduce this risk by expanding expected sales to the partner's market base. In contrast, firms with a large

market base are more confident that they can, on their own, achieve sufficient sales volumes to break-even and are therefore more prone to attempt direct entry into a new business line. Hence the following hypothesis:

H1b: The greater a firm's market base, the more likely it will choose a direct entry strategy over a sequential entry strategy to enter a new line of business

Finally, we turn to financial and generic resources. We define financial and generic resources as those resources that are not specific to any particular business domain or even industry. They are easily redeployable and can be mobilized to enter any new line of business. Though such resources can theoretically be easily obtained when needed through open market mechanisms, market imperfections even for such generic factors might make them easier to mobilize rapidly within firms. Therefore, firms lacking such resources might choose to form alliances to pool the necessary financial and other generic resources required to enter a new line of business. Hence the following hypothesis:

H1c: The greater the financial and generic resources a firm possesses, the more likely it will choose a direct entry strategy over a sequential entry strategy to enter a new line of business

We now turn to our hypotheses on the influence of entry strategy on post-entry success. Based on our definition of "entry", and contrary to most prior studies, we cannot examine entry strategy success by comparing the relative performance of collaborative vs. autonomous activities. Our definition of completed entry implies comparing the success of firms operating on their own following either direct or sequential entry.

When examining the influence of entry strategy on post entry success, we cannot ignore that the factors we hypothesized as driving entry strategy choice might also have a direct influence on success. Indeed, large technical, commercial or financial resources should have a strong impact on the success of any venture undertaken by a firm. If we do not take this into account, we can only expect that firms choosing direct entry - which we hypothesized are firms with greater resource endowments - will outperform firms opting for sequential entry. If we want to meaningfully compare post-entry success of direct vs.

sequential entry strategies, we need to take into account the endogeneity of entry mode choice.

If we focus on the specific influence of entry mode, we must note that sequential entry provides a firm with business line experience before full entry –as defined above- takes place. Indeed, the entering firm will have collaboratively operated in the targeted business line before achieving entry. Numerous scholars have argued that experience improves the ability to combine disparate knowledge elements into valuable new combinations (Kogut and Zander, 1992; Henderson and Cockburn, 1994; Martin and Mitchell, 1998; Katila and Ahuja, 2002; Nerkar and Roberts, 2004). More precisely, Nerkar and Roberts (2004: 781) found empirical evidence that a firm with previous product–market participation enhanced its new products' success because "experience leads to better understanding of market conditions and customer needs". In addition, research found that previous experience increases technological knowledge (Mitchell and Singh, 1992), which also translates into more valuable new products (Nerkar and Roberts, 2004). Consequently, we might argue that products introduced through sequential entry meet with greater success as they benefit from the firm's previous product-market experience.

Another stream of literature suggests a somewhat different view of the impact of experience gained through alliances on subsequent success. As this experience is incomplete, it may give firms a false sense of confidence that can jeopardize the success of future products and endanger the very survival of the operation in the new business line (Balakrishnan and Koza, 1993; Park and Russo, 1996). Indeed, alliances generate only partial learning that may prove insufficient to carry out stand-alone activities. In addition, previous experience may cause superstitious learning (Levitt and March, 1988; Levinthal and March, 1993; Zollo and Reuer, 2003) and overconfidence in one's own capabilities (Hayward and Hambrick, 1997; Durand, 2003) that will hinder future success.

To push our argument further and make predictions about the influence of direct or sequential entry on new venture success, we distinguish between short-term performance and long-term survival.

We expect that pre-entry experience acquired through alliances will enhance a firm's chances of successfully launching a new product on its own. Therefore we argue that sequential entry will increase short-term post-entry success.

Overconfidence, in turn, should primarily appear as a consequence of the accumulation of success. Therefore, a firm with pre-entry alliance experience, that has successfully introduced an autonomously developed product may tend to become overconfident, may over-extend its investments and its exposure in the considered business line and, as a result, may be more vulnerable to environmental shocks that might subsequently affect the business. On the contrary, firms entering directly will have had to overcome greater hurdles without the support from partners, will have encountered more limited success with their first product introduction and will therefore be more cautious in their future ventures in the considered business line.

Firms having entered sequentially might also be more prone to replicating past routines imitated from their partner, which in the short term can prove more effective but in the long term make it more difficult to successfully adjust to changes in the environment. Firms entering directly, in contrast, will have had to progressively develop dynamic capabilities (Teece, Pisano and Shuen, 1997) on their own from the start which may be detrimental in the short term but will provide better abilities to adjust to changes in the medium and long term.

Hence the following hypotheses:

H2a: Firms using sequential entry will achieve greater short-term success than firms using direct entry

H2b: Firms using direct entry will achieve greater long-term success than firms using sequential entry

DATA AND ANALYSIS

We tested our predictions on a sample of firms that eventually established a stand-alone presence, i.e. that, at one point or another during the considered time frame, autonomously developed, manufactured and marketed at least one aircraft model in one of the four sub-fields of the Aircraft Industry. The Aircraft Industry is classically divided into four sub-fields (*Jane's All the World Aircraft,* various years): the fighter aircraft business line, the turboprop aircraft business line, the rotorcraft business line, and the jet transport aircraft business line - which includes business jets as well as passenger and freight jet

transport aircraft. Before the Second World War, all aircraft were powered with piston engines that used automobile engine technology. The invention of jet engines set a new technological paradigm (Frenken and Leydesdorff, 2000) that lead to a major upheaval in the industry.

The data for this study was drawn from an extensive archival study of secondary sources, mainly the *Jane's All the World Aircraft* Annual Reports for each year between 1944 and 2000. *Jane's All the World Aircraft* Reports have been annually published since 1909 and they describe, for each manufacturer throughout the world, the aircraft models in production or in development and provide technical characteristics and sales information.

We collected data on the 84 firms from the Western World (i.e. excluding China and former COMECON countries) that produced aircraft of one of the four types listed above between 1944 and 2000. These 84 firms together undertook 159 entries, i.e. created 159 new operations in the four business lines. Hence, our sample comprises 84 first entries into the industry and 75 incumbent entries into a new sub-field. For 58 % (93 cases) of these 159 entries into a new sub-field, manufacturers chose to enter the new product area without forming pre-entry alliances. In 42 % of the cases (66 entries) sequential entry was selected. Among these 66 firms having selected sequential entry, 20 succeeded in marketing at least one autonomously developed aircraft in the new line of business. 46 firms either exited the industry before having autonomously produced an aircraft in the considered line of business or, though they still operated in the industry at the end of our period of study, had not yet undertaken any autonomous production in the considered line of business.

Our original dataset records technical characteristics and production volumes for a firm's first autonomously developed product in any line of business as well as for all jointly produced aircraft. For incumbents undertaking entry into a new line of business, we also recorded firm characteristics at time of entry into the new sub-field.

To test our hypotheses on the influence of entry strategy on subsequent success while accounting for the endogeneity of strategy entry choice we used two-step treatment effect models (Shaver, 1998; Hamilton and Nickerson, 2003; Greene, 2003). In the first step of the treatment models, we analyzed the entry strategy selected using a probit regression on our sample of 159 observations. In the second step, we analyzed their post-entry success and survival accounting for the endogeneity of their entry strategy choice, using OLS and Cox regressions.

Entry Strategy Model

In the first step of our analysis we tested our hypotheses with a probit regression on the factors driving the choice of direct entry over sequential entry. This enabled us to build a self-selection variable that takes the endogeneity of entry strategy into account. This variable λ is obtained by using inverse Mill's ratios formula (Shaver, 1998; Hamilton and Nickerson, 2003; Greene, 2003):

- $\lambda = \varphi(A) / \Phi(A)$ if entry strategy = direct entry
- $\lambda = - \varphi(A) / (1 - \Phi(A))$ if entry strategy = sequential entry

where

- φ and Φ specify the normal density and the normal cumulative probability functions and A the linear prediction.

The self-selection λ captures the endogeneity of entry strategy choice and is treated as an independent variable in the second step of the model.

Dependent variable

Entry strategy: the dependent variable, i.e. the use of a specific entry strategy, was captured by a dummy variable. This variable takes the value 1 when an entrant made a direct entry and takes the value 0 when the entrant enters one of the 4 sub-fields of the Aircraft Industry though pre-entry alliances. We considered a firm to make a sequential entry when its first listing in the Jane's *All the World Aircraft* in any of the four above mentioned lines of business was described as having been through either cooperation (i.e. joint ventures, consortia, non-equity alliances, joint prime-contractorships, etc.) or licensing. Jane's Yearbooks include a separate section listing all cooperative aircraft models and specifies all licensed production.

Independent variables

(i) technical and production resources: we assessed the stock of technical and production resources available to a firm when entering a new line of business by evaluating the size of the firm in other business domains of the aircraft industry. This size was estimated by a proxy for sales obtained by multiplying the number of aircraft produced in other business lines by their respective complexity; this was calculated at time of entry into the new line of business.

(ii) marketing and sales resources: marketing and sales resources are those resources required to secure adequate sales volumes for a new product. We estimated them by evaluating the size of a firm's market base, i.e. the size of the market to which the firm has a privileged access. As most aircraft are initially developed for military purposes, we assessed the size of a firm's market base through the military budget of the firm's home country, the year of entry into the new line of business, in constant 1970 US dollars. This data was recorded from the *SIPRI* yearbooks (1950-2000).

(iii) financial and other generic resources: we estimated a firm's financial and other generic resources by recording whether the considered entering firm was part of a diversified conglomerate with activities outside the Aircraft Industry. Thus, we built a dummy variable recording whether the firm was active in other industries (electronics, automobiles, other transportation equipment industries, …)

Control variables

We included several control variables that might influence the choice of a specific entry mode: the *year* of the first foothold in the business line to take into account any trend effect, the *business line* (fighter aircraft, turboprop aircraft, rotorcraft, and jet transport aircraft) to capture differences between product types. To capture the influence of possible differences between commercial and military markets and products on entry strategy, we built a dummy variable recording whether the first product in the business line was exclusively a *military aircraft*. We also included a variable recording whether the firm was *state-owned*. We suspect being state-owned might have an influence on a firm's preferred entry strategy though the direction of such an influence is unclear. On the one hand, state-owned companies may enjoy government subsidies that help them overcome a lack of the resources needed to internally develop aircraft models. On the other hand, state-owned companies may be

compelled to enter collaborative ventures – in particular with foreign partners- for political reasons.

We also captured the *complexity* of the first product in the new line of business, as this may have an influence on the choice of the mode used to produce it. Indeed, many studies rooted in the Transaction cost theory or in the resource-based view found that the greater the complexity of a targeted resource, the greater the likelihood to develop it through external means (Arora and Gambardella, 1990; Masten, Meehan and Snyder, 1991; Mitchell and Singh, 1996; Singh, 1997). Following Saviotti and Metcalfe (1984) and Frenken and Leydesdorff (2000), we captured the complexity of an aircraft by multiplying its range (in kilometers), its weight (in kilograms) and its speed (in kilometers/hour). Because the distribution is highly skewed, we log-transformed this data to generate our complexity variable.

Post-Entry Success Models

We now turn to the second stage of our model and test our hypotheses on the influence of entry strategy on post-entry success while accounting for the endogeneity of the choice.

Dependent variables

We used three dependent variables to estimate post-entry success: (i) the development time of the first autonomously developed aircraft program and (ii) its cumulated sales to assess short-term performance and, (iii) the duration of post-entry survival of the considered firm in the new line of business to assess long-term performance.

Short term performance

Development time of the first autonomously developed program (Model A): the development time variable records the time (in years) between the first flight of the aircraft prototype and the first delivery of production aircraft. It ranges from 0.58 to 8.83 years with an average of 3.12 years. As the development time is a continuous variable, we examine it with an OLS regression on the 113 examined firms that eventually achieved entry. Indeed, 46 firms continued producing through alliances or exited the sub-field before achieving full entry.

Cumulative sales of the first autonomously developed program (Model B): our second short-term performance variable is the cumulative sales of the first autonomously developed

program. The complexity of an aircraft influencing its price, we use in this model the log (cumulative production*complexity of the program) as the dependent variable**.** Indeed, selling 100 Piper or Cessna turbo-propeller aircraft is not equivalent to selling 100 Boeing B-747s. In addition, to avoid any right censoring that may corrupt our results, we analyze the cumulated sales with an OLS regression only on those programs where production has been terminated (85 programs). Cumulative production ranges from 12 to 8509 aircraft with an average of 679.

Long term performance

Post-entry survival (Model C): our post-entry survival variable records the time between the introduction (first delivery of production aircraft) of the first autonomously developed program and the exit from the sub-field (either through dissolution or acquisition by a competitor). It is calculated in years. Businesses alive in 2000 are treated as censored. We tested post-entry survival with a Cox regression, with exit from the sub-field as the hazard variable and time to exit as the dependent variable.

Independent variables

As our hypotheses are on the influence of entry strategy on success when accounting for the endogeneity of entry mode choice, we included in our model the following two variables:

Entry strategy: we recorded the entry strategy with a dummy variable that takes the value "1" in case of a direct entry and the value "0" in case of a sequential entry.

Selection λ*:* to take into account the endogeneity of entry strategy choice we included the self-selection dummy variable λ we obtained in the first step of our analysis.

Control variables

We include the same control variables as those used in the first stage of the treatment effect model: the year of the first deliveries of the first autonomously developed aircraft, the type of aircraft, the size of the firm's market base, and finally the commercial or military nature of the aircraft. We also included the complexity of the aircraft for the study of development time (Model 2A) and of post-entry survival (Model 2C) but not for the study of cumulated sales (Model 2B). Indeed, we use aircraft complexity in calculating the dependent variable. In contrast, in model 2B, we included the development time of the aircraft as we suspect it may have a negative influence on sales.

RESULTS

Tables 1, 2 and 3 summarize the descriptive statistics and pair-wise correlations among the variables used in the first and second stages of the analysis. No variable exhibits distribution or correlation problems. Tables 4 and 5 present the results of the 1st and 2nd step of the treatment effect models.

Entry strategy model

Our predictions on the choice of entry strategy are all supported. Indeed, our results show that a firm's technical and production resource endowment, a firm's marketing and sales resource endowment, and a firm's stock of financial and generic resources, all favor the choice of direct entry over sequential entry.

More precisely, we found, as predicted, that firms with a large presence in other sub-fields of the industry tend to enter a new line of business of this same industry directly. Indeed, a firm with a large presence in the industry can redeploy similar technical resources from closely related activities to establish a stand-alone presence in the considered line of business (H1a). Our results also suggest that firms that have access to a large market base tend to prefer to enter a new line of business directly. This result supports our hypothesis (H1b) that a privileged access to a large market increases a firm's confidence that it can achieve adequate sales levels. Finally, we found that firms that are a part of a conglomerate can benefit from easier and quicker access to generic and financial resources required to directly establish an autonomous operation in a new line of business (H1c).

These results suggest that pre-entry alliances are used by firms that have fewer technical, commercial and financial resources. In other words, our main proposition that the use of pre-entry alliances is a means for weaker firms to overcome entry barriers is corroborated.

Performance model

Overall, the results of the second stage of our treatment effect models support our hypotheses.

First, as predicted, we found that the endogeneity of entry strategy choice should be accounted for when studying post-entry performance. Indeed, the self-selection variable is significant in all three models predicting both short and long-term performance. This first result is very consistent with Shaver (1998), Brouthers, Brouthers and Werner (2003) and

Hamilton and Nickerson (2003) who argued that omitting to take into account the endogeneity of strategy choice is likely to lead to biased estimates.

We now turn to the results on the influence of entry strategy on short and long-term post-entry success.

We find that firms that enter a new sub-field directly have a longer post-entry survival compared to firms that use a sequential entry (Model 2C). This supports our hypothesis on the positive influence of entering a new sub-field directly on the long-term post-entry performance (H2b). In contrast, our results show only partial support for our hypothesis on the positive short-term influence of entering a new sub-field through pre-entry alliances. Indeed, we find that experience gained through the use of alliances has a significantly positive influence on the cumulated sales of the first autonomously developed product. However, we find no support for our hypothesis when we use total development time of the first autonomously produced aircraft as the dependent variable. Indeed, contrary to our prediction, our results show direct entry leads to shorter subsequent development time, although this result is not statistically significant.

Overall, we find that sequential entry is selected by weaker competitors to overcome entry barriers. Indeed, pre-entry alliances seem to be used by firms to compensate for limited technical and production resources, for limited commercial and sales resources and for a limited endowment in generic and financial resources. We also verified that entry strategy is endogenous and should be taken into account when studying the performance impact of entry strategy. Concerning the influence on post-entry success, we found that the use of pre-entry alliances increases the cumulated sales of the first product developed on a stand-alone basis. However, we did not find any significant influence of entry strategy on the development time of the first autonomously developed product. Finally, supporting our hypothesis on the long-term performance influence of entry strategy, we found that pre-entry alliances have a negative influence on post-entry survival, even when endogeneity of strategy choice is accounted for.

DISCUSSION, LIMITATIONS AND CONCLUSION

The results of our research suggest that the use of pre-entry alliances by firms that eventually achieved a stand-alone presence in a new line of business helps them develop

market-related capabilities. Indeed, we find that firms that used a sequential entry strategy achieve greater cumulated sales for their first autonomously developed product when compared to firms that entered a new sub-field directly. It thus seems that, through the use of pre-entry alliances, firms effectively learn about who the customers are, about how to understand their needs and about how to deal with them. Following sequential entry, a firm's first autonomously developed product appears to benefit from this better customer knowledge which, in turn, translates into increased cumulated sales.

However, the benefits associated with sequential entry, that we observe in the case of market-related capabilities, do not seem to materialize when technical capabilities are concerned. Indeed, though we had expected pre-entry alliances to also help enhance technical capabilities, this does not seem to be the case, with post alliance development not being significantly shorter than the development of products following direct entry. This discrepancy between market-related and technical capabilities might stem from a number of reasons.

First, commercial and technical tasks and responsibilities in joint aerospace projects are not shared in the same way. Commercial tasks are usually divided up on a geographic basis with each partner carrying out the entire commercial activities in those regions of the world under its responsibility. This provides firms with a comprehensive experience of all market related activities, albeit limited to only a portion of the total market. In contrast, development and manufacturing tasks are divided on the basis of the different sub-systems composing the entire aircraft. Each partner will thus only acquire experience in the production of those parts of the aircraft that are under its responsibility. If development of an aircraft is carried out through the parallel and simultaneous development of all major sub-systems, total development time will be determined primarily by the time required to develop the sub-systems that are new to the firm. In this respect, firms having entered sequentially or directly have a similar (lack of) experience on those sub-systems that they have never produced before. This might account for our somewhat unexpected result on the lack of any significant difference in new product development time following direct vs. sequential entry.

Second, not all alliances associate only new entrants into the considered sub-field. Many of these alliances include one more experienced partner. Thus, in such alliances, the new entrant is a junior partner with much less responsibilities than the senior partner. The

experience acquired through the alliance in such cases may be significantly more limited than what could be expected, also contributing for the absence of significant results in terms of development time.

Finally, success of the jointly produced aircraft may lead to overconfidence following sequential entry and subsequently to underestimating the difficulties of development and manufacturing activities on a stand alone basis. In turn, this illusion of control (Durand, 2003) may result in unforeseen development problems that lead to time-consuming redesign and ultimately cancel out the benefits of whatever technical advantage may have been acquired through the use of pre-entry alliances.

In addition, our data reveals that the first autonomously developed product of firms that used sequential entry is significantly less complex compared to the product they cooperatively produced previously ($p < 0.05$). One possible interpretation for this result is that the first autonomously developed product of firms that used sequential entry is a direct application of downgraded capabilities obtained through the alliance. Hence, firms using a sequential entry strategy may acquire the capability to replicate activities but not to dynamically develop new capabilities required by new customers needs and changes in the environment. Consequently, as we hypothesized and verified, firms that used sequential entry strategies tend to exit the sub-field sooner than firms that used a direct entry. Indeed, firms entering directly and that have thus been forced to learn on their own seem to develop capabilities that allow them to more effectively adjust to changes in the longer term.

Overall, theses results suggest that initial choices at the time of entry, which are affected by pre-entry resources, are critical to post-entry success and survival (Helfat and Lieberman, 2002). Our results are also consistent with Zollo and Winter (2002) and Zollo and Reuer (2003) who found that experience accumulation is less effective compared to other more deliberate forms of learning (such as autonomous product development in the case of this study). Indeed, they argue that tacit experience accumulated operates at low levels of intentionality, therefore, experience may develop overconfidence in one's own competence. In line with this argument, we found in this research that, although experience increases customer knowledge, it does not replace the intentional autonomous development of the required routines needed to effectively develop new products in a high technology context. This illusion of control negatively affects post-entry long-term performance as such intentionally obtained routines are required when changes in the competitive environment

call for the introduction of products adjusted to radically new customers needs or incorporating radically new technologies.

While we believe that this study has shed light on important aspects of the use of pre-entry alliances as a means to enter into a new line of business, it also has limitations. First, as all single-industry studies, it raises the issue of the generalizability of the reported findings. Also, it measures long term post-entry success by survival in the line of business, thus suggesting that all forms of exit should be viewed as failure. However, several scholars (Mitchell 1994; Chang and Singh 1999) have argued that dissolution exits and acquisition exits are different types of exit by nature and should be treated separately. Though we acknowledge the differences between these two types of exits, we chose not to distinguish between them in this study because the size of our sample prevented us from making such a distinction. Future developments of our research should take care of this limitation.

Despite its limitations, the results of our research suggest that the use of pre-entry alliances enables weaker firms to overcome entry barriers. Although we found that experience accumulated through the use of pre-entry alliances increases market-related capabilities, it does not seem to provide the same benefits on the technical side. The use of pre-entry alliances even seems to negatively affect long-term post entry performance. This we interpret as the consequence of the fact that alliance-based experience might create an illusion of control on the resources and abilities required to develop new products. As argued by Zollo and Reuer (2003), our results highlight that experience may develop overconfidence in one's own competence and does not match the deliberate and intentional development of the resources required to successfully operate and, more importantly, continuously and dynamically adjust to changes in the environment of a given line of business.

REFERENCES

Ahuja, G. 2000. The duality of collaboration: inducement and opportunities in the formation of interfirm linkages. ***Strategic Management Journal***, 21(10/11): 317-343.

Amit, R., Schoemaker, P. 1993. Strategic assets and organizational rents. ***Strategic Management Journal***, 14(1): 33-46.

Anand, B., Khanna, T. 2000. Do firms learn to create value? The case of alliances. ***Strategic Management Journal***, 21(3): 295-315.

Arora, A., Gambardella, A. 1990. Complementary and external linkages: the strategies of large firms in biotechnology. ***Journal of Industrial Economics***, 38(4): 361-379.

Balakrishnan, S., Koza, M. 1993. Information asymmetry, adverse selection and joint ventures, theory and evidence. ***Journal of Economic Behavior and Organization***, 20: 99-117.

Barkema, H., Vermeulen, F. 1998. International expansion throught start-up or acquistion: A learning perspective. ***Academy of Management Journal***, 41(1): 20-27.

Brouthers, K. 2002. Institutional, cultural and transaction cost influences on entry modes choice and performance. ***Journal of International Business Studies***, 33(2): 203-221.

Brouthers, K., Brouthers, L. 2000. Acquisition or greenfield start-up ? Institutional, cultural and transaction cost influences. ***Strategic Management Journal***, 21(1): 89-97.

Brouthers, K., Brouthers, L., Werner, S. 2003. transaction cost-enhanced entry mode choices and firm performance. ***Strategic Management Journal***, 24(12): 1239-1248.

Capron, L., Dussauge, P., Mitchell, W. 1998. Resource redeployment following horizontal acquisitions in Europe and North America, 1988–1992. ***Strategic Management Journal***, 19(7): 631-661.

Chang, S., Rosenzweig, P. 2001. The choice of entry mode in sequential foreign direct investment. ***Strategic Management Journal***, 22(8): 747-776.

Chang, S., Singh, H. 1999. The impact of modees of entry and resource fit on modes of exit by multibusiness firms. ***Strategic Management Journal***, 20(11): 1019-1035.

Delios, A., Beamish, P. 2001. Survival and profitability: the roles of experience and intangible assets in foreign subsidiary performance. ***Academy of Management Journal***, 44(5): 1028-1038.

Durand, R. 2003. Predicting a firm's forecasting ability: the roles of organizational illusion of control and organizational attention. ***Strategic Management Journal***, 24(9): 821-838.

Dussauge, P., Garrette, B., Mitchell, W. 2000. Learning from competiting partners: outcomes and durations of scale and link alliances in Europe, North America and Asia. ***Strategic Management Journal***, 21(2): 99-126.

Dussauge, P., Garrette, B., Mitchell, W. 2004. Asymmetric performance: the market share impact of scale and link alliances in the global auto industry. ***Strategic Management Journal***, 25(7): 701-712.

Frenken, K., Leydesdorff, L. 2000. Scaling trajectories in civil aircraft (1913-1997).. ***Research Policy***, 29(3): 331-349.

Greene, W. ***Econometric Analysis.*** Englewoods, NY: Prentice Hall.

Gulati, R. 1995. Does familiarity breed trust ? The implications of repeated ties for contratual choices in alliances. ***Academy of Management Journal***, 38(1): 85-112.

Gulati, R. 1999. Network location and learning: The influence of network resources and firm capabilities on alliance formation. ***Strategic Management Journal***, 20(5): 397-420.

Gulati, R., Gargiulo, M. 1999. Where do interorganizationnal networks come from ?. ***American Journal of Sociology***, 104(5): 1439-1493.

Hamel, G. 1991. Competition for competence and inter-partner learning with international strategic alliances. ***Strategic Management Journal***, 12(SI): 83-103.

Hamel., G., Doz, Y., Prahalad, CK. 1989. Collaborate with your competitors - and win. ***Harvard Business Review***, 67(1): 133-139.

Hamilton, B., Nickerson, J. 2003. Correcting for endogeneity in strategic management research. ***Strategic Organization***, 1(1): 51-78.

Hayward, M., Hambrick, D. 1997. Explaining premium paid for large acquisitions: evidence of CEO hubris. ***Administrative Science Quarterly***, 42(1): 103-127.

Helfat, C., Lieberman, M. 2002. The birth of capabilities: market entry and the importance of pre-history. ***Industrial and Corporate Change***, 11(4): 725-760.

Henderson, R., Cockburn, I. 1994. Measuring competences? Exploring firm effects in Pharmaceutical Research. ***Strategic Management Journal***, 15(S4): 63-84.

Hennart, J.-F. 1991. The transaction costs theory of joint ventures: an empirical study of japanese subsidiaries in the US.. ***Management Science***, 37(4): 483-497.

Hennart, J.-F., Park, Y.-R. 1994. Location, governance and strategic determinants of Japanese manufacturing investment in the US. ***Strategic Management Journal***, 15(6): 419-436.

Hennart, J.-F., Reddy, S. 1997. The choice between mergers/acquisitions and joint ventures: the case of japanese investors in the United States. ***Strategic Management Journal***, 18(1): 1-12.

Ingham, H., Thompson, S. 1994. Wholly-owned vs. collaborative ventures for diversifying financial services. ***Strategic Management Journal***, 15(4): 325-334.

Inkpen, A. 2000. Learning through joint ventures: a framework of knowledge acquisition. ***Journal of Management Studies***, 37(7): 1019-1043.

Jane's. Year 1944-2000. ***All the World's Aircraft.*** London: Jane's Publishing Company Ltd.

Katila, R., Ahuja, G. 2002. Something old, something new: a longitudinal study of search behavior and new product introduction. ***Academy of Management Journal***, 45(6): 1183-1195.

Kogut, B., Singh, H. 1988. The effects of national culture on the choice of entry mode. ***Journal of International Business Studies***, 19(3): 411-432.

Kogut, B., Zander, U. 1993. Knowledge of the firm and the evolutionary theory of the multinational corporation. ***Journal of International Business Studies***, 24(4): 625-645.

Levinthal, D., March, J. 1993. The myopia of learning. ***Strategic Management Journal***, 14(8): 95-112.

Levitt, B., March, J. 1988. Organizational learning. ***Annual Review of Sociology***, 14: 319-340.

Li, J., Guisinger, S. 1991. Comparative business failures of foreign-controlled firms in the United States. ***Journal of International Business Studies***, 22(2): 209-224.

Makino, S., Neupert, K. 2000. National culture, transaction costs, and the choice between joint ventures and wholly owned subsidiary. ***Journal of International Business Studies***, 31(4): 705-713.

Martin, X., Mitchell, W. 1998. The influence of local search and performance heuristics on new design introduction in a new product market. ***Research Policy***, 29(7/8): 753-771.

Masten, S., Meehan, J., Snyder, E. 1991. The cost of the organization. ***Journal of Law, Economics and Organization***, 7(1): 01-25.

Mitchell, W. 1994. The dynamics of evolving markets: the effects of business sales and age on dissolution and divestitures. ***Administrative Science Quarterly***, 39(4): 575-602.

Mitchell, W., Singh, K. 1992. Incumbents' use of pre-entry alliances before expansion into new technical subfields of an industry. ***Journal of Economic Behavior and Organization***, 18(3): 347-372.

Mitchell, W., Singh, K. 1996. Survival of businesses using collaborative relationships to commercialize complex goods. ***Strategic Management Journal***, 17(3): 169-195.

Nerkar, A., Robert, P. 2004. Technological and product-market experience and the success of new product introductions in the pharmateutical industry. ***Strategic Management Journal***, 25(8/9): 779-799.

Pan, Y., Chi, P.S.K. 1999. Financial performance and survival of multinational corporations in China. ***Strategic Management Journal***, 20(4): 359-374.

Park, S., Russo, M. 1996. When competition eclipses cooperation: an event history analysis of joint venture failure. ***Management Science***, 42: 875-890.

Saviotti, P., Metcalfe, J. 1984. A theoretical approach to the construction of technological output indicators. ***Research Policy***, 13: 141-151.

Shaver, M. 1998. Accounting for endogeneity when assessing strategy performance: does entry mode choice affect FDI survival. ***Management Science***, 44(4): 571-585.

Simmonds, P. 1990. The combined diversification breadth and mode dimentions and the performance of large diversified firms. ***Strategic Management Journal***, 11(5): 399-410.

Simonin, B. 1999. Ambiguity and the process of knowledge transfer in strategic alliances. ***Strategic Management Journal***, 20(7): 595-623.

Singh, K. 1997. The impact of technological complexity and interfirm cooperation on business survival. ***Academy of Management Journal***, 40(2): 339-367.

SIPRI. Year 1969-2000. ***SIPRI Yearbook.*** Oxford: Oxford University Press.

Teece, D., Pisano, G. 1994. The dynamic capabilities of firms: an introduction. ***Industrial and Corporate Change***, 3(3): 537-556.

Teece, D., Pisano, G., Shuen, A. 1997. Dynamic capabilities and strategic management. ***Strategic Management Journal,*** 18(7): 509-530.

Vermeulen, F., Barkema, H. 2001. Learning through acquisitions. ***Academy of Management Journal***, 44(3): 457-476.

Vermeulen, F., Barkema, H. 2002. Pace, rhythm, and scope: path dependencies in benefiting from internationalization. ***Strategic Management Journal***, 23(7): 637-653.

Walker, G., Kogut, B., Shan, W. 1997. Social capital, structural holes and the formation of an industry network. ***Organization Science***, 8(2): 109-125.

Woodcock, P., Beamish, P., Makino, S. 1994. Ownership-based entry strategies and international performance. ***Journal of International Business Studies***, 25(2): 253-273.

Zollo, M., Reuer, J. 2003. Superstitious learning in corporate acquisitions. ***INSEAD Working Paper***,: 3-31.

Zollo, M., Winter, S. 2002. Deliberate learning and the evolution of dynamic capabilities. ***Organization Science***, 13(6): 701-713.

Table 1: descriptive statistics and pair-wise correlations for model 1 (N=159)

Variable	Obs	Mean	Std, Dev,	Min	Max	1	2	3	4	5	6	7	8	9	10	11
Direct entry	159	0,585	0,494	0	1	1										
Helico	159	0,145	0,353	0	1	-0,089	1									
Jet	159	0,138	0,346	0	1	0,227	-0,165	1								
Prop	159	0,321	0,468	0	1	0,141	-0,283	-0,275	1							
potential market	159	17 120,5	27 442,5	103,0	92 554,1	0,357	0,128	0,181	0,090	1						
state-owned	159	0,283	0,452	0	1	-0,349	0,020	-0,131	-0,073	-0,356	1					
Industrial group	159	0,654	0,477	0	1	0,300	-0,002	0,138	0,047	0,102	-0,336	1				
Year	159	1967,3	13,9	1944	2000	-0,112	0,127	0,058	0,137	0,024	0,293	-0,194	1			
Complexity	159	2,054	0,923	0,026	4,093	-0,063	-0,624	0,392	0,024	-0,075	-0,007	0,117	-0,088	1		
Size	159	83,6	216,6	0,0	1 396,0	0,244	-0,086	0,337	0,105	0,292	-0,178	0,163	-0,095	0,390	1	
exclu. Military	159	0,535	0,500	0	1	-0,121	-0,297	-0,393	-0,277	-0,343	0,166	-0,069	-0,179	0,087	-0,248	1

Table 2: descriptive statistics and pair-wise correlations for model 2A and 2C (N=113)

Variable	Obs	Mean	Std, Dev,	Min	Max	1	2	3	4	5	6	7	8	9	10	11
Direct entry	113	0,823	0,383	0	1	1										
development time	113	3,122	1,620	0,581	8,836	-0,118	1									
max post-entry age	113	22,699	14,953	2	57	0,168	-0,424	1								
Helico	113	0,142	0,350	0	1	-0,144	0,160	0,001	1							
Jet	113	0,168	0,376	0	1	0,209	-0,242	0,125	-0,183	1						
Prop	113	0,354	0,480	0	1	0,101	-0,042	-0,117	-0,301	-0,333						
potential market	113	21 497,9	29 226,2	337,7	92 554,1	0,284	-0,200	0,072	0,214	0,187	1					
state-owned	113	0,195	0,398	0	1	-0,241	0,311	-0,109	0,057	-0,102	-0,318	1				
Year	113	1967,4	14,3	1944	1999	-0,213	0,300	-0,532	0,247	0,049	0,020	0,280	1			
complexity	113	1,974	0,947	0,026	4,093	0,070	-0,168	0,074	-0,601	0,468	-0,059	-0,131	-0,323	1		
Size	113	118,3	244,5	0,0	1 396,0	0,085	-0,161	0,198	-0,101	0,346	0,271	-0,137	-0,104	0,454	1	
exclu. Military	113	0,540	0,501	0	1	-0,242	0,255	-0,106	-0,134	-0,440	-0,428	0,050	-0,188	-0,027	-0,246	1

Table 3: descriptive statistics and pair-wise correlations for model 2B (N=85)

Variable	Obs	Mean	Std, Dev,	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13
Direct entry	85	0,812	0,393	0	1	1												
development time	85	3,148	1,507	0,581	8,173	-0,035	1											
max post-entry age	85	23,388	15,120	2	57	0,119	-0,387	1										
cumulated sales	85	6,096	1,633	2,624	9,816	0,115	-0,256	0,280	1									
Helico	85	0,059	0,237	0	1	-0,008	-0,069	0,203	-0,294	1								
Jet	85	0,129	0,338	0	1	0,186	-0,195	0,165	0,100	-0,096	1							
Prop	85	0,388	0,490	0	1	0,075	0,029	-0,236	-0,313	-0,199	-0,307	1						
potential market	85	17 797,9	26 108,5	337,7	86 274,0	0,266	-0,156	0,004	0,105	0,228	0,187	0,056	1					
state-owned	85	0,188	0,393	0	1	-0,230	0,231	-0,065	-0,264	0,008	-0,096	0,172	-0,275	1				
Year	85	1963,2	11,7	1944	1994	-0,242	0,293	-0,416	-0,532	-0,070	-0,038	0,445	-0,017	0,345	1			
Product complexity	85	2,106	0,898	0,079	4,093	0,008	-0,089	-0,027	0,434	-0,489	0,479	-0,143	0,022	-0,188	-0,221	1		
Firm size	85	118,8	243,1	0,0	1 396,0	0,071	-0,134	0,122	0,110	-0,106	0,507	0,002	0,316	-0,108	0,008	0,480	1	
exclu. Military	85	0,647	0,481	0	1	-0,230	0,257	-0,046	-0,020	-0,025	-0,449	-0,321	-0,367	0,041	-0,174	-0,156	-0,301	1

Table 4: 1st stage of the treatment effect models - *** p <0.01; ** p<0.05; * p<0.10

dependent var.	Entry Strategy (direct entry=1)			
	Coef.	Std. Err.	Z	
firm size	**0,004**	**0,002**	**2,400**	**
potential market	**0,000**	**0,000**	**2,670**	***
industrial group	**0,668**	**0,272**	**2,460**	**
Line of business				
- fighter [omitted]				
- helico	-0,787	0,584	-1,350	
- jet	1,970	0,637	3,090	***
- prop	0,779	0,432	1,800	*
year	-0,010	0,010	-0,930	
product complexity	-0,846	0,215	-3,940	***
state-owned	-0,418	0,307	-1,360	
excl. military	0,795	0,410	1,940	**
constant	19,545	20,387	0,960	

Regression	Probit
Number of obs.	159
LR chi2 (10)	72,210
Prob > chi2	0,000
Log likelihood	-71,803
Pseudo R2	0,335
Sensitivity	84.95%
Specificity	71,21%
Correctly classified	79,25%

Table 5: 2nd stage of the treatment effect models - *** p <0.01; ** p<0.05; * p<0.10

	MODEL 2A	MODEL 2B	MODEL 2C
Regression	OLS	OLS	COX
Number of obs.	113	85	113
F	4,250	7,93	
Prob > F	0,000	0,000	
R-squared	0,317	0,5171	
Adj R-squared	0,242	0,4519	
No. of failures			64
Failure event			exit from the sub-field
Analysis time			maximum post-entry age
Prob > chi2			0,002
LR chi2(11)			28,930
dependent var.	development time	cumulated sales	maximum post-entry age

	Coef.	Std. Err.	z		Coef.	Std. Err.	z		Coef.	Std. Err.	z	
constant	-69,359	23,398	-2,960	***	108,162	29,523	3,660	***				
Self selection λ	**1,155**	**0,561**	**2,060**	**	**1,087**	**0,441**	**2,470**	**	**1,152**	**0,583**	**1,980**	**
Direct entry	**-0,977**	**0,892**	**-1,100**		**-1,425**	**0,694**	**-2,050**	**	**-1,556**	**0,839**	**-1,850**	*
potential market	0,000	0,000	0,420		0,000	0,000	2,670	***	0,000	0,000	1,050	
firm size	0,001	0,001	0,840		0,001	0,001	1,030		0,000	0,001	-0,460	
Line of business												
- fighter [omitted]												
- helico	0,386	0,618	0,630		-2,819	0,621	-4,540	***	-1,104	0,844	-1,310	
- jet	-0,382	0,726	-0,530		-0,427	0,540	-0,790		0,163	0,751	0,220	
- prop	-0,133	0,460	-0,290		-0,791	0,367	-2,160		0,643	0,422	1,520	
year	0,037	0,012	3,120	**	-0,051	0,015	-3,380	**	0,030	0,014	2,210	**
state-owned	0,658	0,392	1,680	*	-0,085	0,385	-0,220		-0,458	0,391	-1,170	
exclu. military	0,967	0,427	2,270	**					1,035	0,455	2,280	**
product complexity	0,005	0,271	0,020						0,151	0,257	0,590	
development time					-0,199	0,100	-2,000	**				