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RESEARCH NOTES AND COMMUNICATIONS

FOREIGN ENTRANT SURVIVAL AND FOREIGN MARKET SHARE: CANADIAN COMPANIES' EXPERIENCE IN UNITED STATES MEDICAL SECTOR MARKETS

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We show that successful foreign market entry is related to the extent of foreign presence in an industry at the time of entry. Survival of 31 Canadian-based businesses that entered 24 U.S. medical sector markets between 1968 and 1989 tended to be somewhat longer in product markets in which foreign-based businesses held a moderate market share when the Canadian businesses entered than in low and high foreign share product markets. The result controls several other industry and business-level factors, including industry concentration, entry year, corporate size, related diversification, entry mode, and service sector status.

Although many companies have become successful players in world markets, expanding internationally is risky. Newbould, Buckley, and Thurwell (1978) found that small British businesses often failed when they expanded abroad. Bane and Neubauer (1981) found that a high proportion of subsidiaries of multinational companies failed within a few years of startup or acquisition. Lane and Hildebrand (1990) showed cases in which many strong Canadian businesses failed in their attempts to expand into U.S. retail markets. Mascarenhas (1992) showed that early followers in offshore oil-drilling markets often suffered. There is a striking need to increase our understanding of the influences on successful and failed expansion in international markets.

Key words: International market entry timing, business survival

In this paper, we propose that there will often be a nonmonotonic relationship between the success of international market entry and the presence of foreign players in the market at the time of entry. Two recent empirical studies hint at the prediction, which stems from the tension between opportunities for later entrants to learn from earlier entrants and growing competition as more businesses enter a market. Mitchell, Shaver and Yeung (1992) found that many businesses expanding in an industry that already contained several successful multinational players failed. By contrast, Mitchell *et al.* (1993) found that increased international presence led to positive results in industries that did not yet contain well-established international competitors. To test our prediction, we estimate the effect of foreign presence at entry time on the survival of 31 Canadian businesses that entered medical sector product markets in the United

States between 1968 and 1989. The analysis, which controls several relevant business and industry-level factors, indicates that a foreign entrant's survival, which is one measure of performance, might be more likely when target markets have moderate levels of foreign presence than when foreign presence is low or high.

BACKGROUND

Motivation

Businesses conduct foreign direct investment when their managers believe that the advantages accruing to multinational operations will outweigh the costs associated with international operations. The advantages of international expansion might be tempered by at least three types of problems, the significance of which will vary depending on the extent of foreign participation in a product market at the time of entry. First, some industries do not offer sufficient benefits of global operation to outweigh the difficulties and costs of managing a complex multinational organization. Although rational managers are unlikely to conduct such unprofitable international expansion intentionally, costs and benefits calculations are uncertain and managers often discover whether there is sufficient net benefit to out compete indigenous players only after undertaking expansion.

Second, even in an industry that offers substantial benefits of global operation, businesses may make damaging and costly mistakes in the process of expansion. When compared with indigenous players, newly-entering foreign-based businesses are less familiar with the local input markets, distribution systems, consumer tastes and habits, and legal and regulatory environments. Newcomers may make irreversible mistakes in sourcing, choosing production sites, selecting distribution approaches, and making logistic decisions that limit sales opportunities or incur unduly heavy operating costs, taxes, and regulatory burdens. The first problem can be viewed as a regrettable choice of market in which to expand, while the second problem amounts to choosing the wrong expansion strategy in the right market.¹

The first two types of problems will be

particularly common for the earliest foreign entrants to a geographic market. Calculating costs and benefits and choosing entry strategies will be especially difficult for them because there is little precedent from which to learn about the idiosyncrasies of a market. Most early entrants will make mistakes, sometimes incurring nontrivial costs that cause irreversible damages and lead to business failure. This argument is similar to conclusions of entry order and preemption studies of entry to new industries, in which the earliest entrants often run a high risk of making irreversible mistakes or entering markets that do not develop as expected (e.g., Glazer, 1985; Lieberman and Montgomery, 1988; Mitchell, 1991). Although some early entrants may be able to establish strong long-term positions in a market, many others may fail.

A third problem will be most common for late foreign entrants to a geographic market. We expect many late entrants to fail when they enter a geographic market containing well-established foreign competitors, which often will have already realized many of the benefits of international operation. The benefits may provide major advantages to the first foreign businesses that establish successful operations in a market and strengthen their ability in defending their positions. While trying to displace an established competitor, a newcomer must pay the price of learning to manage a complicated global network of business activities. Often, the price will be too high and the opposition from entrenched competitors too strong, so that the entrant will have to retreat. This argument parallels ecological studies, which often find that increasing population density at entry time is associated with higher exit rates (e.g., Carroll and Hannan, 1992).

The greatest opportunities for successful international expansion are likely to arise in geographic markets that have experienced some penetration by foreign operators but in which foreign businesses do not yet play a strong role. Companies may be able to avoid unwarranted expansion by waiting until a few pioneers have entered a geographic market and demonstrated

¹ The first and second types of problems differ conceptually. Think of maximizing business value $V(X,e)$, where X is a strategy value (defined by the method and location of

expansion) and e is a stochastic term. The first type of problem refers to a highly negative and unexpected realization of e . The second type of problem refers to mistakes in choosing and implementing X .

that net advantages of international operations do exist. Moreover, businesses that enter during such a midrange period can often observe and evaluate the entry strategies chosen by their predecessors. To the extent that midrange entrants can learn from the mistakes and successes of earlier foreign entrants, they are more likely to make appropriate choices for sourcing, production, marketing, organizational, and other key decisions. This reasoning is similar to analyses showing that organizations beginning production later may be able to learn from earlier entrants (e.g., Argote, Beckman, and Epple, 1990). Also, experience from interactions between early entrants and local suppliers of raw materials, labor, and managerial skills may reduce communication and transaction difficulties between later foreign entrants and the local suppliers. Thus, businesses that enter foreign markets that have been cultivated by predecessors from which there are opportunities to learn and in which genuine net advantages of international presence have begun to emerge may do very well.²

Midrange entrants will often become the well-entrenched foreign competitors that put pressure on businesses that expand later. Such entrenchment may stem from switching costs that are incurred by the customers of the earlier successful entrants, from declining margins that are insufficient to cover the fixed costs of entry of later entrants, or from other factors of imperfectly competitive markets. This reasoning is consistent with Hymer's (1976) argument that companies expand internationally in order to create entry barriers and to exploit market power. In many cases, of course, later entrants will succeed despite the presence of successful businesses, either because the later businesses provide sufficient cost or quality advantages or because changing market conditions have negated the earlier entrants' advantages. Owing to such

environmental changes, international strategy takes place in a constantly changing arena, in which managers must regularly evaluate their current and future actions. However, many environments are stable enough that successful businesses enjoy advantages for substantial periods. We predict, then, that success after expansion into a foreign market will tend to have a nonmonotonic relationship with the presence of other foreign businesses at the time of entry. Although the point at which the competitive problems begin to outweigh the learning opportunities may vary markedly, we expect the general pattern to hold across many industries.

Key variables: Business survival and foreign business presence

For this paper, we define success in terms of the length of continued operation in a geographic market, which we refer to as business survival.³ Business survival complements profitability measures of performance, consistent with a growing recognition that managers must consider many criteria when evaluating the long-term potential of their businesses (Eccles, 1991). Business survival is especially relevant in dynamic industrial settings, in which managers must consider the length of time available to recover sunk investments. Business survival has long been recognized as an important indicator of commercial performance. Barnard (1947: 93), for instance, argued that 'nothing but the absolute test of survival is significant objectively' as a measure of overall efficiency for most organizations. Bane and Neubauer (1981: 221) argued that business exit from foreign markets usually indicates failure of

² In some cases, key knowledge may remain proprietary to individual businesses, so that all new entrants will face the chance of making mistakes (problem 2). Even in such cases, however, the chance of entering a market that offers few benefits to international operators (problem 1) will decline as other foreign businesses enter, because the simple fact of their success or failure will provide information to other businesses. Moreover, critical learning issues in most industries include elements that are not easily protected by an individual business, such as information about product-market segmentation, plant location, suppliers, and other elements of business strategy.

³ Survival *per se* is not necessarily a sign of good performance because shareholders, employees, and the general economy sometimes benefit if a business shuts down. Similarly, however, current profitability is not always an indicator of strong performance, if externalities are not accounted for or if short-term profits are attained at the cost of foregone valuable investment. The ideal approach to studying performance of an expanding business would be to document multiple measures of immediate and longer term performance in all markets in which the business operates. The approach often is infeasible, however, because objective and comparable longitudinal performance data usually are not available. We do not include measures of profitability performance in the study because many businesses in the sample are privately held companies or divisions of large corporations, which either do not report profits or do not separate division-level profits.

managements' original aims for the business, noting that 'it is rarely if ever that healthy units are sold and in fact we know of no company that behaves in this way.' Business survival has received growing research attention as a measure of performance in the past 15 years, particularly from researchers concerned with business performance in changing industries (e.g., Hannan and Freeman, 1977, 1989; Aldrich, 1979; Evans, 1987a, b; Hall, 1987; Romanelli, 1989; Audretsch, 1991; Mitchell, 1991; Mitchell *et al.*, 1992, 1993; Mitchell and Singh, 1993). Business survival also is relevant to employees who must consider the stability of their jobs and to economic policy makers who must be concerned with the long run ability of companies to provide jobs and taxes (Dertouzos, Lester, and Solow, 1989).

Several studies have found positive relationships between business survival and market performance. Greater sales tends to be linked with longer survival in that older businesses tend to be larger businesses and, equivalently, larger businesses have lower exit rates (Aldrich and Auster, 1986; Evans, 1987a,b; Dunne, Robert, and Samuelson, 1989). In addition, a theoretical model described by Jovanovic (1982) suggests that companies may enter a market at low size and expand if they are successful, so that longer survival will be linked with both greater size and greater profitability.⁴

Studies investigating the relationships between the type of exit and financial performance also suggest that business exit is frequently linked with weak financial performance. Although not all business exits stem from financial failure and not all ongoing businesses are financially successful, most bankruptcies and voluntary business dissolutions stem from low profitability

performance, whether the result of poor management (Dun and Bradstreet, 1978) or of environmental conditions that are changing more rapidly than a business can adapt (Carroll, 1984). Schary (1991: 350) found a weak relationship between financial equity strength and the likelihood of bankruptcy or voluntary liquidation of American cotton textile manufacturers operating between 1924 and 1940. Conceptually, cases in which corporations divest one or more businesses to other firms are less clearly linked to financial failure than are business dissolutions, because successful businesses may sometimes be acquired by firms seeking market power, scale economies, or complementary resources (e.g., Passer, 1953; Gort, 1969; Scherer *et al.*, 1975; Teece, 1986). However, Duhaime and Grant (1984: 311) found that business divestment was related to low financial strength and low sales growth of the business unit. Similarly, Jain (1985) found that sell-offs tended to be preceded by a period of negative share returns. Schary (1991) found a moderate relationship between weaker equity strength and the likelihood that a business would be sold. Bethel and Liebeskind (1993: 26) also found that low business unit sales growth had a significant influence on business divestitures among 388 large American corporations between 1981 and 1987. Mitchell and Singh (1993) found that smaller business unit market share was linked with shorter survival in the American medical diagnostic imaging industry. In studies of international expansion, Newbould *et al.* (1978), Bane and Neubauer (1981), and Lane and Hildebrand (1990) found that businesses that exited a new market soon after their entry achieved poor financial performance during their time in the market. As with all performance measures, business survival must be interpreted carefully, but the measure provides an important indicator of financial and other performance that is of interest to shareholders, managers, employees, and others affected by the success of a business.

We define the presence of other foreign businesses in terms of the share of the geographic product market held by nonlocal businesses when a foreign-based business enters the market, which we refer to as foreign share at entry. The foreign share at entry variable estimates the extent to which foreign businesses have learned to operate in the particular domestic market and the extent

⁴ We know of no empirical study investigating the relationship between business age and business profitability. However, if older businesses tend to be larger and larger businesses tend to be more profitable, then an age-profitability relationship can be identified indirectly. As we note in the text, most studies suggest that age and size are positively related. In turn, greater business size often will be linked to greater business profitability if nontrivial volume economies or market power can be obtained. Empirically, the relationship between greater business size and profitability is often positive, although some controversy exists. (Weiss (1971) summarizes studies finding positive relationships between size and profitability; Stigler (1963) and Samuels and Smyth (1968) report null or negative relationships.) Therefore, greater business age may have an indirect link with greater profitability.

to which they have established a strong presence in the market. In product markets with low aggregate foreign share, we assume that nonlocal businesses have not yet demonstrated the most successful methods of market penetration and are still cultivating their opportunities. Increasing aggregate foreign share indicates that successful operating methods have been learned and put into practice, and indicates an increase in the level of competition.⁵

Prediction

We test the hypothesis that, holding other factors constant, *a business's length of survival in a foreign market will have negative relationships with low and high foreign share at entry, relative to moderate foreign share at entry.* We will examine the relative size of the low and high share signs as an empirical issue in this analysis. The negative effect of high foreign share might be stronger than that of low foreign share, that is, that the chance of failure for late entrants will be higher than for early entrants. Such an outcome would occur if businesses tend to find it easier to overcome mistakes made during early entry than to overcome successful entrants at later stages of industry evolution. Conversely, successful entrants might be particularly easy to dislodge in some industries, while early mistakes might be especially difficult to overcome. The issue provides a basis for fruitful conceptual development and empirical analysis.

In addition to competition from entrenched foreign-based businesses, foreign entrants may also face opposition from domestic businesses that possess international operations. We will address in the statistical analysis the competitive pressure created by domestic businesses,

especially those with international operations, but we will focus most attention on the pressure created by foreign businesses. The empirical basis for our focus on foreign entrants stems from the recognition that key geographic markets of most major industries contain businesses based in multiple countries rather than being dominated by domestic players with international operations. The conceptual basis for our focus is that foreign entrants, compared with domestic businesses, often draw on different technical resources, offer differentiated products, and follow different marketing strategies. Many of these differences are long-lasting and cannot be countered quickly by domestic businesses so that many geographic markets contain some space for foreign-based players, whether or not domestic players possess international operations. Our interest concerns the opportune timing for entry by foreign businesses.

SAMPLE

We tested the hypothesis by examining the survival of Canadian-based businesses that entered the U.S. medical sector between 1968 and 1989, tracking their participation until mid-1991. The U.S. medical sector has undergone drastic changes since the beginning of the period covered by this study. In 1968, most medical markets in the United States were served primarily by local businesses. By 1991, foreign businesses had penetrated many U.S. medical sector markets. In the diagnostic imaging and pacemaker industries, for instance, foreign-based businesses accounted for more than 40 percent of sales in the United States in 1990. Nonetheless, some American medical markets remain primarily domestic, particularly in the service sector. Therefore, the medical sector provides a useful quasi-experimental setting to examine questions concerning success of foreign entry in relation to the different degree of foreign penetration.

We chose a national-based sample in order to provide a reasonably consistent basis for comparing business success. We chose the Canadian businesses owing in part to data availability and in part to the recent Canada-U.S. Free Trade Agreement, which has raised specific interest in the ability of Canadian-based businesses to operate in United States markets.

⁵ An alternative foreign presence measure would be the cumulative number of prior foreign entrants to the national product market at the time of entry. This would be a useful means of measuring learning opportunities if we assume that the number of ways of doing business that have been tried will increase with the number of businesses that have entered a product market, thereby providing more models of success and failure. However, it is often difficult to estimate cumulative entrants to a product market owing to data limitations and to changing industry definitions. (The industry definition issue applies to stability over time but does not affect measurement of foreign presence and concentration at entry time, which are cross-sectional issues). Moreover, prior cumulative entry often will be positively correlated with foreign market share at entry time.

Because all sample businesses are in the same sector and identical home and host countries, variations in our sample data are unlikely to stem from idiosyncratic environmental forces.

We gathered data from a series of trade guides that list businesses participating in the United States medical sector (Hale and Hale, 1975, 1978, 1983, 1986, 1989; Smith, 1990, 1991), the business press, and several phone conversations with corporate personnel. By Canadian-based businesses we mean public and private companies of which the majority ownership was held in Canada or, in two cases, the Canadian subsidiaries of European companies that did not yet do business in the United States. We identified 34 businesses based in Canada that entered medical sector markets in the United States between 1968 and 1989. We eliminated three entrants that were primarily affected by issues outside the bounds of the study. (Two businesses were owned by Canadian government agencies that sold the businesses during a divestiture wave of the late 1980s and one business made a minority investment in a U.S. pharmaceutical company). Reviewing directories of medical equipment companies operating in Canada revealed few other Canadian-based businesses that are likely to have entered the U.S. medical sector (Department of Industry, Trade, and Commerce, 1981; Hale and Hale, 1986), so that we believe the remaining sample of 31 businesses (30 distinct corporate entities) accurately represents the experience of Canadian-based businesses operating in the United States medical sector. We determined whether the entrants were still operating in the United States in mid-1991 and identified exit years for those that were no longer conducting business.

The 31 Canadian-based entrants operated in 24 different industries in the United States, including mechanical-based manufacturing industries such as diagnostic imaging equipment and patient monitors, chemical-based manufacturing industries such as blood and medical chemicals, and service industries such as nursing homes and retail pharmacies. The median entry year was 1982. Most parent corporations were located in Ontario (14 cases) and Quebec (8). Methods of entry to the U.S. used by the 31 businesses included acquisition of existing businesses (13 cases), establishment of new businesses (12 cases), one joint venture (later converted to

a wholly-owned subsidiary of the Canadian company), and five unknown entry methods. Ten of the 31 entries exited by mid-1991: eight disappeared, which are most likely to be cases of business dissolution, and in two cases the American unit of a Canadian business was sold to another corporation. The ten businesses that exited had average life of 6.3 years, compared to 9.2 years for the 21 businesses that remained at the end of the study period.

VARIABLES AND METHODS

The dependent variable for this analysis is the number of years that a Canadian-based entrant operated in the United States, with an additional 0–1 dummy variable indicating businesses that continued to operate at the end of the study (was right-censored). The key independent variables are 0–1 dummy variables that denote whether foreign businesses held low, moderate, or high share when a Canadian business entered the market. The predicted relationship with survival will produce negative signs for low and high share when the moderate share dummy variable is omitted. Table 1 lists product–moment correlations and summary statistics for the covariates and the right-censor variable.

To operationalize the foreign share variables, we used classifications reported by the trade guides in order to identify the relevant markets. The guides identified distinct product markets (e.g., patient monitors) in 19 of 31 cases and reported the market share held by significant U.S. and foreign-based players. We divided the empirical range of foreign share into three equal parts to define the low (0–12%), moderate (13%–24%), and high (25%–36%) foreign share categories. As we will discuss in the results section, our results are not especially sensitive to the boundaries. In the remaining 12 cases, the guides reported product classifications (e.g., spectrophotometers), which we treated as product markets, and listed the participants. The guides did not report detailed market shares in these 12 cases but no foreign firms were listed in eight of the product classifications, which we assigned to the low foreign share category. In the remaining four cases, it was apparent from the lists of participants and the descriptions of them that foreign firms held low shares in two markets

Table 1. Variable correlations and summary statistics (31 cases)

Variables	Product-moment correlations										
	1	2	3	4	5	6	7	8	9	10	11
1. Low foreign share	1	-0.77	-0.51	-0.50	-0.02	-0.18	0.38	0.39	-0.01	-0.08	0.01
2. Moderate foreign share	-0.77	1	-0.16	0.37	0.20	0.18	-0.29	-0.36	0.07	0.11	0.16
3. High foreign share	-0.51	-0.16	1	0.27	-0.23	0.04	-0.19	-0.11	-0.08	-0.04	-0.24
4. Industry concentration	-0.50	0.37	0.27	1	0.14	-0.06	-0.40	-0.10	-0.08	-0.11	-0.35
5. Percent global U.S. firms	-0.02	0.20	-0.23	0.14	1	-0.41	-0.28	-0.30	-0.13	0.49	-0.10
6. Entry year	-0.18	0.18	0.04	-0.06	-0.41	1	-0.28	-0.33	0.15	-0.19	0.31
7. Service business	0.38	-0.29	-0.19	-0.40	-0.28	-0.28	1	0.41	-0.03	-0.17	0.25
8. Parent sales (log \$ million)	0.39	-0.36	-0.11	-0.10	-0.30	-0.33	0.41	1	-0.25	-0.44	-0.27
9. Related parent	-0.01	0.07	-0.08	-0.08	-0.13	0.15	-0.03	-0.25	1	0.27	0.12
10. Entry as new business	-0.08	0.11	-0.04	-0.11	0.49	-0.19	-0.17	-0.44	0.27	1	0.12
11. Right censored	0.01	0.16	-0.24	-0.35	-0.10	0.31	0.25	-0.27	0.12	0.12	1
Summary statistics											
Mean	0.71	0.19	0.10	28.3	0.40	81.6	0.26	2.44	0.77	0.39	0.68
Standard deviation	0.46	0.40	0.30	21.9	0.23	5.6	0.44	2.64	0.43	0.50	0.48
Minimum	0	0	0	4	0.04	68	0	-1.14	0	0	0
Maximum	1	1	1	87	0.83	89	1	7.37	1	1	1

and high shares in two markets, and we assigned the cases accordingly.

We defined several industry-level independent variables to control alternative explanations to the foreign share effects. We recorded the four-firm concentration ratio in the year of entry (industry concentration), expecting that highly concentrated industries would be more difficult to penetrate successfully.⁶ We directly calculated market concentration ratios for the 19 cases with detailed information and estimated the concentration ratios based on qualitative descriptions for the remaining 12 cases.⁷ Canadian-

based businesses participated in more than one industry in two cases, where we selected the primary industries based on the written description of the entrants' activities. We also identified the proportion of businesses operating in the market that were American-based businesses with international medical sector experience (percent global U.S. firms). This variable addresses the extent to which survival was influenced by the presence of American-based international players rather than by foreign-based businesses.⁸ We also noted the calendar year of entry (entry year). One motivation for the entry year variable is that foreign expansion may have become increasingly feasible during the study period, as the demands of international operation become more generally understood over time and because the Canada-U.S. Free Trade Agreement

⁶ We use concentration as an estimate of entry barriers, which often stem from the existence of sunk costs required to undertake market entry (sunk costs are the portion of fixed costs that cannot be recovered if a firm exits an industry). Kessides (1990) shows that the four-firm concentration ratio may serve as a good proxy for the level of sunk costs. Further, barriers may also stem from the existence of competitive profitable businesses in the industry. Because the four-firm concentration ratio increases with the market share of the leading businesses, the ratio provides an estimate of such barriers given the Cournot result of a relationship between lower marginal cost (competitiveness) and greater market share. Therefore, the concentration ratio provides a joint estimate of both the existence of large sunk costs and entry barriers created by successful incumbents.

⁷ For the concentration ratio estimates in the 12 cases, we judged fragmented, moderate, and highly-concentrated status and assigned four-firm concentration measures of 12 percent, 37 percent, and 60 percent based on the median values of the known cases. The concentration results were not sensitive

to these assumptions or to an alternative modeling technique in which three dummy variables recorded increasing levels of concentration. We chose the continuous single variable approach in order to conserve degrees of freedom.

⁸ Counts of American businesses with global operations were more generally available than their market shares, which would have provided another measure of the strength of such businesses. The trade guides report international presence information for each business (see Mitchell *et al.*, 1992). We credited American-based businesses that exported, had overseas manufacturing facilities, or had achieved medical multinational status with international experience.

gradually has become a reality.⁹ The entry year variable also provides a statistical control for the fact that many later entrants are right-censored cases, that is, many businesses entering during later years had not exited by the end of the study period. Although the accelerated failure time regression technique controls for this issue, by calculating survival functions for right-censored cases, using the entry year variable helps assure that the right-censoring does not introduce a bias to the estimates.

We also defined several business-level control variables. We distinguished between manufacturing and service sector businesses (service business) because Canadian service businesses may be at a disadvantage in the United States, where detailed customer knowledge often is necessary (Lane and Hildebrand, 1990). We recorded the size of the corporate parent (parent sales) because entries conducted by companies with a larger financial base may be more likely to survive (Newbould *et al.*, 1978). We noted whether the parent operated in the same industry in Canada as that being entered in the United States (related parent) because many studies have found that expansion into related industries leads to superior financial performance and longer survival than expansion into unrelated industries (e.g., Rumelt, 1974; Bane and Neubauer, 1981; Singh and Montgomery, 1987; Morck, Shleifer, and Vishny, 1990; Mitchell, 1992).¹⁰ We also compared entrants that established new business (entry as new business) to a category comprising those that entered by acquiring an ongoing business, undertook a joint venture, or had unknown entry modes. (The results did not change materially when we distinguished a separate variable for the five unknown entry mode cases rather than combining them with the base case.)

Owing to data limitations we were not able to measure several other influences that might affect survival. Greater international experience may

lead to superior performance due to managers' experience in gathering and analyzing information and assessing risks (Aharoni, 1966) and to decrease technology transfer costs (Teece, 1977). Unfortunately, reliable estimates of prior foreign experience were not available for many of the businesses in the sample. Similarly, we were unable to obtain estimates of the entrants' strength in the Canadian market and other tangible and intangible measures that also might influence their success in the United States (Caves, 1982; Morck and Yeung, 1991, 1992).

Future research needs to address the effects of other firm-level influences on entry timing and performance in foreign markets. It is possible that firm characteristics such as strength in the domestic market influence both entry timing and ultimate success in a foreign market. If so, then observed relationships between entry timing and success may in part stem from missing variables. However, for two reasons, we believe the existing analysis is valuable. First, entry timing is likely to have effects independent of business strength in the home country. The most competitive businesses in a home market might not be competitive in the foreign market (e.g., Evans, Lane, and O'Grady, 1992), while a less competitive home-country firm might well be able to survive in a foreign market, especially if its entry timing is appropriate (e.g., Mitchell, Shaver, and Yeung, 1993). Second, the parent sales and related parent variables that are included in the analysis in this paper are likely to be correlated with omitted firm characteristics such as foreign experience and domestic strength, so that the results incorporate some firm-level elements. We stress that the results of the analysis must be interpreted cautiously because other factors may influence both entry timing and performance. Nonetheless, we believe that the study provides insights to competition in international markets.

We used accelerated failure time loglinear maximum-likelihood regression to analyze the data (Kalbfleish and Prentice, 1980; Cox and Oakes, 1984), using Proc Lifereg of the SAS statistical package (SAS Institute, 1988). The accelerated failure time technique is equivalent to an inverse measure of exit likelihood, such as that calculated with logistic regression. The method is superior to logistic regression because the more-conventional technique does not deal effectively with the difference in entry dates to

⁹ Market conditions may also vary over time, from year to year, being sometimes favorable and sometimes unfavorable to entrants. We estimated the effects of variables capturing past market growth and also dummies indicating good and bad general economic growth. While these additional independent variables have unstable results, our main results were never affected.

¹⁰ What is classified as unrelated in this analysis might be classified as related in the cited studies because our industry classification is at a fairly refined level (about equivalent to 6- and 7-digit SIC).

the industries, that is, the shorter period available for relatively late entrants to exit before the end of the study period. With the accelerated failure time techniques, one specifies a baseline parametric distribution and then estimates the influence of independent variables as loglinear additions and subtractions (accelerators and decelerators in a linearized model) from the expected duration of survival if all independent variables were equal to zero (the expected length of survival has an inverse relationship with the failure rate). The technique controls observations that have not exited by the end of the study, as is true of almost 70 percent of our cases. The control is effected by using the survival length of observations that have not exited to calculate a survival function and the participation length of exiting cases to calculate a probability density function of the specified underlying parametric distribution. We used the loglogistic distribution which captures the nonmonotonic survival rate that is commonly found in studies of organizational exit, although the results were not sensitive relative to the alternative Weibull and lognormal distributions. The regression models took the form $\ln(T) = \beta X - \sigma \varepsilon$, where $\ln(T)$ is the natural logarithm of the observed length of survival, X is a matrix of independent variables, β is a coefficient vector (including an intercept), ε is a vector of parametrically distributed error terms, and σ is a distribution scale parameter. With the loglogistic distribution, $\sigma < 1$ is consistent with a nonmonotonic S-shaped baseline exit rate (the exit rate is initially slow, next rises, and then declines), while $\sigma > 1$ suggests a monotonically decreasing exit rate.

ANALYSIS

Table 2 reports the results of the analysis. We first estimated a model that included only the industry-level and time variables, which is reported in column 1. Column 2 then reports a model that contains the full set of industry and business-level variables. We report several measures of explanatory power for the two models, as noted by the χ^2 statistics at the foot of each column. The model loglikelihood χ^2 statistic is defined as -2 times the loglikelihood of the estimated model, with degrees of freedom equal to the number of variables and baseline

parameters, while the covariate, foreign share, and business-level χ^2 statistics are likelihood ratio tests of whether the variables add explanatory power to a model that omits the relevant variables.¹¹ The significant model loglikelihood χ^2 statistic indicates that factors other than those included also influence the length of survival, but the likelihood ratio statistics indicate that the reported models do provide statistically significant explanatory power relative to no-covariate baseline models (covariate χ^2) and models that omit the two foreign share variables (foreign share χ^2). Adding the business-level variables does not increase the overall explanatory power, as noted by the nonsignificant business-level χ^2 statistic in column 2, but two of the business-level characteristics are important individual explanatory factors.

In both analyses, the low and high foreign share dummy variables took the expected negative signs, with substantial and statistically significant effects. The results indicate that the effect on survival of foreign share at the time of a Canadian business's entry was highest for moderate levels (between 13% and 24% in the reported analyses), which was the base case category. In column 2, the low foreign share coefficient of -0.742 produced a survival time decelerator of 0.48 and the high foreign share coefficient of -1.627 produced a survival decelerator of 0.20, meaning that entry into low foreign share industries reduced expected duration of survival by slightly more than one half and entry into high foreign share industries reduced expected survival by 80%.¹² Although the point estimates of the effects must be interpreted cautiously, the results

¹¹ With arithmetically nested analyses, the difference between two χ^2 statistics is also distributed as a χ^2 , with degrees of freedom equal to the difference in the number of variables in the two models. The covariate χ^2 statistic is the difference between the model χ^2 and the χ^2 of a baseline analysis containing only the intercept and scale parameters, and tests the null hypothesis that a baseline model has as much explanatory power as that containing the independent variables. The foreign share χ^2 is the difference between the model χ^2 and the χ^2 of an analysis that omitted the two foreign share variables, and tests the null hypothesis that the foreign share variables add no explanatory power. The business-level χ^2 (column 2) is the difference between the model χ^2 statistics of columns 1 and 2, and tests the null hypothesis that the business-level variables add no explanatory power.

¹² Because the estimated models are loglinear, the decelerators are calculated by taking the exponential function of the coefficients. With the foreign share coefficients in column 2

Table 2. Loglinear accelerated failure time regression estimates of influences on length of survival of Canadian firms in U.S. medical sector markets, 1968–1991 (31 entrants, 10 exits)

Variable	(1)		(2)	
	Coef.	s.e.	Coef.	s.e.
<i>Industry-level influences</i>				
Low foreign share	-0.650	0.449*	-0.742	0.517*
High foreign share	-1.238	0.522***	-1.627	0.813**
Industry concentration	-0.019	0.006***	-0.008	0.007
Percent global U.S. firms	0.139	0.730	-0.016	1.178
Entry year	-0.049	0.029**	-0.030	0.037
<i>Business-level characteristics</i>				
Service business			0.968	0.569**
Parent sales			-0.140	0.091*
Related parent			-0.094	0.375
Entry as new business			0.018	0.333
Intercept	7.462	2.518***	6.051	3.264**
Loglogistic scale	0.318	0.087	0.280	0.077
Model LL chi-square (d.f.)	33.95 (7) ***		27.98 (11) ***	
Covariate chi-square (d.f.)	12.96 (5) **		18.93 (9) **	
Foreign share chi-square (d.f.)	5.58 (2) *		5.36 (2) *	
Business-level chi-square (d.f.)			5.97 (4)	

Positive coefficients are associated with longer survival.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ (one-tailed tests).

support the key prediction of the paper, both in terms of direction and substantive impact.

Among the industry-level control variables, the degree to which an industry consisted of U.S. businesses with global operations had no significant effect in either model, while later entry year and greater industry concentration were significant in column 1 but lost their significance when the business-level variables are added in column 2. Among the business-level results, the related parent and entry as new business variables had no influence but service business status had a positive influence on survival and higher parent sales had a negative influence. The positive service business result suggests that manufacturing-based businesses may find it more difficult to establish supplier, customer, and other relationships needed for

success than service businesses. The negative parent sales result might stem from a relationship between parent size and the number of businesses that the parent operates, with more diversified companies having less commitment to any one business.

Sensitivity analysis

We carried out several sensitivity analyses of the full model (column 2 in Table 2) to examine the robustness of the foreign share results to different model specifications and assumptions. We calculated estimates that omitted the highest and lowest foreign share cases to test for possible influences of extreme values, finding equivalent results to those reported. Including a dummy variable that indicated the four cases for which only categoric information on foreign share was available neither changed the significance of the foreign share results nor improved the overall fit of the model. Also, omitting the four cases did not change the statistical significance of the results. To check for any bias introduced by the right-censored cases (the businesses that remained in the market at the end of the study period),

of Table 2, the decelerators are calculated as $e^{-0.742} = 0.48$ and $e^{-1.627} = 0.20$. With these point estimates, a business that otherwise would expect to operate for 25 years (the expected life of a business with mean values of the independent variables other than the foreign share measures) would have its expected survival reduced by 13 years (0.52×25 years) if it entered a low foreign share industry and by 20 years (0.80×25 years) if it entered a high foreign share industry.

we calculated estimates of foreign share effects for the subsample of 10 businesses that exited the market, consistently finding significant negative low and high share effects.

We also varied the cutoff points for moderate foreign share to test the sensitivity to different ranges. Significant low and high foreign share results emerged with a moderate share range as low as 8 percent–21 percent inclusive, both for the full data set and when we omitted the four estimated foreign share cases.¹³ We also replaced the low and high foreign share dummy variables with continuous measures of foreign share and share squared, finding a positive effect of share and a negative influence of share squared. This pattern is consistent with the prediction, indicating an initial positive association between survival and foreign share which then turns to a negative influence as foreign share at entry continues to increase. The continuous measures are less susceptible to issues of range selection than the dummy variable method but the approach has the disadvantage of imposing symmetric effects on each incremental change in foreign share, while the dummy variables allow the absolute values of the low and high share influences to differ.

We also used several alternative specifications of the industry concentration variable, finding that the foreign share results remained significant. This aspect of the sensitivity analysis suggests that the negative impact of industry concentration was nonlinear, being particularly strong for relatively high levels of concentration. In keeping with organizational ecological reasoning we also recorded overall destiny at entry but found no effect, possibly owing to the measure's close relationship with the industry concentration and percent global U.S. firms variables. Given the

stability of the foreign share estimates within substantial variation of model specification, it is clear that within our sample the central results of the study are robust.

DISCUSSION AND CONCLUSION

In this paper, we identified a negative influence of low and also of high foreign share at the time of entry on the length of survival, relative to the length of survival of businesses that entered a U.S. market when foreign businesses held only a moderate share. We suspect that the negative low foreign share effect stems from mistakes made by early movers, although we can not determine whether businesses failed because of mistaken expansion (problem 1) or mistakes made during expansion (problem 2). We argue that the positive moderate foreign share effect is likely to stem from opportunities for midrange entrants to learn from early movers and to benefit from the predecessors' cultivation of consumer and supplier awareness. Businesses that waited until foreign share reached substantial levels tended to survive for shorter periods, possibly owing to difficulties in competing with entrenched foreign competitors (problem 3). Although the results are only indirect evidence of the logic underlying our prediction, they suggest that the success of foreign expansion may be associated with the degree of foreign presence in a market at entry time.

The results also indicate that, for Canadian entrants to the U.S. medical sector, the negative effects of too late entry tend to be stronger than those of too early entry. In both the industry-level and full analyses, the absolute value of the high share coefficient was somewhat greater than that of the low share influence. In the medical sector, at least, this may indicate that it sometimes is easier to identify successful entry strategies in markets that are just beginning to welcome foreign businesses than it is to challenge successful foreign entrants once they become established.

We stress that the results obtained are only suggestive and the validity of our theoretical ideas must await replication and extension of the study. Further analysis might examine different countries, industrial sectors, and geographic markets. In addition, it would be useful to examine influences produced by entry timing

¹³ This check is particularly important given the small sample size and the small number of cases in the high share category. In the reported analysis, with moderate share being accorded in the 13 percent–24 percent range, three cases fit in the high foreign share category and six cases in the moderate share category. Thus, the sensitivity analysis result of the original range specification when the four cases were omitted must be interpreted cautiously because only one case remained in the high share category. With the 8 percent–21 percent range for moderate share status, the moderate category continues to contain six cases and the size of the high share category increases to four cases. When we omit the four cases for which only categoric information is available, two cases remain in the high share category.

relative to competitors and industry age, market sales growth, an entrant's market share and other performance in its domestic market, and the extent to which a company has prior international experience. It also would be useful to incorporate other measures of performance such as profitability and market share. Nonetheless, this is the first study to systematically examine the influence of foreign share at entry on business survival and as such provides both a contribution to our understanding of the analysis and an impetus for continued research.

We also stress that both our empirical results and theoretical argument do not mean that a business cannot succeed if it expands into a market in which several well-entrenched international competitors already operate. Rather, we suggest that successful expansion will be more difficult to obtain in such cases. We expect that a business expanding when there are already entrenched competitors will need to possess a significant degree of business-specific competitive capabilities at the time of the expansion if the expansion is likely to succeed. By contrast, businesses expanding when there are fewer established multinational competitors will often have time to build capabilities. Overall, the implication is that successful entry to foreign markets is a strategic issue dependent on both business capabilities and entry timing.

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