NATIONAL DIFFERENCES AND THE SURVIVAL OF FOREIGN INVESTED ENTERPRISES IN CHINA

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Abstract

This research paper applies the Resource Based View (RBV) and the COX Proportional Hazards Model (COX HP) to investigate how differences in national factors between home countries and China impact the survivability of new Foreign Invested Enterprises (FIEs) in China. By identifying and examining key factors such as international experience, total R&D expenditure, direct investment flow abroad, access to foreign high-skilled people, and corporate adaptability and flexibility, this research seeks to analyze the survival ratio of a large sample of new foreign invested enterprises in China. The results of this project may help investors predict the risk of investing in emerging markets.

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1: Introduction

Near the end of the 1970s, China began its transition from a planned economy to a market economy, massively reconstructing its economy and continuously increasing its influence on the international stage. Meanwhile, China began to deal with overseas foreign direct investment into China, demonstrating the willingness of the Chinese government to increase its global image. Although China officially permitted foreign investment in 1979, FDI activities did not become very active until the 1990s when the Chinese government adjusted its economic policy in order to speed up economic reforms and further open up its economy to foreign investment. FDI activities have played an important role in Chinese growth over the past 20 years. By the end of the first half of 2003, China's accumulated utilization of FDI had reached $468 billion US (Lin and Yeh, 2003). At that time, China surpassed the United States to become the largest FDI recipient country in the world. We expect FDI activities will continue to be very active in China for the next decade.

Although FDI has brought substantial growth and returns for both foreign investors and China, past studies have revealed that new foreign investments often suffer from very high failure rates (Phillips and Kirchhoff, 1989; Watson and Everett, 1996; Brian, 2003). Many researchers from different areas have made considerable efforts to investigate the cause of new foreign direct investment failure. A substantial number of theories and models have been developed to predict the failure rate of FDI, on the basis of different views of determinant factors (Claver and Quer, 2005). One of the essential questions is

how the foreign investor's own characteristics will affect the failure rate of its FDI in China. Our paper will discuss this question by analyzing six determinant factors.

The purpose of this paper is to apply the Resource Based View (RBV) and COX Proportional Hazards Model to investigate how international experience, total R&D expenditure, direct investment flow abroad, the availability of foreign high-skilled people in home countries, and corporate adaptability and flexibility will affect the failure rate of FDI ventures. RBV theory is an economic tool used to determine the strategic resources available to a firm. The rationale behind the RBV is that the basis for a competitive advantage of a firm primarily comes from the application of bundles of valuable resources (Wernerfelt, 1984; Rumelt, 1984). These bundles of resources can assist a firm to sustain above average returns. We believe that the unique resources stem from the five national factors we will discuss in the following paragraphs.

2. Literature Review and Hypotheses

The Resource Based View model has three key steps. The first step is to identify a firm's list of potential key resources. The second step is to evaluate whether these resources fulfill the following four criteria. First, the resource must enable a firm to implement a value creation strategy by outperforming its competitors or reducing its own weakness (Barney, 1991). Second, a resource should be rare, so that the company can leverage the resource to generate above-average returns. Third, this resource should be inimitable. If a valuable resource is controlled by only one firm, it will generate comparative advantages

for that company. However, if this resource can be easily imitated, then that company will lose its comparative advantages. An advantage is sustainable if competitors are not able to duplicate the strategic asset perfectly (Peteraf, 1993, 183). Fourth, it is also important that the resource be non-substitutable. If competitors can find a substitute to counter a firm's value creation strategy, the price or profit of the firm will be driven down. The third step of the model is to protect valuable resources and leverage them to generate value. The following hypotheses will follow the rationale behind resource based theory to analyze each factor.

Hypothesis 1: International Experience

Long experience of foreign operations and diversified experience in different countries will tend to enhance a firm's ability to adapt to a new market (Carlsson et al., 2005). This experience could include marketing campaign methods, supply chain management, the formalities of public relationship management and knowledge of the characteristics of certain types of customers in foreign countries. Global FDI experience can be acquired from international operations and can be transferable to different geographical locations (Carlsson et al., 2005). According to Johanson and Vahlne (1990), international operations experience will help foreign direct investors to effectively learn to operate in the Chinese market. Firms with foreign operations experience in countries near to China will more likely gain advantages, compared to those without such experience. Welch and Luostarinen (1988) state that if a firm has FDI experience and has developed skills in other countries, these skills and experience will facilitate moving into new target countries, especially in the preliminary stages, such as export or contractual agreements.

Also, international experience can increase a foreign entrant's probability of survival since international experience enables managers to learn about the challenges associated with different strategic moves in foreign markets (Mitchell, 1994). This type of experience increases the chances of success in international markets (e.g., Smith et al., 1996). Firms with more FDI experience will find it relatively easier to overcome the additional costs that a firm must face when it starts to operate in an international market. According to the Resource Based View, international experience is a very solid resource that has great value creation functionality, and is hard to imitate or substitute. In general, international experience widely penetrated into many parts of companies, such as corporate culture, business model, team or department collaborations process and even company structures. Each company will have its own customized international experiences, so those experiences are very hard to imitate or substitute. Thus we hypothesize:

The more international experience the home country has relative to China, the more likely its enterprises will survive in FDI in China.

Hypothesis 2: R&D Expenditure

Some empirical research has shown that the intensity of R&D is positively related to survivability of FDI (Caves, 1996). According to Caves' point of view, since the supply chain, production process, consumer tastes and other key factors are different in the host country; the parent company has to expend a portion of its R&D to modify technologies to suit local conditions. In addition, although many multinational companies can move their low technology production into China at relatively low cost, they must upgrade or at

least modify their R&D activities in their home country to make their international operation successful. The value of R&D has been confirmed by many research studies and it is viewed as a competitive advantage in foreign direct investment. Furthermore, companies operating abroad should own some assets to help them to overcome the disadvantages in foreign markets caused by lack of experience. Investments in managerial skills development and research and development activities could create valuable resources that might help companies to overcome disadvantages. The relationship between R&D expenses and FDI is treated as mutually interdependent (Lin and Yeh, 2003). Since each country's market has its own unique trait and characteristics, R&D development will be tailored into that particular country and even particular companies. Consequently, the products and advantages brought by R&D expenditure are difficult to imitate or substitute. Thus we hypothesize:

The more R&D expenditure the home country has relative to China, the more likely its enterprises will survive in FDI in China.

Hypothesis 3: Direct Investment Flow Abroad

According to IMF/OECD definitions, direct investment flow abroad is one category of international investment that is made by a resident entity in one economy into an enterprise resident in another economy (OECD, 2005). Furthermore, this category of international investment implies that a direct investor has a long-term relationship with and a significant degree of influence on the target enterprise in another economy. A direct investor is defined as an individual, an incorporated or unincorporated public or private enterprise, a government, a group of related individuals, or a group of related

incorporated and/or unincorporated enterprises which have a direct investment enterprise that is a subsidiary, associate or branch, operating in a country other than the country or countries of residence of the direct investor(s). A direct investment enterprise is defined as an incorporated or unincorporated enterprise in which a foreign investor owns 10% or more of the ordinary shares or voting power of an incorporated enterprise or the equivalent of an unincorporated enterprise (OECD, 2005). Foreign direct investment is usually comprised of three components: equity capital, reinvested earnings and inter-company debt transactions. We believe that high direct investment flow abroad from a company's residential country would benefit a company's investment in a Chinese enterprise in the following two ways. First, if a firm's residential country has a greater flow of direct investment abroad, the firm will have a greater shared knowledge of FDI, partnership opportunities and third party services such as international financing services, accounting services, and legal services. These valuable resources will enhance the firm's competitive advantages and facilitate the value creation process. Second, if the foreign direct investment flow is higher for a particular country, this implies that the firm's residential government will have fewer restrictions on capital outflow to foreign countries. Similarly, this also implies that that a country's foreign direct investment faces less governmental restriction from the foreign countries. Consequently, the firm may find it relatively easy to survive in such a relaxed investment environment. In addition, this value resource does not only facilitate the value creation process, but it is also hard to imitate and substitute. It is usually very difficult for one country to rapidly increase its direct investment flow abroad during a short period, because of the constraints from

many factors, such as governmental policy, economic structure, characteristics of domestic capital market etc. Thus we hypothesize:

The more direct investment flow abroad a country has, the more likely companies from that country will survive in FDI in China.

Hypothesis 4: Foreign High-skilled Human Capital

In the resource-based view of the firm, human capital is frequently assumed to contribute to competitive advantage due to its inimitability based on its intangible, firm-specific, and socially complex nature (Hatch and Dyer 2004). Human capital with some high skill characteristics would reinforce the sustainable competitive advantage of a business and even improve the competitiveness of an industry by initiating innovation, which is a widely recognized as a key ingredient of productivity success (Rao, Ahmad, Horsman, and Kaptein-Russell, 2001), and by elevating the technology level, aimed at improving business efficiency. When high-skilled human capitals are acquired internationally, more diverse and innovative technology, managerial skills and experience, which may not be found locally or cannot be acquired from the local R&D, will be imported, which not only serve as the complement to the development of a nation's innovation and technology, but also link them to the global standard. As management and operation techniques reach the international level, the national enterprises become more equipped to adapt and succeed in the international business environment. The success of Procter and Gamble (P&G) in China serves as a very good example. In 2003, P&G China generated US$1.8 billion in sales for the enterprise and its market share has continued to rise. Laurent Philippe, head of P&G in China, believes that this success is due to a

combination of global support, local research and skilled workers, which helped P&G to effectively challenge the competition (Strategic Direction 2005). Indeed, global innovation has been becoming widely accepted as a cutting edge for business success in China. A Cisco-sponsored survey of 181 senior executives in China, conducted by the Economist Intelligence Unit, actually identified that innovation has become one of the most critical success factor in China (EIU 2009). An innovative capability at international level can lead to a comparative advantage for foreign enterprises against the local Chinese companies. Trevino and Grosse (2002) found that foreign high-skilled workers have a positive influence upon a firm's survivability in terms of FDI. Claver and Quer (2005) also indicate that a firm with more skilled foreign workers will be better able to support overseas expansion through FDI. Thus we hypothesize:

The more foreign high-skilled people the home country has relative to China, the more likely the foreign enterprise will survive in FDI in China.

Hypothesis 5: Flexibility and Adaptability

The fifth examined factor is the difference in corporate flexibility and adaptability between the home nation and China. The flexibility of a company refers to whether an enterprise can readjust its business and operation strategies efficiently and effectively to encounter any challenge from its external business environment. The adaptability of a business is then determined by how effectively and efficiently an enterprise can develop and implement a business strategy in any new business environment. Adaptability and flexibility are the keys to survival in the corporate world. This can be clearly demonstrated by the success stories of international giants such as Apple, which changed

its core business from computers to smartphones and multi-use devices, Sound ID, which transformed from a hearing aid company to a manufacturer of Bluetooth headsets, and Texas Instruments, which shifted from manufacturing silicon transistors and integrated circuits to calculators, defense electronics, and speech synthesis products. All of them managed to survive significant challenges from competitors and sudden adverse changes in their business environments due to exceptional adaptability and flexibility. These traits are especially important to a new venture operating in a foreign business world as the high levels of uncertainty and very rapid rates of change that characterize new ventures require fluid and highly adaptive forms of organization. An organization that can respond quickly and effectively is a must (Timmons & Spinelli, 1977). Wuensch, an instructor at the Cyvia and Melvyn Wolff Center for Entrepreneurship at Bauer, provides a good conclusion on the importance of adaptability and flexibility, saying, "Reading the environment and reacting to it is what an entrepreneur does. Figure out your position of strength, make good solid decisions based on your position of strength and the odds really are in your favour" (Geraghty 2008). Therefore, we believe that the greater the corporate flexibility and adaptability of the home country, the better the venture can operate in any adverse condition in a new business environment, and thus the greater the chance it can survive.

Hypothesis IV: The greater the home country's corporate flexibility and adaptability relative to that of China, the greater the chance that a foreign enterprise will survive.

3. Research Methodologies

3.1 Sample selection

China is amongst the four golden brick countries, one of the most rapidly growing emerging markets in the world. Due to its fast paced economic expansion and market development, a vast number of business opportunities have been created for foreign investors and these have attracted huge amounts of foreign direct investment. According to the World Investment Report 2009 (UNCTAD, 2009), China has been the biggest host country for FDI in the sectors of manufacturing and agriculture for four consecutive years. Therefore, the significant amount of existing FDI and a marketplace offering unlimited business opportunities make China an appropriate test field for this research. Also, as the Chinese market becomes more open to global investment, the national competitiveness of China is expected to undergo a great change. Therefore, it is interesting to explore how the change in China's national competitiveness relative to that of the home countries of foreign enterprises affects the survivability of foreign enterprises.

Our paper utilizes a sample of manufacturing foreign enterprises from the Chinese Foreign Invested Enterprises Database (CFIED), gathered by the National Bureau of Statistics of China (NBSC). The database collects basic information such as the company's start date, its company identity number, end date, and failure information, all of which will be used in our regression test. The NBSC has provided four years (from 1998 to 2001) of data from manufacturing enterprises that submitted their annual reports for at least one year between 1998 and 2001. The initial sample contained more than five

thousands companies that began their business in or after 1998. We filtered out data for some companies that contained extreme values or lacked information related to the variables used for the statistical analysis. Our final sample consisted of 8,325 firm-years of data from 4,605 ventures. Among these firms, 492 filed a bankruptcy or run out of business within three years of observed operation periods (from 1998 to 2001). Table 1 and Figure 1 have provided a description on the Hazard ratio and survival function distribution of the sample ventures.

As shown in Table 1, in the first four years of operation, foreign enterprises that managed to survive account for around 66 percent of totals. In other words, 34% companies failed. Censored ventures, which refer to the companies that avoided failure but discontinued their operation at the end of each observation period, are the basis samples used to compute the survival ratio for each year. For example, if a venture began its operation in 1998 and continued its business until the end of 2001, the venture is one of the 346 ventures censored at the end of their third year of operation. The total number of ventures at risk at the beginning of the next period are then reduced by the number of censored and failed ventures. For example, of the 1,442 ventures that survived through two years of operation, 209 ventures failed in the third year, and 346 ventures were censored. Consequently, only the remaining 887 surviving ventures were kept for the analysis in the fourth year. Among these 887 ventures, none of the companies failed in the fourth year of their operation. Therefore, the hazard ratio (failure rate) for the fourth year is 0% (0 divided by 887).

Our paper then applied the competitiveness factors provided by the IMD World Competitiveness Center to compute the national differences between China and the home countries of the examined FDI enterprises. How the IMD World Competitiveness Yearbook (WCY) evaluates a nation's competitiveness depends on the country's capability for providing and maintaining a competitive marketplace in which enterprises can compete. The WCY has created a list of criteria of over more than 300 competitive factors. The WCY also identifies four main principles for the measurement of competitiveness and divides these 331 national factors into four main categories:

Economic Performance,

Government Efficiency,

Business Efficiency,

Infrastructure

(IMD 2008).

Economic performance refers to a macro-economic evaluation of the domestic economy. Government efficiency is aimed at measuring the extent to which government policies are conducive to competitiveness. Business efficiency calculates how much the national environment encourages companies to perform in an innovative, profitable and responsible manner. The last one, infrastructure, assesses the extent to which basic, technological, scientific and human resources meet the needs of a business. Each of these factors is then separated into 5 sub-factors which highlight every facet of the areas analyzed. Altogether, the WCY features 20 such sub-factors (IMD 2008).

Among those four main categories, we believe that economic performance, business efficiency and infrastructure will provide more meaningful insights into the impact of national differences on the survivability of foreign enterprises in China. In addition, we have selected five factors from these three categories. In our analysis, we sample national competitiveness factors from 41 countries for the period between 1998 and 2005. To achieve an unbiased estimator, our regression analysis collected an extensive sample. Theory suggests that such large samples and sampling period can provide unbiased statistical results. The data for the 41 countries' national characteristics are then subtracted from those of China to generate samples of national differences.

3.2 Variable Measurement

3.2.1 Independent Variables

In our study, we have selected three national factors from the competitiveness principle of business efficiency as we believe that this category provides the primary impact on the competitiveness of a foreign enterprise. International Experience (LMIE) is the measurement of whether the international experience of senior managers is significant. A hypothesis test is conducted on data for 41 countries, for each year, and the results are used to generate data for significance levels. A high-value significance level indicates that the initial assumption that the international experience of a nation's senior managers is not significant should be rejected. We then subtract the significance level for each of the 41 countries from that of China. Another factor measuring the availability of skill in the labour market of a nation, or foreign high-skilled people, measures the extent

to which foreign high-skilled people are attracted to a country's business environment. An attractiveness level, which is proportional to the percentage inflow of foreign high-skilled human capital, is assigned to each country. The number ranges from 0 to 10. Our regression test then takes a difference between the attractiveness level of a home country and that of China. The last factor under the category of business efficiency, adaptability and flexibility, evaluates whether the adaptability and flexibility of a company is significantly high when facing new challenges in a new business environment. Again, a hypothesis test is conducted on 41 countries, resulting in information on significance levels for the period from 1998 to 2005.

The other two variables are factors from the competitiveness principles of infrastructure and economic performance. According to the IMD Yearbook (IMD 2008), data on the two national factors, total expenditure on R&D and direct investment flows abroad, are acquired from international, national and regional organizations, private institutions and IMD's network of 52 Partner Institutes worldwide. Both R&D expenditure and direct investment flows abroad are expressed as percentages of the GDP.

In addition, we include two firm level control variables, capital size (a logarithmic function of the firm's total assets) and leverage ratio (debt over equity), in order to compute the effect of firm size and corporate structure on the survival chance of the FIE.

3.2.2 Dependent Variable

The hazard ratio, which refers to probability that a company will fail within a year given that the company managed to survive in previous years, is the dependent variable.

We defined the failure of a venture as being dissolved or bankrupted. A venture is then defined to have survived if it can prevent failure during the period between its start up year and the end of our observation period.

3.3 Cox PH Model

The hazard ratio in survival analysis is a measurement of the effect of the independent variables on the hazard or risk of an event. The Cox PH model has been applied to explain the association between explanatory and dependent variables. The Cox model is described as follows (Cox and Oakes 1984).

$$H(t \mid x_i) = h_0(t)\exp(\beta x_i) \qquad (1).$$

This model gives an expression for the hazard function of having failed or having been run out of business at time t for the enterprise with a given specification of explanatory variables that influence the probability of failure denoted by X_i. The Cox model formula states that the hazard at time t is composed of two parts. The first of these, $h_0(t)$, is called the baseline hazard function, which reflects the hazard function for individuals without consideration of covariates (when xi=0). The second one is the exponential expression *e* to β*i Xi* (Kleinbaum and Klein 1996). The Cox model computes the coefficient vector β by calculating the maximization of the following likelihood function (Cox 1972):

$$L(\beta) = \prod_{i=1}^{k} \frac{\exp(x_i'\beta)}{\sum_{j \in R(t)} \exp(x_j' B)} \qquad (2),$$

where k denotes the number of distinct firm ages in which the sample ventures failed, and R(t) is the "risk" set of ventures that had not failed at the beginning of the firm age t.

4: Statistical Interpretations and Results

In our analysis, we compute the Cox model by applying the statistics tool, the STATA version 9 statistical package. The regression results of the Cox model provide key information for the survival analysis, such as the hazard ratio and coefficient figures on the testing variables.

The results of the Cox model are reported in Table 2. All five examined factors of national difference indicate a strong association with the foreign enterprises' survival. Among these five factors, international experience (LMIE) and access to foreign high-skilled people (LMHFSP), demonstrate particularly significant influence on the survival ratio. The significant results generated by these two factors imply that the business efficiency of a nation has a strong relationship to the success of the FIEs of that country.

The coefficient figure on each variable represents the measurement of the failure rate. A positive (or negative) coefficient (beta) refers to the fact that enterprises possessing that specific national difference factor have a higher (or lower) probability of failure than those companies that do not have that factor. In addition, higher (or lower) probability could lead to an earlier (or later) outcome of failure.

In the regression test, one national factor, international experience (LMIE), results in a highly significant negative coefficient ($\beta = -0.322$, $p < 0.01$). This shows that as the national difference in international experience between China and the home country increases by one unit, the probability of failure is lowered to 72% (that is, $e^{-0.322}$) of the initial level. On the other hand, when there occurs 1 unit of increase in LMIE, the probability of failure will decrease by 28%. A 3 unit increase will then lead to a failure reduction of ($1-e^{-3x0.322}$), or 61.9%. International experience is measured in terms of significance levels; therefore, that the significance level of the home country increases by one unit relative to China means the survival chance of the foreign enterprise increases by 28%.

Another significant determinant for the survival rate of FIEs, the national difference in foreign high-skilled human capital (LMFHSP), results in a negative coefficient ($\beta = -0.16$, $p < 0.01$). The outcome can be interpreted such that as the attractiveness level of foreign high-skilled human capital in the home country of foreign enterprises in China rises by one unit relative to that of foreign high-skilled human capital in China, the probability of failure decreases by 15 percent ($1-e^{-0.16}$).

Data on the adaptability and flexibility of companies (AVFA) provides us information on whether a company can stand for any new challenge when operating in an unfamiliar business environment. The higher these two business traits, the better the company can protect itself from failure. However, our regression result managed to provide an opposite implication. It produced a positive beta of 0.17, which implies that with a one unit increase in the adaptability and flexibility figure relative to that of China,

the failure ratio increases by 18.7% ($e^{0.17}$-1) and the survival chance will decrease by the same amount.

In our assumptions, R&D serves as very important competitive advantage, aimed at maintaining the survivability of a foreign enterprise. The regression test provides strong evidence for the argument. A negative beta of -0.098 implies that with a one percent increase in total expenditure on R&D against GDP (TERDP) in the home country relative to that of China, the chance of survival of the FIEs increases by 9.3% (1-$e^{-0.098}$).

A factor from the economic performance principle, the national differences in direct investment flows abroad, generates a result opposite to what we initially assumed in our hypothesis. It results in a positive coefficient ($\beta = 0.032$, $p < 0.01$), indicating that as the direct investment flows abroad of the home country relative to that of China increases by one percent of GDP, the failure probability of the foreign enterprises in China increases by 3.25% ($e^{0.032}$-1). An increase of 2 units will then lead to an increase in failure by ($e^{0.032x2}$-1), or 6.65%.

Two control variables, total asset size (TA) and leverage ratio (LR) are observed to have insignificant effect on the survival of the FIEs. Therefore, it is found out that firm level traits will provide little explanation to the success of a foreign venture in China.

Table 3 provides information on the correlation between the independent variables examined in this research. It is observed that the correlation coefficients

between the independent variables are high, ranging from -0.063 to 0.955. As every pair of variables has a correlation with each other, it is possible that multicollinearity is a factor, impacting the coefficient estimates reported in Table 2. One particular pair of variables has a very significant correlation with each other: adaptability and flexibility and international experience. Their strong association can be explained by the fact that the more international experience a country incurs, the higher adaptability and flexibility it will have. In order to isolate the effect of multicollinearity, we separate these two highly correlated variables from each other and re-run the regression test. According to tables 2(i) and 2(ii), the hazard ratio for the variable, international experience, increases as the result of the re-group. An opposite regression result even occurs when the international experience variable is excluded from the regression test.

5: Conclusion

This study is aimed at exploring whether a difference in national competitive factors between the investing company's home country and China will impact the survivability of a foreign enterprise in China. Among our examined five factors, three are consistent with our hypotheses, but not adaptability and flexibility and direct investment flow abroad. The results can be interpreted as indicating that a foreign enterprise in China is less likely to face failure if its home country has greater attractiveness to foreign high-skilled people, spends more on R&D relative to China, and if companies from the home country have more significant international experience than local companies in China.

On the other hand, the survival chance of the foreign enterprises will be lower if direct investment flow abroad is greater than that of China.

Our analysis has provided strong evidence supporting some traditional beliefs that international experience can increase the chance of success for foreign ventures in international markets (e.g., Smith et al., 1996). The results are also consistent with the study by Trevino and Grosse, which summarize that foreign high-skilled workers have a positive influence upon a firm's survivability in FDI. Our regression test on the R&D factor also provides support for Lin and Yeh's argument that the relationship between R&D expenses and FDI can be treated as mutually interdependent. On the other hand, our study has provided strong evidence against the idea that direct investment flow abroad of the home country can enhance the survivability of FIEs in China; instead it actually accelerates their failure. This phenomenon could serve as an interesting topic for future research.

However, some limitations appear in our study. First, this test only focused on manufacturing sectors in China. It is very possible that national factors have different magnitudes of impact on different sectors or industries. For instance, the effect of R&D may be greater on a technology intensive sector than on a labour intensive industry.

Second, national factors, adaptability and flexibility and international experience, are expressed as the significance results of hypothesis tests. The results do not provide much information about the magnitude or value of these factors. The methodology used

to compute a company's level of adaptability and flexibility and international experience may make the results between different nations hardly comparable.

TABLE 1

Survival Distribution for 4,605 Sample Ventures in the First Four Years of Operation

(1) Age of the venture (years)	(2) Number of ventures at risk [i]	(3) Number of ventures that fail	(4) Number of ventures censored [ii]	(5) Survival Function [iii]	(6) Hazard Ratio [iv]
1	788	93	(793)[v]	88.2%	11.8%
2	1488	190	(144)	76.94%	12.77%
3	1442	209	346	65.79%	16.96%
4	887	0	887	65.79%	0%

i. Number of ventures at risk is the number of ventures that had not failed at the beginning of the age interval.

ii. Censored ventures are defined as ventures that had not failed until the end of the observation period. For example, if a venture started in 1998 and continued to operate until the end of 2001, the venture is one of the 346 ventures censored at the end of their third year of operation.

iii. The survival function using the Kaplan-Meier (1958) procedure is calculated using the following expression: $S(t)=\prod_{j|t_j\le t}\left(\frac{n_j-d_j}{n_j}\right)$, where S(t) indicates the probability of survival by age t, n_j is the number of ventures at risk at the beginning of age t_j, d_j is the number of ventures failed in age t_j.

iv. The hazard ratio is calculated from the following expression: $h(t)=\frac{[S(t-1)-S(t)]}{S(t-1)}$, where h(*t*) is the probability of failure at age t, S(*t*) is Kaplan-Meier's estimate of survival function.

v. The number is in negative value. The main reason for that is one particular independent variable does not have data for several periods; this results some of the ventures are excluded during the survival analysis.

TABLE 2
Regression Results for Cox Model

Independent Variables	Expected sign	Cox Model	
		Coefficient [a]	Hazard Ratio
Indirect Investment Flow Abroad %GDP (IIDIFAP)	+	.032(5.81)*	1.032
Adaptability and Flexibility (AVFA)	+	0.17(2.52) *	1.187
International Experience (LMIE)	-	-0.32(-3.71)*	0.72
Foreign High Skilled People (LMFHSP)	-	-0.16 (-4.01)*	0.85
Total Expenditure on R&D %GDP (TEDRP)	-	-0.0985(-2.01) *	0.906
Total Asset Size (TA)	-	-.0375(-1.46)	0.963
Leverage Ratio (LR)	-	-.000415(-0.57)	0.9995

a. Numbers in parentheses are z statistics
b. *,significant at the 0.1 level or better

Table 2(i) -- Regression Results (1st Re-group)

Independent Variables	Expected sign	Cox Model	
		Coefficient	Hazard Ratio
Indirect Investment Flow Abroad %GDP (IIDIFAP)	+	.032(5.81)	1.032
International Experience (LMIE)	-	***-0.123(-4.1)***	***0.884***
Foreign High Skilled People (LMFHSP)	-	-0.16 (-4.01)	0.85
Total Expenditure on R&D %GDP (TEDRP)	-	-0.0985(-2.01)	0.906
Total Asset Size (TA)	-	-.0375(-1.46)	0.963
Leverage Ratio (LR)	-	-.000415(-0.57)	0.9995

Table 2(ii) -- Regression Results (2nd Re-group)

Independent Variables	Expected sign	Cox Model	
		Coefficient	Hazard Ratio
Indirect Investment Flow Abroad %GDP (IIDIFAP)	+	.032(5.81)	1.032
Adaptability and Flexibility (AVFA)	-	***-0.0599(-2.37)***	***0.94***
Foreign High Skilled People (LMFHSP)	-	-0.16 (-4.01)	0.85
Total Expenditure on R&D %GDP (TEDRP)	-	-0.0985(-2.01)	0.906
Total Asset Size (TA)	-	-.0375(-1.46)	0.963
Leverage Ratio (LR)	-	-.000415(-0.57)	0.9995

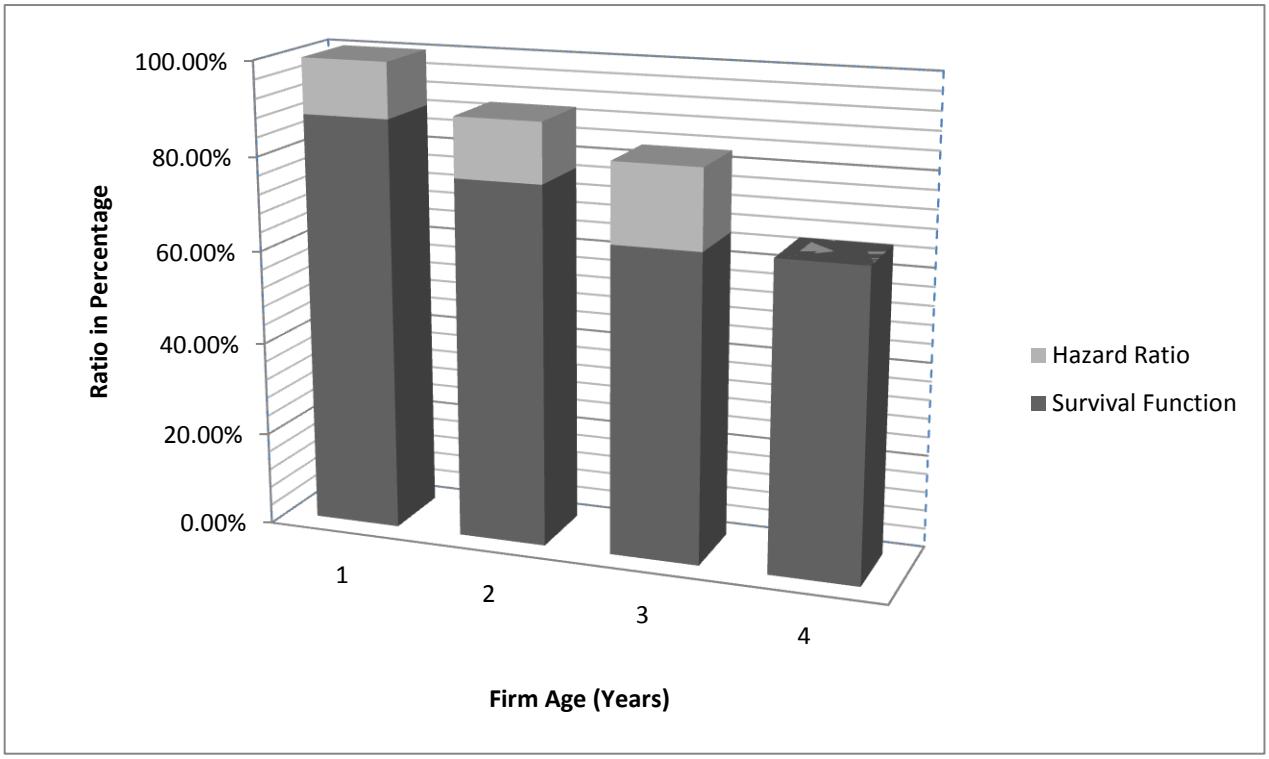
Table 3: Pearson's Correlations among Variables

		IIDIFAP	AVFA	LMFHSP	LMIE	TERDP
IIDIFAP	Pearson Correlation	1	.429**	-.067**	.462**	-.310**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	4695	4693	4693	4693	4695
AVFA	Pearson Correlation	.429**	1	.456**	.955**	.287**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	4693	4693	4693	4693	4693
LMFHSP	Pearson Correlation	-.067**	.456**	1	.489**	.155**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	4693	4693	4693	4693	4693
LMIE	Pearson Correlation	.462**	.955**	.489**	1	.212**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	4693	4693	4693	4693	4693
TERDP	Pearson Correlation	-.310**	.287**	.155**	.212**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	4695	4693	4693	4693	4695

**. Correlation is significant at the 0.01 level (2-tailed).

FIGURE I

Survival and Hazard Ratios for 4 Years of Operation



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