



The rise and fall of multinational enterprises in Vietnam: survival analysis using census data during 2000-2011

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[Abstract]

Using census data from 2000–2011, we examined the survival of multinational enterprises (MNEs) located in Vietnam using Cox hazard models with time–variant covariates. Beside enterprises’ characteristics and performance, we found that the firm characteristics, structure of the ownership and nationalities of the foreign partners are associated with the probability of exiting, which suggests that a joint–venture between a foreign partner and a domestic non–state owned enterprise is more likely to exit than other types of MNEs. Also, a firm with a greater capital share owned by foreign partners was found to survive longer. Furthermore, time cost due to bureaucratic procedures and inspections, among indicators of local government performance, was found to be associated with a greater probability of MNEs exiting.

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1. Introduction

Since the first laws on foreign investment after doi moi in Vietnam were put into force in 1997, multinational enterprises (MNEs) have become crucial stakeholders in the Vietnamese economy. MNEs accounted for 11.52 percent of the employment in the economy in 2000; the share increased rapidly to 22.84 percent in 2007 (GSO, 2013b). Moreover, the amount of capital stock associated with foreign direct investment (FDI) almost doubled from 580 billion to 1,108 billion Vietnamese dong (GSO, 2013a¹). Despite this rapid growth in the FDI inflow in Vietnam, the census data also demonstrate a high rate of exit of MNEs from the Vietnamese market, a finding that is consistent with Ha and Kiyota (In press), which found a high turnover (approximately 35 percent for both entry and exit rates in 2008) of manufacturing firms in the country including domestic firms. This situation presents a challenge to the country's outward-oriented growth strategy and the continued success of MNEs in their business in Vietnam.

This indicates the need for detailed research on the behavior of MNEs in Vietnam in terms of the performance in their survival in business as well as that in their entry. A number of empirical studies have investigated firms' turnover patterns using firm-level data (see, for example, Griliches and Regev, 1995). Most of these studies focus on entry and exit probabilities at a particular time point, but this short-run framework is not necessarily suitable for capturing the complex nature of a firm's survival (or exit) decisions. Firms might take the past, present and future economic conditions into account in making survival decisions. For example, firms might not exit immediately when they run a deficit; they might stay in business if there are opportunities in the future (Dixit, 1989). Thus, focusing on how long a firm survives, or in other words, the duration of its survival, may be more suitable to account for the observed turnover patterns of firms. As discussed below in detail, empirical studies on MNEs' turnover focusing on duration of survival and its determinants, especially using census data of emerging or developing countries, are relatively scarce, however.

Previous studies on determinants of firm turnover patterns using firm-level data have focused on a limited set of factors such as firm productivity, firm's ownership structures such as share of foreign capital, firm's ownership type such as public/private ownership, and other firm-specific characteristics such as employment size and firm age. Also, the institutional and policy environment can be an important factor affecting FDI flows and the effectiveness of FDI (see, for example, Globerman and Shapiro, 2002). However, the limited availability of spatially disaggregated data on the institutional and

¹ The amount of capital stock is converted to 2010 value using GDP deflator available at World Economic Outlook Database (<http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/index.aspx>) of International Monetary Fund.

policy environment has constrained firm-level analysis incorporating those variables.

Accordingly, our paper focuses on the duration of survival of MNEs in Vietnam, and investigates a wide range of its potential determinants while paying particular attention to firm ownership structures, and the performance of local governments by combining the firm-level data of Vietnam on MNEs for 12 consecutive years from 2000 to 2011 and the annual survey on provincial competitiveness. The data period covers the period after the first laws on foreign investment and the period before and after the country's WTO accession. Also, this firm-level dataset of MNEs is virtually a census dataset containing nearly all MNEs that existed in Vietnam during the period, which allows us nearly full-sample estimation. At the same time, this allows us to be free from any sample selection problems and makes direct interpretation on the population of MNEs, hence, very convincing policy discussion, possible. The use of spatially disaggregated and time-variant indices for the performance of the local government allows us to examine the implications of the institutional and policy environment, which we claim make an important contribution. These indices include start-up costs, transparent business environment, and time spent on bureaucratic procedures and inspections.

Also, the census dataset also allows us to examine the influence of ownership structures in terms of the degree of foreign ownership and foreign partners' nationality of origin are expected to affect the behavior of firms from various aspects. The availability of data on the capital share of foreign and domestic partners of joint ventures allows us to analyze the influence of the degree of foreign ownership. Furthermore, the availability of source country information of the foreign partners enables us to examine the potentially differing impact of FDI by source. The ownership type, most importantly, public and private ownership of the domestic partner, can also affect the foreign partner's incentive for investment and improved performance, and hence, firm turnover. We examined the effect of the selected factors on the duration of survival of MNEs using Cox hazard models. The Cox hazard models have the advantage of taking the time varying effect into account; such time-varying factor includes the growth of total assets and (average) start-up costs. This feature of the Cox hazard models allows us to incorporate the complex path-dependent turnover decisions of firms, thereby allowing examination of the effect of the determinants on the performance and behavior of the firms.

Our major findings are as follows: First, we found that joint-ventures of MNEs formed with non-state owned enterprises are the most likely to exit. Second, the increment of the capital share owned by foreign partners helps to prolong survival in joint-venture enterprises. Third, we identified six nationalities whose MNEs are more likely to survive, namely, Japan, Thailand, Hong Kong (China), Taiwan, Germany, and Singapore. Finally, we show the local government performance, similar to MNEs' performance, in association with the survival of the firms.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 introduces the data used, and Section 4 describes our empirical methodology. Section 5 presents our findings. Section 6 reports the robustness check. Section 7 discusses our results and presents our conclusions.

2. Related literature

Dixit's (1989) provides a conceptual framework for a firm's turnover decisions. The firm enters if the product price that the firm faces is greater than the variable cost and the interest charges on the entry cost. Similarly, the firm exits if the product price is less than the variable cost minus the interest charges on the exit cost. Geroski's (1995) survey paper presents several stylized facts on firm turnover. It points out that entry and exit rates are positively correlated because the entry of new firms typically occurs through the displacement of old firms. It also points out that survival is more difficult than entry, and that expected survival duration is a priority issue to be considered at the time of entry. Industries where FDI is active are often considered as "footloose" as they are likely to be sensitive to the wage rate. However, a wage increase does not necessarily lead to a withdrawal of investment (Flamm, 1984). Dixit (1989) argues that the withdrawal (shrinkage) of investment (employment) should consider the later return (expansion) when opportunities arise.

Despite the importance of the issue, however, little attention has been given to the influence of differing ownership structure on the performance of joint-ventures between MNEs and domestic partners, especially in the case of state-owned firms in transition economies. Nguyen and van Dijk (2012) indicated that, before 2000², state-owned enterprises had been granted privileges in land acquisition by the government in Vietnam.

Previous studies have focused on various determinants of the firm's turnover patterns. Mata and Portugal (1994), McCloughan and Stone (1998), Audretsch et al. (1999), and Holmes et al. (2010) are among those studies that demonstrated the importance of size and age on firm turnover patterns. Mata and Portugal (1994) found one fifth of the Portuguese manufacturing firms in 1983 exited during the first year after their establishment. Also, they found that initial start-up size is positively correlated with the survival of new entrants. Cabral and Mata (2003) indicated that the distribution of the size of Portuguese firms was skewed upward, and that this upward skewness becomes more prominent for firms of greater age. Geroski (1995) showed that firms in the US and Canada may take up to ten years to reach the average necessary size after their entry.

Other important characteristics that are focused on in the literature include

² In 2000, at the time the revised Enterprise Law became effective, state-owned enterprises owned more than 67.13 percent of total capital among all types of firms (GSO, 2013a).

technology and management level. McCloughan and Stone (1998) examined whether the nationalities of source countries of FDI might have a distinct effect on the survival of manufacturing MNEs in the UK. They found only a slight difference in the effect of FDI among source countries of FDI (US, Japan, Germany, Sweden, Netherlands, and Canada) possibly because those countries, due to their similarity in the stage of development, are quite similar in managerial skills and technologies. In the case of Vietnam, however, the effect of the nationalities of the source countries of FDI can be analyzed more appropriately because Vietnam as an emerging economy is expected to attract investment from countries in various stages of development.

The performance of the firm is also considered as a key determinant of firm turnover patterns. The performance is measured in various ways including the level of the firm's productivity, the growth of the firm's market share (employment expansion), the firm's capital stock and debt (ability to borrow), and its product derivation from existing firms. A number of studies have examined the relationship between firm productivity and turnover patterns (see, for example, Griliches and Regev, 1995; Pavcnik, 2002; and Ha and Kiyota, in press).

Other studies focused on industry-, region-, or economy-level determinants of firm turnover. Mata and Portugal (1994), using the data on the Portuguese manufacturing sector, focused on industry-level factors such as the market share of the new entrants and industry growth rate, and found that the probability of failure of new entrants decreases with the industry-level growth rate. Geroski (1995) showed, however, that the differences in entry rates between industries dissipate over time. Some studies focused on region- or economy-level determinants such as the institutional and policy environment, and macroeconomics factors. Investors in emerging and developing countries consider government performance in their decision of entry (Svensson, 2003; Rand and Tarp, 2012). This tendency appears even more prominent in emerging and developing countries than in OECD countries due to the aim of protecting domestic industrial sectors (Tybout, 2000). Nguyen and van Dijk (2012) found that corruption, as a measure of the (poor) performance of local or national government, harms the growth of the private sector in Vietnam. Hansen et al. (2009) found that tax exemptions during a firm's start-up facilitate the growth of Vietnamese firms. Moreover, Fisman et al. (2007) showed that the negative effect of bribery on the growth of Ugandan firms is three times more than that of taxation.

Thus, previous empirical studies have taken only, at best, partial determinants into account. Our study, instead, allows to examine the effect on the survival of a firm of factors ranging from firm-level to industry- or region-level factors, or from economic to institutional factors. The key determinants of interest include firm's ownership structures, ownership types, characteristics and performance, industrial features, and government performance. To the best of our knowledge, research on the survival of MNEs using firm

level data is still limited as far as developing and emerging economies are concerned. Thus, our study fills the gaps in the literature by taking advantage of a census dataset of MNEs and provincial competitive index.

3. Data

We used two survey data in our estimations, the Vietnamese Enterprise Survey (VES) 2000–2011 and Provincial Competitive Index (PCI) 2006–2011. The latter is matched with the former based on the province names and codes.

3.1 VES 2000–2011

Since 2001, the General Statistics Office of Vietnam (GSO) has collected annually information on economic activities of the preceding year of each business identity all over the country. The survey is most commonly known as the Vietnamese Enterprise Survey. The obtained data length is twelve consecutive years. Although the sampling methods are different for each year for private firms, GSO has continued to collect a census of all active multinational enterprises (MNEs).

MNEs are defined as having registered capital coming from overseas investors. Thus MNEs can be a solely foreign-owned enterprise (FOE), a joint-venture between overseas investors with a state-owned enterprise (*Joint – venture with SOE*), or with partners other than a state-owned enterprise (*Joint – venture with other than SOE*).

VES contains two important questionnaires on MNEs. First, the questionnaires ask general information about the MNEs including information about their business tax code. We also have information about the firm's performance in the year prior to the survey. This information comes directly from the balance sheet of the firm. Following laws on the usage of the statistics, we do not have information of the firms' names. The first part (tax code) is quite consistent and the same code is repeatedly used for a single firm over the years. This allows us to create the necessary data set for the survival analysis. Second, another part of the questionnaires specializes in collecting information on MNEs. We obtained information about the capital share with countries and territories of origins. However, VES only started to include this part in 2002.

We deployed multiple criteria to identify the appearance of MNEs during 2000–2011. First, we used the tax code as key information to construct panel data of MNEs. A unique tax code is provided to each MNE by the Provincial Department of Finance and strictly follows the guidelines of the Ministry of Finance. We combined this useful information with the provincial code as a primary identifier for MNEs. The combination is unique all over the country and across years. However, we found that some MNEs are not recorded with a tax code. These firms still appeared in subsequent years with the tax code.

We were able to identify this problem and recover the tax code of the missing year based on information about the MNEs landline telephone number. We combined the last six digits of the landline telephone and province code as a secondary identity because this combination acts approximately as a unique telephone number in a country. Also, we assumed that firms do not change their telephone number twice within three consecutive years due to business cost³. However, to further increase the accuracy of matching, we employed a third identifier from GSO. GSO includes in the data two variables to identify each firm. These variables combined with the province code are totally unique within a year. Thus, we only used the third identity to confirm the recovered cases but not if the first and second identifiers both matched.

The difference between the number of MNEs in our sample and the population of active MNEs was minor. We compared the number of identified MNEs having all the necessary information for estimations with that in the official report of GSO. The difference was less than four percent every year, except year 2000 (with 9.5 percent) as shown in Table 1.

[INSERT TABLE 1]

Furthermore, the VES 2000–2011 has an advantage over other databases of firms for examining survival. We obtained the exact time of exit of all MNEs since in–active MNEs are not respondents of the survey. In addition, VES 2011 is a census survey addressed to even inactive MNEs. Thus we were able to identify the exit of the firms in 2010 without waiting until VES 2012 was available.

Therefore, we were able to examine the survival of MNEs in Vietnam from 2000–2011. The total number of MNEs during 2000–2011 (2006–2011) was 51,770 (36,891). However, since newly established MNEs in 2011 perfectly survive, we excluded these observations from our estimations. Thus, we actually used 49,858 (34,979) observations in our estimations. Details are shown in Table 2 and the variables shown in the table are discussed in the next section.

[INSERT TABLE 2]

3.2 PCI 2006–2011

PCI is an annual survey conducted by the Vietnamese Chamber of Commerce and Industry (VCCI) with support from the U.S. Agency for International Development (USAIDS). The survey first began in 2005 with 42 provinces but covered all provinces in subsequent years. Firms (over 6,000 respondents per year) are randomly selected from a list of registered private firms supplied by the National Tax Authority, stratified by

³ The cost includes not only reprinting contacts such as name card and brochures but also opportunity cost due to their customers losing the firm's contact information.

business age, sector, and legal form (page 11, VCCI, 2012) for a sample of country representative. The indexes are built based on several questions. Each index has the same scale 1–10 from 2005–2011. A higher index indicates a more competitive province.

The sub–indices repeated across 2006–2011 are (a) low entry costs for business start–up, (b) easy access to land and security of business premises, (c) transparent business environment and equitable business information, (d) minimal informal charges, (e) limited time spent on bureaucratic procedures and inspections, and (f) proactive and creative provincial leadership in solving problems for firms. We used (a), (c) and (e) in our estimations⁴.

4. Empirical models and econometric specifications

4.1 Empirical models

We employed Cox hazard models with time–variant covariates and firm clustered robust standard errors. For robustness check, we deployed a linear probability model with firm clustered robust standard errors.

The study period was from 2000 to 2011. All MNEs were observed since they first appeared in the study period. All MNEs were considered to have exited in the following year if they did not appear in the next two consecutive years. MNEs found in 2011 were (right) censored data because these firms might exit sometime after 2011.

We measured the duration of survival by the period from the time at which the MNE was first observed to the time at which it was last seen within the data period regardless of cohort selections. We followed the definition of the OECD (2013)⁵ on the survival of employers. In our estimations, a surviving firm should have at least one employee, report to GSO, keep the same tax code⁶ throughout its appearance in the study period and not be inactive for two consecutive years⁷. We assumed that all MNEs

⁴ (b), (d) and (f) were overlapping and/or had a strong statistical correlation with other sub–indices. For example, the correlations between (a) and (b), (b) and (d), (b) and (f) were 0.4394, 0.6690 and 0.5781, respectively. Thus we excluded the three sub–indices, (b), (d) and (f). Another reason why we dropped these three sub–indices is that after trying various empirical specifications, explained in the next section, which includes various combinations of the sub–indices, only (a), (c), and (e) showed statistical significance. In other words, (b), (d), and (f) were not statistically significant in all specifications.

⁵ There is no clear-cut definition for duration of survival, but the OECD’s (2013) definition is widely used. The duration of survival of firms is defined as the time during which firms employ at least an employee, and should not be inactive in two consecutive years. Active firms in just one year are also considered as survivors. This excludes mergers and acquisitions. The survival rate is attached to the number of surviving firms of a specific birth cohort.

⁶ This naturally excludes firms taken over by mergers and acquisitions since the tax code is required to change.

⁷ We identified and omitted 169 firms (769 appearances) missing for more than two years, 99 of which first appeared in 2000–2002. We were unable to verify whether they were inactive or missing due to data collection.

established before 2000 were established in 2000. This assumption is not unreasonable because the first laws of foreign investment after *doi moi* became effective in 1997 and, from Table 1, there were 1,379 MNEs in year 2000 while the total number of MNEs was approximately 51,770 for 2000–2011 with an average annual increment number of 871 newly established MNEs.

In the equations below, we denote the probability of exit of a firm as $F(t)$. The survival function of a firm is the probability of a firm being observed in the time of study, $S(t) = 1 - F(t) = P(T > t)$ and $S(t) = 1$ at $t = 0$.

The hazard function, $h(t)$, is the instantaneous rate of exit:

$$h(t) = \lim_{\Delta t \rightarrow 0} [(P(t + \Delta t > T > t | T > t)) / \Delta t] = (f(t)) / (S(t)). \quad (1)$$

The cumulative hazard function is

$$H(t) = \int_0^t h(u) du = \int_0^t [f(u) / S(u)]. du = -\ln\{S(t)\}. \quad (2)$$

The likelihood function of survival of the firm is

$$\mathcal{L} = S(t). h(t), \quad (3)$$

and returns to $\mathcal{L} = S(t)$ at the point the data are censored.

We assumed baseline hazard (survival) of MNEs to be homogenous. Thus the differences in the characteristics of MNEs link with the differences in the survival of MNEs. The simplest conventional Cox hazard for an MNEs at time t is

$$h(t) = h_0(t). \exp(Z_i. \beta_i), \quad (4)$$

where $h_0(t)$ is the baseline hazard, and Z_i is a vector of constant characteristics of firm i . However, we argue that $h(t)$ would contain time varying covariates. For example, the growth rate of capital would have a different effect on the survival of the firm at different ages of the firm. Thus we modified (4) with time-covariates

$$h(t) = h'_0(t). \exp[Z_i. \beta_i + g(t). (X_{it}. \alpha_i)], \quad (5)$$

where $g(t)$ is a function of time, and X_{it} is a vector of time varying covariates⁸. We assumed $g(t) = t$ and put the results into the main analysis. However, we also eased this assumption by hypothesizing that the nexus is loosening over time at an exponential rate. We assumed the half-life of factor X_{it} as 2, 3, 4, and 5 years. Thus the other replacement forms of $g(t)$ were $\exp(-0.35 \times t)$, $\exp(-0.233 \times t)$, $\exp(-0.175 \times t)$, and $\exp(-0.14 \times t)$. However, as the mean of survival duration is 5 years as seen in Table 2, we only put the results using $g(t) = \exp(-0.14 \times t)$ in Appendix 3 and 4 as other

⁸ A characteristic can be represented in both X_{it} and Z_{it} .

references⁹.

Due to the heterogeneity problem, the estimations would become unreliable if the baseline hazard function were not chosen appropriately (Heckman and Singer, 1984). However, we followed a flexible parametric proportional hazards model as suggested by Han and Hausman (1990). This model assumes a nonparametric baseline hazard (constant baseline hazard within each interval), a particular form of the covariates, and takes advantage of large sample data.

In fact, we split the data into yearly intervals and set up a piecewise linear baseline hazard. We used a set of dummies $C_{i,entry\ year}$ to control for the fixed time effects of the entry year, which could influence $h_0(t)$. We also considered the difference in the industrial fields of the firms and the provincial government performance in each year as a set of dummies, D_i and vector of PCI, $G_{i,year}$. Thus, (5) becomes

$$h(t) = h_0^*(t) \cdot \exp[Z_i \cdot \beta + g(t) \cdot (X_{it} \cdot \alpha) + C_{i,entry\ year} \cdot \beta_c + D_i \cdot \beta_d + G_{i,year} \cdot \alpha_{year}], \quad (6)$$

where $h_0^*(t)$ is non-parametric baseline hazard. $h_0^*(t)$ is estimated from the data. Thus, as displayed in our results, the hazard ratio, $h(t)/h_0^*(t)$, is the probability of exiting compared with the baseline hazard. More specifically, if the hazard ratio is more (less) than one, the firm is more (less) likely to exit.

Besides, to check the robustness, we applied a linear probability model for the exit of the firm by setting a binary outcome of exit as

$$exit_{it} = \begin{cases} 1, & \text{if year} < 2011 \text{ and } t \text{ is the time the firm last seen} \\ 0, & \text{if otherwise} \end{cases}, \quad (7)$$

and using the ordinary least squared model to estimate:

$$exit_{it} = Z_i \cdot \beta + X_{it} \cdot \alpha + C_t \cdot \beta_c + D_i \cdot \beta_d + G_t \cdot \alpha_{year} + \varepsilon_{i,t}. \quad (8)$$

The model of linear probability has some advantages over Cox hazard models. The model is free from some assumptions necessary for specifications of Cox hazard models that are debatable. However, the linear probability model is unable to take advantage of the data in the year 2011 as censored data. Thus we limited the usage linear model for the robustness check.

4.2 Specifications

We selected independent variables for the Cox hazard model as follows. Also, a similar set of independent variables can be applied to the linear probability model. The descriptive statistics for those variables are presented in Table 2.

⁹ Other results using the different functions $g(t)$ are available upon request.

Three types of MNEs are *joint-venture with SOE*, *joint-venture with other than SOE*, and foreign-owned enterprises (served as the baseline).

Initial firm size is the number of employees at the year end when first seen in the time of study.

Indicators for the performance of the firms include a proxy for shut-down point ($\ln(\text{total revenue}_t/\text{labor cost}_t)$), ratio of liabilities to fixed assets ($\ln(\text{liabilities}_t/\text{fixed assets}_t)$), growth of total labor ($\ln(\text{labor}_t/\text{labor}_{t-1})$), and growth of total assets ($\ln(\text{total assets}_t/\text{total assets}_{t-1})$). We used t to denote the value as of the end of the survey year and $t - 1$ for the corresponding number recorded in the beginning of the survey year. We assumed these indicators as time-variant covariates. As some observations contain zero values in the raw variables, it is impossible to take log for some ratios. We applied “dummy variable adjustment” (Cohen and Cohen 1983; and Cohen, Cohen, West, and Aiken 2003). Concretely, zero was assigned for variables that cannot be converted into log. At the same time, we constructed dummy variables to control for these special cases. Thus, binary indicator variables (include Zero total revenue $_t$, Zero liabilities $_t$, Zero fixed assets $_t$, Zero total labor $_{t-1}$, Zero total assets $_{t-1}$, and Zero total assets $_t$) are created that are coded as 1 if the corresponding values are zero, and 0 otherwise.

The logarithm of the accumulated capital share owned by foreign partners ($\ln(\text{foreign capital}_t/\text{total capital}_t)$) is set to zero if foreign-owned enterprises and takes other values if otherwise. This is hypothesized to be time-variant covariate. We noticed that the information of capital share owned by foreign partners is recorded in 2002 and later¹⁰.

The nationalities of MNEs are the country of origin of FOE or of foreign partners in joint-venture enterprises. We selected top 20 nationalities that have the largest number of MNEs (over 500) during 2002–2011 and set as dummies such as *Japan* and *Germany*. The baseline is *other countries*, which includes less than the 20 nationalities.

The PCIs 2006–2011 in each province were integrated to the data by converting the table between provincial codes and names. They were indices of low entry costs for business start-up (*low entry costs*), transparent business environment and equitable business information (*transparency*), and limited time spent on bureaucratic procedures and inspections (*low time costs*). A high index shows a competitive local government. Also, to reduce the problem of possibly correlated variables of PCIs, we calculated the first

¹⁰ Whenever $\ln(\text{foreign capital}/\text{total capital})$ cannot be computed due to (a) missing information or (b) zero Vietnamese capital while the firm declares to be joint-venture, we applied “dummy variable adjustment” as explained in the previous paragraph. The numbers of observations with each of such issues were 134 and 1,385 and dummy variables *Missing Vietnamese partner $_t$* and *Zero Vietnamese partner $_t$* were created. At the same time, zero was assigned to $\ln(\text{foreign capital}_t/\text{total capital}_t)$ for these observations.

principal component (*first principal component*) from the three indices as another option¹¹. *First principal component* can be the first-order effect of governance and interpreted as similar to PCIs. In addition, we set PCIs (*first principal component*) as both time-variant and time-invariant covariates.

Also, we constructed several dummies for the fixed effect. D_i comes from the Vietnamese Standard Industrial Classification (VSIC) level 1 recorded in the data¹². We used 13 dummies for the major industries in which MNEs are located. They were agri-aquaculture/forestry, banking/finance, constructions, education, entertainment, health, information and communication technologies (ICT), logistics, manufacturing, mining, restaurant/hotel, trading and other industries. The baseline is “agri-aquaculture/forestry.” Also we converted all provincial codes into the code in 2011 (the most updated classification of provincial administrative divisions) and set up 62 dummies to control for the differences of locations among 63 provinces in Vietnam. Dummies for financial year (*Year 2000–Year 2011*) were also included.

Finally, we deployed comparable estimations among the data cohorts 2000–2011, 2002–2011, 2000–2005 and 2006–2011 using the same set of independent variables. We dedicated 2006–2011 as the cohort for analysis with a full set of independent variables. This is because information on the capital share owned by foreign partners (origins) and PCI data are only available from 2002 and 2006, respectively.

5. Results

The estimation results are shown in Table 3 and 4. Note that “(tvc)” in the tables means the variables treated as time-variant covariates.

The ownership of the foreign partner has a significant connection with the probability of exiting. There are three important pieces of evidence.

First, there was a significant difference in the probability of exiting among different types of MNEs during 2000–2011 as seen in Table 3. A joint-venture with a domestic partner had an approximately 1.6 times higher probability of exiting than a FOE. Similarly, a joint-venture with a SOE was more likely to exit than that with a FOE during 2000–2011; however, this difference was not statistically significant during 2006–2011.

[INSERT TABLE 3]

Second, the capital share owned by a foreign partner has the nexus with a

¹¹ Such orthogonal transformation converts the set of PCIs into a set of linearly uncorrelated principal components.

¹² GSO once changed the classification in 2007, thus we convert all codes in VSIC2007 into VSIC1993 to make the dummies consistent across years. VSIC2007 is based on International Standard Industrial Classification revision 4 (ISIC Revision 4) by the United Nation Statistical Division.

probability of exiting among types of joint-ventures. As shown in the hazard ratio of the corresponding variables in Table 4, an increase in the share would connect with a lower probability of exit. Besides, the probability varies positively with the duration, given the same capital share ratio and other things being equal because the variable is time-variant covariates. In addition, the results are consistent and robust regardless of the choices of data cohorts, of $g(t)$ forms, and the type of joint-ventures. Table 4 and Appendix 4 show the details. This implies that foreign partnership is associated with a longer duration of survival. These results agree with those of Lu and Hébert (2003).

[INSERT TABLE 4]

Third, we found that the nationalities of foreign partners connect with the probability of exiting. As shown in analysis (1) and (2) in Table 4, we found that the nationalities of MNEs having the lowest probability of exiting among top investors in Vietnam are Japan, Thailand, Hong Kong (China), Taiwan, Germany, and Singapore. The nationalities of MNEs can be a proxy for a difference in technology, management, culture and support from the headquarters. It is notable that all the origin countries except Germany are Asian countries, which could support our hypothesis that the nationalities could be a proxy for the above-mentioned dimensions. We cannot divide the connection into specific sub-categories. However, similar to the case of the foreign capital share, this connection is persistent regardless of the data cohorts although the ranking among the top countries may change with the assumption of $g(t)$ and the models in use.

Turning to the issue of the quality of local governments, the competitiveness of provincial government correlates with the survival of the firms in opposite directions. While it facilitates the establishment of new firms, it also increases the probability of failing for existing firms. In comparing Table 4, Appendix 2 and Appendix 4, the signs of the three indices are consistent regardless of the assumptions on $g(t)$ or the models used. As seen in analysis (3) of Table 4, a one-point increase in the index of *low entry cost*, which means the provincial business environment has a lower cost for entrants, links with 1.2818 times higher in the probability of exiting of the existing MNEs. There are two possible explanations. A lower cost for entrants would create more competitors for the existing MNEs. Thus, existing MNEs are more likely to exit because of stiffer competition. Another interpretation is that a lower cost for entrants may be attractive to firms with lower competitiveness, which are more likely to exit. Also, if a provincial government improves the transparency of the business environment and equitable business information, a one-point gain in the transparency index could lead to a probability of 1.1686 times higher probability of exiting. Since there are more MNEs enter than exit over time as shown in Table 1, higher transparency increases the competitiveness of the business environment and only the most competitive would survive. Thus this selection would boost economic

development. In contrast, a one–point improvement in the index for limited time spent on bureaucratic procedures and inspections would help to reduce 0.7878 times lower in the probability of exiting.

In addition, we examined specifications including the first-order principal component constructed from three local government quality indices. This would provide a first order effect of the quality of the local government on the survival of MNEs. Unfortunately, since each of the indices would have opposite directions, these cancel out in the estimation results. The first principal component would have a minimal connection with survival as shown in analysis (4) of Table 4 or elsewhere in the corresponding analysis in Appendix 2 and 4.

Also, our study confirmed the characteristics and performance of MNEs to the exit. A one–labor increase in the initial size is associated with 0.9991–0.9994 times lower probability of exiting of MNEs as indicated in Tables 3 and 4. Our results agree with those of Audretsch and Mahmood (1995). The growth of labor and total assets, and the logarithm of revenue over cost of labor, likewise link with a lower probability of exiting. Meanwhile, the indicator of low ability to pay debt, $\ln(liabilities_t/fixed\ assets_t)$ connects positively to the probability of exiting.

6. Robustness check

Differences in data cohort are less likely to affect our estimations. The information of foreign capital share and origins are only available in 2002 and after, while PCIs are later than 2005. However, the sign of the main coefficients of our findings such as MNEs types, initial size, performance and the share of capital owned by foreign partners are consistent across data cohorts as shown in Tables 3 and 4. The only exception is the statistical significance level of types of MNEs, in a particular joint-venture with SOE. However, in general, our interpretation for cohort 2006–2011 can be extrapolated to that of 2000–2011.

Thus, our main findings appear to be robust. We found that the sign and significance of coefficients for our main findings are sufficiently similar between the Cox hazard estimations and the linear probability estimations as demonstrated in Appendix 1 and 2. Similarly, the assumptions on $g(t)$ do not affect the results in regard to our main variables as in Appendices 3 and 4¹³.

7. Conclusion and discussion

We examined the probability of MNEs exiting using a census survey of MNEs

¹³ We also examined and confirmed this with other specifications of $g(t)$ as listed in Section 4.1 and those results are available upon request.

from 2000–2011 in Vietnam using Cox hazard models and the linear probability model. We also combined the data with annual provincial competitiveness indices. The results show a connection between the structures and types of ownership, and the probability of exiting, hence the duration of survival. Joint-ventures with other than SOE are more likely to exit than the rest. In contrast, a higher proportion of capital owned by foreign partners would link with a higher probability of survival. We hypothesized that better business decisions empowered by sharing the capital of foreign partners would prolong the life of the MNEs. Furthermore, the nationalities of MNEs have different influences on the probability of exiting. We argue that the nationalities would be a proxy for differences in technology and management and culture proximity. Local government performance can either prolong or shorten the duration of survival. Our study also confirms the influence of MNEs' characteristics and performance on its decision to stay or to exit.

Three main policy implications can be drawn from these findings. First, MNEs should raise the proportion of the capital owned by the foreign partner in the total capital to increase the likelihood of surviving. However, it should be noted that there are legal share limits on foreign owned capital imposed by the Vietnamese government in some specific cases¹⁴, however. The country should consider removing or relaxing the limits against MNEs, as was also suggested by Kosová (2010). Second, the best surviving nationalities should be considered among Vietnamese in attracting foreign investment. Third, in the short run, improvement in local government performance should put more weight on reducing time costs due to bureaucratic procedures and inspections. On the other hand, creating a more competitive business environment by lowering the entry costs, with more transparency and equitable business information would secure better and sounder economic development.

Our study has some limitations. First, the survival difference among the three types of MNEs may be endogenous. For example, foreign partners might avoid SOEs because it tends to take longer to reach the conclusion of a contract with SOEs. Thus the duration of survival is short regardless of later decisions. Second, similarly, the capital share among partners may also imply the duration of the contract. Third, the location choice would be endogenous (Shaver, 1998). Fourth, there is some minor miss-matching among different assumptions of $g(t)$ or between the duration model and the linear probability model, which affect the statistical significance of the coefficients. For example, the coefficient of *transparency* becomes statistically insignificant if $g(t) = \exp(-0.14 \times t)$ as in Appendix 4. However, *transparency* is statistically significant if included but the other two indicators are omitted¹⁵.

¹⁴ An example is Article 13 of the Government Decree 102/2010/ND-CP dated 01/10/2010 entitled "Detailing a number of articles of the law on enterprises."

¹⁵ We estimate this case but do not show it in the main report.

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Table 1 Appearance of MNEs in 2000–2011

Start-up year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
2000	1,379	1,264	1,223	1,185	1,167	1,127	1,086	1,071	1,046	1,002	968	943
2001		748	650	640	634	592	561	542	526	508	488	463
2002			351	307	297	278	262	260	251	239	229	217
2003				454	421	385	362	360	343	338	328	320
2004					561	534	496	480	445	432	417	407
2005						682	613	582	534	514	491	473
2006							746	680	632	597	588	569
2007								919	823	765	724	701
2008									973	876	816	776
2009										1,207	1,076	1,001
2010											1,029	884
2011												1,912
Total	1,379	2,012	2,224	2,586	3,080	3,598	4,126	4,894	5,573	6,478	7,154	8,666
GSO*	1,525	2,011	2,308	2,641	3,156	3,697	4,220	4,961	5,626	–	–	–

(*): GSO (2013a)

Table 2 Descriptive statistics of main variables

Variables	2000–2011			2006–2011		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Duration (years)	49,858	4.3987	2.9917	34,979	5.0660	3.1872
Exit (dummy)	49,858	0.0460	0.2096	34,979	0.0452	0.2077
Joint–venture with SOE (dummy)	49,858	0.1260	0.3318	34,979	0.0908	0.2873
Joint–venture with other than SOE (dummy)	49,858	0.1031	0.3041	34,979	0.1041	0.3053
Initial firm size (number of labor)	49,858	187.9	627.05	34,979	175.57	576.37
$\ln(\text{foreign capital}_t/\text{total capital}_t)$	49,858	-0.0987	0.2784	34,979	-0.0956	0.2829
$\ln(\text{foreign capital}_t/\text{total capital}_t)$ (among joint-ventures and if foreign capital _t & total capital _t > 0)	10,439	-0.4715	0.4408	6,104	-0.5478	0.4593
$\ln(\text{total revenue}_t/\text{labor cost}_t)$ (if total revenue _t & labor cost _t > 0)	47,656	1.2161	1.4345	33,556	1.1650	1.4859
$\ln(\text{liabilities}_t/\text{fixed assets}_t)$ (if liabilities _t & fixed assets _t > 0)	46,308	0.4573	1.8075	32,410	0.6210	1.8340
$\ln(\text{labor}_t/\text{labor}_{t-1})$ (if labor _t & labor _{t-1} > 0)	45,480	0.0988	0.4757	32,526	0.0859	0.4660
$\ln(\text{total assets}_t/\text{total assets}_{t-1})$ (if total assets _t & total assets _{t-1} > 0)	44,950	0.1546	0.4522	32,213	0.1588	0.4679
Entry costs				34,979	7.6539	0.9382
Transparency				34,979	6.4980	0.7462
Time cost				34,979	6.2065	0.9145
First principal component of entry costs, transparency and time cost				34,979	0.4967	1.0062
Zero total revenue _t (dummy)	49,858	0.0437	0.2044	34,979	0.0401	0.1961
Zero liabilities _t	49,858	0.0401	0.1961	34,979	0.0355	0.1850
Zero fixed assets _t	49,858	0.0487	0.2152	34,979	0.0520	0.2221
Zero total labor _{t-1}	49,858	0.0878	0.2830	34,979	0.0701	0.2553
Zero total assets _t	49,858	0.0061	0.0780	34,979	0.0013	0.0366
Zero total assets _{t-1}	49,858	0.0979	0.2972	34,979	0.0785	0.2690
Zero Vietnamese partner _t	49,858	0.0027	0.0523	34,979	0.0022	0.0515
Missing Vietnamese partner _t	49,858	0.0278	0.1643	34,979	0.0021	0.0466
Industry dummies						
Agri–Aquaculture/Forestry	49,858	0.0176	0.1315	34,979	0.0151	0.1219
Banking/Finance	49,858	0.0075	0.0861	34,979	0.0049	0.0700
Constructions	49,858	0.0278	0.1644	34,979	0.0322	0.1765
Education	49,858	0.0019	0.0436	34,979	0.0001	0.0107
Entertainment	49,858	0.0019	0.0436	34,979	0.0000	0.0000
Health	49,858	0.0013	0.0366	34,979	0.0019	0.0434
ICT	49,858	0.0409	0.1981	34,979	0.0468	0.2113
Logistics	49,858	0.0305	0.1721	34,979	0.0309	0.1731
Manufacturing	49,858	0.6747	0.4685	34,979	0.6493	0.4772
Mining	49,858	0.0216	0.1452	34,979	0.0283	0.1659
Restaurant/Hotel	49,858	0.0221	0.1471	34,979	0.0193	0.1376
Trading	49,858	0.0338	0.1807	34,979	0.0373	0.1895
Other industries	49,858	0.1184	0.3231	34,979	0.1338	0.3404

Table 2 (Cont.)

Variables	2000–2011			2006–2011		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Year dummies						
Year 2000	49,858	0.0277	0.1640			
Year 2001	49,858	0.0404	0.1968			
Year 2002	49,858	0.0446	0.2064			
Year 2003	49,858	0.0519	0.2218			
Year 2004	49,858	0.0618	0.2407			
Year 2005	49,858	0.0722	0.2588			
Year 2006	49,858	0.0828	0.2755	34,979	0.1180	0.3226
Year 2007	49,858	0.0982	0.2975	34,979	0.1399	0.3469
Year 2008	49,858	0.1118	0.3151	34,979	0.1593	0.3660
Year 2009	49,858	0.1299	0.3362	34,979	0.1852	0.3885
Year 2010	49,858	0.1435	0.3506	34,979	0.2045	0.4034
Year 2011	49,858	0.1355	0.3422	34,979	0.1931	0.3947

Table 3 Hazard ratio of exit by data cohorts

VARIABLES	2000–2011	2002–2011	2000–2005	2006–2011
	(1)	(2)	(3)	(4)
	Haz. ratio	Haz. ratio	Haz. ratio	Haz. ratio
Joint–venture with SOE	1.3871*** (0.0984)	1.4233*** (0.1107)	1.2900*** (0.1216)	1.1656 (0.1166)
Joint–venture with other than SOE	1.6009*** (0.0893)	1.5801*** (0.0924)	1.4819*** (0.1429)	1.6022*** (0.1072)
Initial firm size	0.9993*** (0.0002)	0.9992*** (0.0002)	0.9991*** (0.0002)	0.9994*** (0.0002)
$\ln(\text{total revenue}_t/\text{labor cost}_t)$ (tvc)	0.9640*** (0.0032)	0.9641*** (0.0033)	0.9078*** (0.0247)	0.9653*** (0.0034)
$\ln(\text{liabilities}_t/\text{fixed assets}_t)$ (tvc)	1.0051* (0.0030)	1.0054* (0.0030)	1.0299 (0.0228)	1.0063** (0.0030)
$\ln(\text{labor}_t/\text{labor}_{t-1})$ (tvc)	0.9125*** (0.0070)	0.9134*** (0.0070)	0.6429*** (0.0618)	0.9230*** (0.0071)
$\ln(\text{total assets}_t/\text{total assets}_{t-1})$ (tvc)	0.9640*** (0.0076)	0.9650*** (0.0076)	0.7373*** (0.0766)	0.9682*** (0.0073)
Provincial dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Other dummies	Yes	Yes	Yes	Yes
Observations	49,858	46,467	13,877	34,979

Robust see form in parentheses (***) $P < 0.01$, ** $P < 0.05$, * $P < 0.1$). Time–variant covariates are noted with (tvc) and $g(t) = t$. Other dummies include Zero total revenue_t, Zero liabilities_t, Zero fixed assets_t, Zero total labor_{t-1}, Zero total assets_{t-1}, and Zero total assets_t.

Table 4 Hazard ratio of exit

VARIABLES	2002–2011	2006–2011	2006–2011	2006–2011
	(1)	(2)	(3)	(4)
	Haz. ratio	Haz. ratio	Haz. ratio	Haz. ratio
Joint–venture with SOE	1.2230** (0.0996)	1.0052 (0.1036)	1.0168 (0.1054)	1.0057 (0.1037)
Joint–venture with other than SOE	1.3863*** (0.0884)	1.4036*** (0.1025)	1.3944*** (0.1018)	1.4035*** (0.1026)
Initial firm size	0.9992*** (0.0002)	0.9994*** (0.0002)	0.9994*** (0.0002)	0.9994*** (0.0002)
$\ln(\text{total revenue}_t/\text{labor cost}_t)$ (tvc)	0.9664*** (0.0033)	0.9670*** (0.0034)	0.9676*** (0.0035)	0.9671*** (0.0034)
$\ln(\text{liabilities}_t/\text{fixed assets}_t)$ (tvc)	1.0053* (0.0029)	1.0064** (0.0030)	1.0060** (0.0030)	1.0064** (0.0030)
$\ln(\text{labor}_t/\text{labor}_{t-1})$ (tvc)	0.9118*** (0.0066)	0.9218*** (0.0069)	0.9229*** (0.0070)	0.9218*** (0.0069)
$\ln(\text{total assets}_t/\text{total assets}_{t-1})$ (tvc)	0.9623*** (0.0075)	0.9660*** (0.0073)	0.9667*** (0.0073)	0.9660*** (0.0073)
$\ln(\text{foreign capital}_t/\text{total capital}_t)$ (tvc)	0.9543*** (0.0094)	0.9543*** (0.0098)	0.9540*** (0.0097)	0.9542*** (0.0098)
Japan	0.5821*** (0.0542)	0.5669*** (0.0589)	0.5696*** (0.0592)	0.5666*** (0.0589)
USA	0.9460 (0.1016)	0.9017 (0.1086)	0.9120 (0.1096)	0.9014 (0.1088)
Taiwan	0.6701*** (0.0577)	0.6284*** (0.0613)	0.6271*** (0.0616)	0.6268*** (0.0614)
China	0.9864 (0.0990)	0.8748 (0.1025)	0.8755 (0.1029)	0.8745 (0.1026)
Hong Kong (China)	0.8361 (0.1016)	0.6135*** (0.0988)	0.6179*** (0.0996)	0.6124*** (0.0987)
Korea	1.0838 (0.0837)	0.9423 (0.0820)	0.9483 (0.0827)	0.9412 (0.0820)
Russia	1.6055*** (0.2580)	1.9504*** (0.3541)	1.8316*** (0.3353)	1.9628*** (0.3569)
France	0.7739* (0.1103)	0.6478** (0.1125)	0.6462** (0.1127)	0.6488** (0.1126)
Germany	0.7587 (0.1448)	0.6557* (0.1517)	0.6598* (0.1532)	0.6547* (0.1516)
Belgium	0.7325 (0.2696)	0.7905 (0.2883)	0.8050 (0.2882)	0.7927 (0.2886)
Denmark	0.9902 (0.1999)	1.1189 (0.2277)	1.1357 (0.2323)	1.1186 (0.2274)
Italy	1.0711 (0.3767)	0.7917 (0.3601)	0.7948 (0.3651)	0.7890 (0.3595)
Netherlands	0.7309 (0.1785)	0.6316 (0.1777)	0.6403 (0.1810)	0.6319 (0.1779)
Norway	0.8109 (0.3369)	0.9407 (0.3849)	0.9749 (0.4008)	0.9416 (0.3846)
Thailand	0.7568 (0.1303)	0.6078** (0.1325)	0.6053** (0.1323)	0.6078** (0.1326)
Singapore	0.7906** (0.0822)	0.7263*** (0.0845)	0.7292*** (0.0850)	0.7258*** (0.0845)

Table 4 (Cont.)

	(1)	(2)	(3)	(4)
Indonesia	0.8372 (0.4618)	1.1140 (0.5946)	1.1133 (0.5950)	1.1234 (0.5992)
The Philippines	1.5769* (0.3682)	1.3265 (0.3666)	1.3134 (0.3678)	1.3247 (0.3665)
Malaysia	0.8955 (0.1211)	0.8496 (0.1307)	0.8518 (0.1305)	0.8504 (0.1309)
Low entry costs			1.2818*** (0.1021)	
Low entry costs (tvc)			1.0017 (0.0105)	
Transparency			1.1686** (0.0898)	
Transparency (tvc)			1.0034 (0.0154)	
Low time costs			0.7878*** (0.0531)	
Low time costs (tvc)			0.9982 (0.0112)	
First principal component				1.0559 (0.0640)
First principal component (tvc)				0.9993 (0.0093)
Provincial dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Other dummies	Yes	Yes	Yes	Yes
Observations	46,467	34,979	34,979	34,979

Robust standard errors in parentheses (***) $P < 0.01$, ** $P < 0.05$, * $P < 0.1$). Time-variant covariates are noted with (tvc) and $g(t) = t$. Other dummies include Zero total revenue_t, Zero liabilities_t, Zero fixed assets_t, Zero total labor_{t-1}, Zero total assets_{t-1}, Zero total assets_t, zero capital share value of Vietnamese partner (Zero Vietnamese partner_t) and missing information of the capital share value of Vietnamese partner (Missing Vietnamese partner_t).

Appendix 1 Linear probability models for the exits of MNEs by data cohort

VARIABLES	2000–2011	2002–2011	2000–2005	2006–2011
	(1)	(2)	(3)	(4)
	Exit	Exit	Exit	Exit
Joint-venture with SOE	0.0047 (0.0035)	0.0046 (0.0046)	0.0199** (0.0091)	0.0018 (0.0057)
Joint-venture with other than SOE	0.0269*** (0.0024)	0.0255*** (0.0030)	0.0570*** (0.0129)	0.0285*** (0.0026)
Initial firm size	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)
$\ln(\text{total revenue}_t/\text{labor cost}_t)$	-0.0095*** (0.0010)	-0.0097*** (0.0012)	-0.0228*** (0.0024)	-0.0091*** (0.0011)
$\ln(\text{liabilities}_t/\text{fixed assets}_t)$	0.0019 (0.0017)	0.0022 (0.0018)	0.0021 (0.0060)	0.0024 (0.0016)
$\ln(\text{labor}_t/\text{labor}_{t-1})$	-0.0373*** (0.0026)	-0.0375*** (0.0024)	-0.0649*** (0.0064)	-0.0343*** (0.0026)
$\ln(\text{total assets}_t/\text{total assets}_{t-1})$	-0.0139*** (0.0026)	-0.0142*** (0.0024)	-0.0186*** (0.0050)	-0.0152*** (0.0031)
Constant	0.2253*** (0.0531)	0.1757*** (0.0189)	0.3169** (0.1114)	0.2036*** (0.0306)
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Provincial dummies	Yes	Yes	Yes	Yes
Other dummies	Yes	Yes	Yes	Yes
Observations	49,858	46,467	14,879	34,979
R-squared	0.049	0.051	0.102	0.056

Robust standard errors in parentheses (** $P < 0.01$, ** $P < 0.05$, * $P < 0.1$). Other dummies include Zero total revenue_t, Zero liabilities_t, Zero fixed assets_t, Zero total labor_{t-1}, Zero total assets_{t-1}, and Zero total assets_t.

Appendix 2 Linear probability models for the exits of MNEs

VARIABLES	2002–2011	2006–2011	2006–2011	2006–2011
	(1)	(2)	(3)	(4)
	Exit	Exit	Exit	Exit
Joint-venture with SOE	-0.0068** (0.0026)	-0.0109** (0.0048)	-0.0106* (0.0048)	-0.0109** (0.0048)
Joint-venture with other than SOE	0.0122** (0.0045)	0.0137*** (0.0033)	0.0135*** (0.0034)	0.0136*** (0.0033)
Initial firm size	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)
ln(total revenue _t /labor cost _t)	-0.0092*** (0.0011)	-0.0087*** (0.0011)	-0.0087*** (0.0011)	-0.0087*** (0.0011)
ln(liabilities _t /fixed assets _t)	0.0020 (0.0016)	0.0022 (0.0014)	0.0021 (0.0014)	0.0022 (0.0014)
ln(labor _t /labor _{t-1})	-0.0371*** (0.0024)	-0.0338*** (0.0025)	-0.0339*** (0.0025)	-0.0338*** (0.0025)
ln(total assets _t /total assets _{t-1})	-0.0148*** (0.0024)	-0.0156*** (0.0031)	-0.0156*** (0.0031)	-0.0156*** (0.0031)
ln(foreign capital _t /total capital _t)	-0.0215** (0.0075)	-0.0248*** (0.0048)	-0.0248*** (0.0048)	-0.0248*** (0.0048)
Japan	-0.0197*** (0.0040)	-0.0229*** (0.0047)	-0.0225*** (0.0047)	-0.0229*** (0.0047)
USA	0.0004 (0.0046)	-0.0024 (0.0070)	-0.0020 (0.0070)	-0.0024 (0.0070)
Taiwan	-0.0166*** (0.0038)	-0.0205*** (0.0052)	-0.0203*** (0.0052)	-0.0205*** (0.0052)
China	0.0030 (0.0034)	-0.0056 (0.0042)	-0.0054 (0.0042)	-0.0056 (0.0042)
Hong Kong (China)	-0.0107** (0.0046)	-0.0238*** (0.0034)	-0.0233*** (0.0035)	-0.0238*** (0.0034)
Korea	0.0051 (0.0046)	-0.0041 (0.0073)	-0.0037 (0.0072)	-0.0041 (0.0073)
Russia	0.0500*** (0.0140)	0.0858** (0.0329)	0.0850** (0.0324)	0.0858** (0.0328)
France	-0.0138 (0.0089)	-0.0209 (0.0128)	-0.0206 (0.0129)	-0.0209 (0.0129)
Germany	-0.0131* (0.0073)	-0.0208** (0.0072)	-0.0201** (0.0072)	-0.0208** (0.0072)
Belgium	-0.0049 (0.0144)	0.0012 (0.0171)	0.0020 (0.0171)	0.0012 (0.0171)
Denmark	0.0058 (0.0090)	0.0119 (0.0114)	0.0123 (0.0114)	0.0119 (0.0114)
Italy	0.0098 (0.0180)	-0.0100 (0.0212)	-0.0095 (0.0215)	-0.0100 (0.0212)
Netherlands	-0.0135* (0.0070)	-0.0199** (0.0086)	-0.0194** (0.0084)	-0.0199** (0.0085)
Norway	-0.0059 (0.0230)	0.0073 (0.0346)	0.0079 (0.0348)	0.0073 (0.0346)
Thailand	-0.0105 (0.0083)	-0.0203* (0.0093)	-0.0201* (0.0093)	-0.0203* (0.0093)
Singapore	-0.0115** (0.0048)	-0.0163*** (0.0049)	-0.0160*** (0.0050)	-0.0163*** (0.0049)
Indonesia	-0.0108 (0.0128)	0.0025 (0.0142)	0.0029 (0.0143)	0.0025 (0.0142)
The Philippines	0.0234 (0.0271)	0.0129 (0.0284)	0.0138 (0.0285)	0.0129 (0.0284)
Malaysia	-0.0044 (0.0050)	-0.0093 (0.0057)	-0.0091 (0.0056)	-0.0093 (0.0057)

Appendix 2 (cont.)

	2002–2011	2006–2011	2006–2011	2006–2011
	(1)	(2)	(3)	(4)
VARIABLES	Exit	Exit	Exit	Exit
Low entry costs			0.0044* (0.0021)	
Transparency			0.0085** (0.0029)	
Low time costs			-0.0136*** (0.0024)	
First principal component				-0.0002 (0.0019)
Constant	0.1872*** (0.0163)	0.2201*** (0.0281)	0.1997*** (0.0306)	0.2200*** (0.0280)
Provincial dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Other dummies	Yes	Yes	Yes	Yes
Observations	46,467	34,979	34,979	34,979
R-squared	0.055	0.061	0.062	0.061

Robust standard errors in parentheses (***) $P < 0.01$, ** $P < 0.05$, * $P < 0.1$). Other dummies include Zero total revenue_{*t*}, Zero liabilities_{*t*}, Zero fixed assets_{*t*}, Zero total labor_{*t*-1}, Zero total assets_{*t*-1}, Zero total assets_{*t*}, zero capital share value of Vietnamese partner (Zero Vietnamese partner_{*t*}) and missing information of the capital share value of Vietnamese partner (Missing Vietnamese partner_{*t*}).

Appendix 3 Hazard ratio of exit by data cohorts with $g(t)=\exp(-0.14\times t)$

VARIABLES	2000–2011	2002–2011	2000–2005	2006–2011
	(1)	(2)	(3)	(4)
	Haz. ratio	Haz. ratio	Haz. ratio	Haz. ratio
Joint–venture with SOE	1.2799*** (0.0882)	1.2967*** (0.0979)	1.2900*** (0.1216)	1.0421 (0.1015)
Joint–venture with other than SOE	1.5899*** (0.0871)	1.5641*** (0.0897)	1.4819*** (0.1429)	1.5876*** (0.1043)
Initial firm size	0.9994*** (0.0002)	0.9993*** (0.0002)	0.9991*** (0.0002)	0.9995*** (0.0002)
$\ln(\text{total revenue}_t/\text{labor cost}_t)$ (tvc)	0.8494*** (0.0158)	0.8384*** (0.0159)	0.8947*** (0.0280)	0.8397*** (0.0174)
$\ln(\text{liabilities}_t/\text{fixed assets}_t)$ (tvc)	1.0517*** (0.0195)	1.0629*** (0.0209)	1.0345 (0.0263)	1.0657*** (0.0237)
$\ln(\text{labor}_t/\text{labor}_{t-1})$ (tvc)	0.4438*** (0.0255)	0.4464*** (0.0251)	0.6016*** (0.0665)	0.4666*** (0.0333)
$\ln(\text{total assets}_t/\text{total assets}_{t-1})$ (tvc)	0.7297*** (0.0467)	0.7298*** (0.0470)	0.7043*** (0.0842)	0.7666*** (0.0517)
Provincial dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Other dummies	Yes	Yes	Yes	Yes
Observations	49,858	46,467	13,877	34,979

Robust standard errors in parentheses (***) $P < 0.01$, (**) $P < 0.05$, (*) $P < 0.1$). Time–variant covariates are noted with (tvc). Other dummies include Zero total revenue_t, Zero liabilities_t, Zero fixed assets_t, Zero total labor_{t–1}, Zero total assets_{t–1}, and Zero total assets_t.

Appendix 4 Hazard ratio of exit with $g(t)=\exp(-0.14 \times t)$

VARIABLES	2002–2011	2006–2011	2006–2011	2006–2011
	(1)	(2)	(3)	(5)
	Haz. ratio	Haz. ratio	Haz. ratio	Haz. ratio
Joint–venture with SOE	1.1360 (0.0928)	0.9223 (0.0944)	0.9445 (0.0977)	0.9208 (0.0942)
Joint–venture with other than SOE	1.3214*** (0.0953)	1.3508*** (0.1112)	1.3519*** (0.1125)	1.3480*** (0.1113)
Initial firm size	0.9993*** (0.0002)	0.9995*** (0.0002)	0.9995*** (0.0002)	0.9995*** (0.0002)
$\ln(\text{total revenue}_t/\text{labor cost}_t)$ (tvc)	0.8450*** (0.0161)	0.8448*** (0.0176)	0.8446*** (0.0177)	0.8438*** (0.0176)
$\ln(\text{liabilities}_t/\text{fixed assets}_t)$ (tvc)	1.0633*** (0.0211)	1.0626*** (0.0238)	1.0619*** (0.0239)	1.0637*** (0.0238)
$\ln(\text{labor}_t/\text{labor}_{t-1})$ (tvc)	0.4488*** (0.0250)	0.4663*** (0.0335)	0.4681*** (0.0329)	0.4659*** (0.0332)
$\ln(\text{total assets}_t/\text{total assets}_{t-1})$ (tvc)	0.7343*** (0.0484)	0.7676*** (0.0524)	0.7698*** (0.0523)	0.7665*** (0.0522)
$\ln(\text{foreign capital}_t/\text{total capital}_t)$ (tvc)	0.7121*** (0.0765)	0.7140*** (0.0866)	0.7324** (0.0934)	0.7116*** (0.0866)
Japan	0.5721*** (0.0522)	0.5535*** (0.0567)	0.5544*** (0.0567)	0.5521*** (0.0566)
USA	0.9668 (0.1021)	0.9299 (0.1109)	0.9345 (0.1114)	0.9255 (0.1106)
Taiwan	0.6905*** (0.0576)	0.6413*** (0.0611)	0.6403*** (0.0612)	0.6413*** (0.0613)
China	0.9776 (0.0969)	0.8874 (0.1027)	0.8871 (0.1029)	0.8884 (0.1030)
Hong Kong (China)	0.8233 (0.0986)	0.6147*** (0.0982)	0.6129*** (0.0986)	0.6130*** (0.0981)
Korea	1.0729 (0.0808)	0.9293 (0.0792)	0.9324 (0.0794)	0.9275 (0.0791)
Russia	1.7005*** (0.2734)	2.0662*** (0.3699)	1.9153*** (0.3516)	2.0900*** (0.3733)
France	0.7769* (0.1071)	0.6627** (0.1117)	0.6619** (0.1121)	0.6662** (0.1121)
Germany	0.7545 (0.1423)	0.6573* (0.1512)	0.6566* (0.1518)	0.6566* (0.1512)
Belgium	0.9470 (0.2476)	0.9570 (0.2597)	0.9521 (0.2577)	0.9577 (0.2602)
Denmark	0.9554 (0.1929)	1.0872 (0.2205)	1.0943 (0.2231)	1.0869 (0.2202)
Italy	1.1107 (0.3793)	0.8354 (0.3703)	0.8351 (0.3740)	0.8403 (0.3731)
Netherlands	0.6922 (0.1668)	0.5952* (0.1656)	0.5998* (0.1680)	0.5946* (0.1654)
Norway	0.8486 (0.3569)	0.9990 (0.4196)	1.0323 (0.4362)	1.0017 (0.4213)
Thailand	0.7381* (0.1276)	0.5903** (0.1287)	0.5929** (0.1293)	0.5923** (0.1292)
Singapore	0.7486*** (0.0767)	0.6947*** (0.0799)	0.6991*** (0.0803)	0.6952*** (0.0799)

Appendix 4 (Cont.)

	(1)	(2)	(3)	(4)
Indonesia	0.7710 (0.4347)	1.0226 (0.5654)	1.0339 (0.5695)	1.0337 (0.5700)
The Philippines	1.4561 (0.3430)	1.2105 (0.3364)	1.1938 (0.3329)	1.2087 (0.3359)
Malaysia	0.8629 (0.1168)	0.8130 (0.1248)	0.8198 (0.1253)	0.8137 (0.1250)
Low entry costs			1.2260* (0.1352)	
Low entry costs (tvc)			1.1079 (0.1478)	
Transparency			1.2582 (0.1840)	
Transparency (tvc)			0.9117 (0.1772)	
Low time costs			0.7076*** (0.0779)	
Low time costs (tvc)			1.1616 (0.1730)	
First principal component				0.9583 (0.0957)
First principal component (tvc)				1.1647 (0.1422)
Provincial dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Other dummies	Yes	Yes	Yes	Yes
Observations	46,467	34,979	34,979	34,979

Robust standard errors in parentheses (***) $P < 0.01$, ** $P < 0.05$, * $P < 0.1$). Time-variant covariates are noted with (tvc). Other dummies include Zero total revenue_{*t*}, Zero liabilities_{*t*}, Zero fixed assets_{*t*}, Zero total labor_{*t-1*}, Zero total assets_{*t-1*}, Zero total assets_{*t*}, zero capital share value of Vietnamese partner (Zero Vietnamese partner_{*t*}) and missing information of the capital share value of Vietnamese partner (Missing Vietnamese partner_{*t*}).