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Determinants of the Withdrawal of Foreign-invested Enterprises: Evidence from China

By

Zhihao Wang

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Determinants of the Withdrawal of Foreign-invested Enterprises: Evidence from China

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May 9, 2022

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ABSTRACT

Based on the industry and commerce annual report data, the present study uses the continuous-time nonparametric, parametric, and semi-parametric estimation to investigate the determinants influencing the withdrawal behaviour of foreign-invested enterprises. Through the survival analysis of 3,858 foreign-invested enterprises located in China from 2013 to 2020, the study found that operation profit, enterprise size and enterprise age have significantly negative impacts on the probability of enterprise withdrawal. At the industry-level and region-level, the improvement of industry entry rate and regional business environment ranking can significantly increase the probability of enterprise survival. The rise of the regional GDP growth rate and wage rate can significantly increase the probability of enterprise withdrawal. The study also found that the influence of some variables on enterprise withdrawal varies with different withdrawal patterns. After applying multiple models for estimation, similar results were replicated, which reinforced the validity of the conclusions offered in the present study.

Keywords: Foreign-invested Enterprises, Withdrawal, Closure, Divestment, Survival Analysis.

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CONTENTS

CHAPTER 1
INTRODUCTION

Since the 1990s, with the deepening of the economic reform and opening as well as the development of the market economy, China has attracted more and more foreign investment. By 2002, China had become the largest recipient of foreign direct investment in the world (Mao et al., 2005). In terms of the utilization of foreign capital, the actual utilized foreign capital increased from over 10 billion US dollars in 1990 to over 138 billion US dollars in 2019. The number of foreign-owned enterprises increased from just over 84,000 in 1992 to over 627,000 in 2019 (see Figure 1). These foreign direct investments have played an important role in increasing employment, expanding exports, improving the TFP and management level of enterprises, and promoting the development of China's economy.

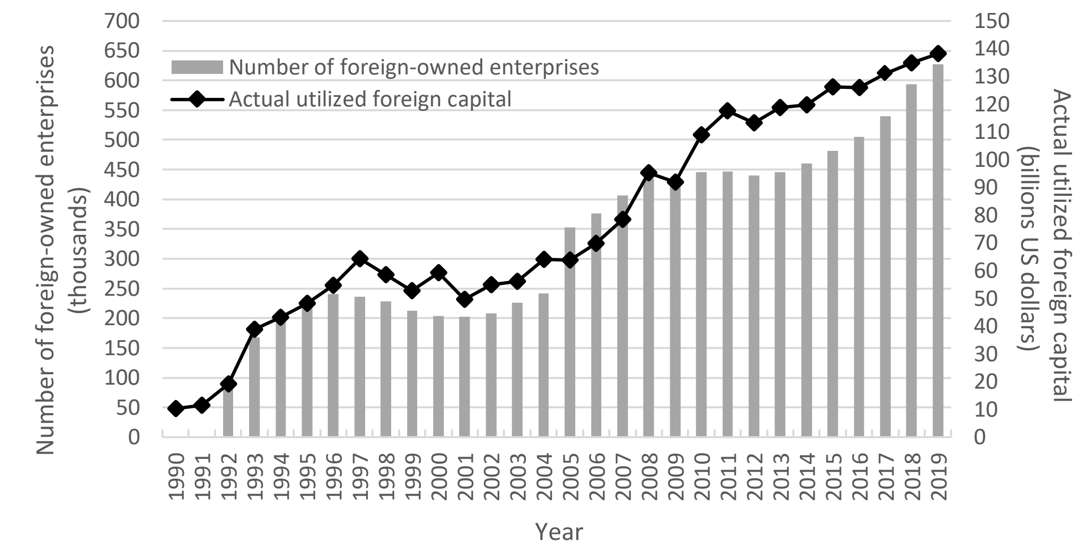

FIGURE 1. Number of Foreign-invested Enterprises and Actual Utilized Foreign Capital

(*Source: National Bureau of Statistics of China*)

An economy maintains its vitality through enterprises' continuous entry, survival, and exit. The entry of foreign-invested enterprises should be accompanied by exits. Studies have shown that China has experienced two relatively pronounced "exit waves" of foreign-invested enterprises: one from 1997 to 2001 (Mao et al., 2005) and another from 2010 to 2012 (Liu & Li, 2016). Using a simple method of estimating the annual change in the net number of foreign-invested enterprises, the present study outlines the numbers related to these exit waves (see Figure 2). Luo and Si (2020) found that the employment scale of foreign-invested enterprises in China had been declining year by year since 2013. It is important to avoid the negative impact on employment and investment caused by the "exit waves" of foreign-invested enterprises; therefore, evidence suggests that it is necessary to identify the determinants of the withdrawal of foreign enterprises in China, which in turn provides the basis for effective macro-control measures (Han & Zhang, 2015).

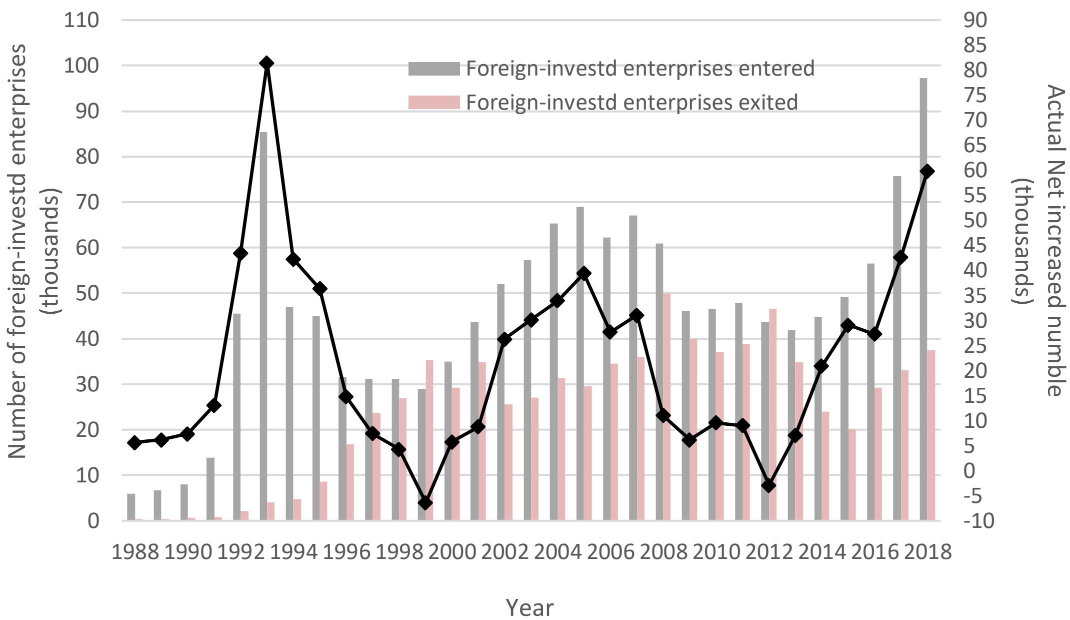

Figure 2. Number of Foreign-invested Enterprises in China from 1988 to 2018

(Source: National Enterprise Credit Information Publicity System of China and Ministry of Commerce, PRC.)

Based on the Chinese Industrial and Commercial Enterprises Data, the present study examines the determinants of withdrawal of foreign-invested enterprises from three aspects: firm-level, industry-level, and region-level. Compared with existing studies, the innovations of the present study can be summarized in a three-step process. First, the enterprise exiting behaviour is further subdivided into closure and divestment, and the Cox model is used to study the two behaviours respectively. Second, instead of limiting samples to a single industry or above-designated size enterprises, the present study used a data set that includes various industries and scales, which makes the conclusions more representative. Third, the annual report data was used to observe the changes in the annual indicators of firms. This new data has only been available since 2014 and has not been published completely. Thus, there are few studies that have used it on the research for the newest survival status of enterprises in the past eight years except our paper.

Based on the observation and research of sample enterprises from 2013 to 2020, we found that several factors can significantly reduce the probability of withdrawal of foreign-invested enterprises, including the improvement of profitability, enterprise size, enterprise age, industry entry rate and regional business environment. The increase of regional GDP growth rate and wage growth rate can significantly reduce the probability of enterprise survival. The results obtained by different estimation methods are similar. We also found that the influence of some variables on enterprise withdrawal varied with different withdrawal patterns.

The rest of the paper is organized as follows: Chapter 2 reviews the literature. Chapter 3 describes the statistical models. Chapter 4 introduces the data sources, data processing, and variables. Chapter 5 presents benchmark estimates and extended analysis. Chapter 6 shows the robustness analysis. Chapter 7 includes our conclusions.

CHAPTER 2
LITERATURE REVIEW

2.1. Withdrawal types of multinational enterprises

A multinational enterprise (MNE) is a firm that controls and manages production establishments located in at least two countries. The definition given by Teece (1985) has been widely accepted by academics. However, different scholars have different interpretations on what behaviours of MNEs should be considered as an exit. From the withdrawal perspective, exit actions result in the reduction of foreign ownership in a multinational company and specifically include voluntary or involuntary sale, liquidation, expropriation, and nationalization (Boddewyn, 1979). From a home country perspective, withdrawal is the reduction of all activities outside the home country, from suspension to complete abandonment of the entire undertaking of an MNE in the host country (Benito, 1997). From the strategic management perspective, withdrawal involves the process of rationalizing the scope of an MNE's operations through voluntary liquidation, sale of overseas businesses or other means as exit actions to response (Benito & Welch, 1997). From the host country perspective, withdrawal involves foreign investors removing their capital and completely or partially terminate production and operation activities of MNEs in the host country belong to withdrawal behaviours (Mao et al., 2005).

Some believe that there is a difference between the complete withdrawal and partial withdrawal of foreign capital, which needs to be further distinguished in the study of foreign-invested enterprises. There are two entry modes of MNEs: (1) greenfield investment, which involves setting up a new venture; and (2) mergers and acquisitions (M&A), which involves acquiring an existing firm or operating a joint venture (Li, 1995). There are also two exit modes corresponding to the entry mode: (1) closure, in which all production and business activities are completely terminated; and (2) divestiture, which involves the reduction of foreign-invested shares in MNEs (Mata & Portugal, 2000).

However, the studies in the traditional perspective of an MNE's exit behaviour pay more attention to the complete withdrawal. One reason is that the early withdrawal behaviour of MNEs is still mainly characterized by the reduction of the number of enterprises, the situation of divestment is not frequently observed. A representative mean is the changeable quantity of newly established and existing firms applied by Boddewyn (1979) to observe the exit situation of American MNEs. Another reason is that the selected samples or data sets have certain limitations themselves. The industrial enterprises above designated size used by He and Yang (2016) exhibits a problem that the disappearance of a firm in the record only indicates that it no longer meets the admission criteria of the dataset but is not possible to further distinguish whether it belongs to closure or divestment. The cross-sectional data used by Li et al. (2016) to study the causal relationship between variables, resulting in their conclusion, is not as solid as the studies that used time-series data.

Prior to Mata and Portugal (2000), only a small group of scholars were concerned about the divestment cases of MNEs. For example, Hamilton and Chow (1993) observe business divestitures of New Zealand firms. Mitchell (1994) studied the different choices of start-up and diversified firms between business failure and capital divestiture. Mariotti and Piscitello (1999) examined the ownership change of MNEs. It is in recent years that empirical studies on divestment cases using microdata have begun, such as research conducted by Luo and Si (2020).

2.2. Determinants of the withdrawal of MNEs in firm-level

Whether adopting the Monopoly Advantage Theory first proposed by Hymer (1960) and further explained by Kindleberger (1969), the Product Life-Cycle Theory presented by Vernon (1966), or Eclectic Paradigm presented by Dunning (1980), keeping international businesses profitable is regarded as the premise for FDI. We consider the operating profit as a factor affecting the withdrawal behaviour of MNEs. Boddewyn (1979) found that the bad operation of subsidiary corporations in the host country—including poor operating conditions, low profits, and even losses—is an important reason for parent companies decide to exit. This view is supported by many empirical studies (e.g., Hamilton & Chow, 1993; Haynes et al., 2003; Li et al., 2016). Research has also found that financial restraint or debt level has a significant negative impact on enterprise survival (e.g., Luo & Chen, 2011; Jiang, 2016). The higher the financial restraint of a business, the greater the likelihood of divestment. Since losses incurred by subsidiaries need to be borne by their parent firm, poorly performing subsidiaries will force the managers of the parent firm to divest inferior businesses (Hoskisson et al., 1994).

We also consider the organizational form of enterprises as a determinant of MNEs' exit behaviours and name this factor legal form. Studies have shown that there is a correlation between firm survival and legal form (e.g., Brüdel et al.,1992). Precisely, limited liability companies are more likely to fail but less likely to divest than other legal forms of firms (Harhoff et al., 1998). The fact that firms with different legal forms are subject to different levels of legal liability is the underlying reason for the correlation. The firm with more limited liability can more easily transfer property rights, leading to a higher probability to be divested and a lower probability of being shut down. Dixit and Pindyck (1994) illustrate that limited companies have higher start-up costs while receiving higher option values through waiting and are consequently more willing to maintain a longer operating status. When a business goes bankrupt, the operator of a limited liability company has a limited personal liability, while the personal liability of the operator of an unlimited liability company increases with the debt level of the business. We can expect that operators of limited liability companies are more capable of taking risks and less likely to exit from the market than operators of unlimited liability companies.

Ownership structure primarily refers to the shareholding ratio in the enterprise. A common classification method divides enterprises into sole proprietorship or joint venture, and this is based on whether the shareholding ratio is 100%. Then, according to whether the shareholding ratio is greater than 50%, a joint venture is divided into majority and minority holdings. It is necessary to further distinguish the foreign direct investment (FDI) and foreign portfolio investment (FPI) in studies. Basically, an enterprise with a foreign share that is less than 10% is regarded as a FPI according to the definition of OECD. Transaction Cost Theory operates under the premise that a joint venture is a reaction to market failure (Hennart, 1988). Thus, the ownership structure is the third factor we considered. In theory, it would be cheaper to share resources by forming a joint venture, converting external costs into internal ones, rather than through a market trade. However, Hennart (1991) reports that Japanese firms that survived longer in America are less likely to be joint ventures. Mata and Portugal (2000) report that wholly foreign-owned firms have a lower probability of failure than joint ventures and a higher probability of disinvestment. Although both parties have the motivation to free ride, the minority holdings, especially those with a small proportion of shares, are more likely to fail to undertake their responsibilities according to the contract. The benefits of the joint venture will be offset by the costs as the partnership lasts longer. Because of the instability, joint ventures tend to sign multiple contracts to increase default costs and reduce the dissolution risks (Kogut, 1989).

The fourth factor is the firm scale. Since the ownership advantage of a firm includes both physical and human capital, the firm scale is generally measured using total assets, operating income, and the number of employees. Several studies have found a positive relationship between the scale and the probability of enterprises' survival (e.g., Audretsch & Mahmood, 1995; Dunne et al., 1989; Ericson and Pakes, 1995; Mata et al., 1995; Mitchell, 1994). One explanation links firm size to comparative advantage. Competitive advantage is usually related to a firm's ability to develop specific assets (Wernerfelt, 1984), which is critical to the performance of the firm (Bogner et al., 1996; Burgelman, 1994). From the perspective of competitive advantage, Chang (1996) argues that a firm with specific assets is usually a large enterprise with technological and organizational advantages that can adapt to the conditions of the host country more quickly. As a result, their risk of withdrawal is relatively low. From the perspective of scale advantage, small firms have difficulty raising sufficient capital to help them enter at optimal scale in the early stages (Evans & Jovanovic, 1989). When the scale of a firm is smaller than the industrial economies of scale, it will suffer cost disadvantages, especially in the industries with higher economies of scale. Consequently, the risk of small firms being squeezed out of the market is higher (Audretsch & Mahmood, 1994).

An inverted U-shaped relationship between enterprise age and survival has been reported in some studies (e.g., Agarwal et al., 2002; He & Yang, 2016), but the explanations for this observation are different. From the perspective of enterprise performance, the startup lacks experience, management, capital, and technology, resulting in low efficiency. An established enterprise has more difficulty adapting to the changes of external environment, such as intensified competition and economic slowdown, due to its bureaucracy, inflexible strategy (Kücher et al. 2020), and a lower percentage of creative young employees (Ouimet & Zarutskie, 2014). However, Thomson (2005) proposes that the age effect is related to the variations of firm quality caused by selection bias including pre-entry experience and birth environment rather than complex enterprise performance theories. Pre-entry selection bias has a permanent impact on the life cycle of an enterprise. Another explanation is that enterprise survival depends on the life cycle of both products and enterprises (Agarwal & Gort, 2002). Products do not have mature production conditions or technologies in the early stage and are gradually eliminated by the market in the later stage, resulting in difficulties for enterprises to survive in these two periods. Furthermore, studies have found that the age effect is different in different industries (Hannan et al., 1998) and different withdrawal modes. The closure hazard and enterprise age have a positive correlation (Xu & Mao, 2016) or non-linear correlation (Yu et al., 2015) while the divestment hazard and enterprise age have a negative correlation (Berry, 2013).

2.3. Determinants of the withdrawal of MNEs in industry-level

The industry entry rate is the proportion of newly entered firms in an industry to the total number of firms in the industry. Some scholars have found that the high industry entry rate has a positive correlation with the likelihood of firm exit (e.g., Dunne et al., 1988; Mata & Portugal, 1994, 2002). The reason for this correlation is related to the degree of crowdedness in the industry: Industries with a high entry rate usually have plenty of homogeneous firms. This can be explained by entry barriers. Foreign-invested enterprises that enter the market early will be in a stronger position to defend against competitors that enter later (Mitchell et al., 1994). The lack of market knowledge makes the survival of entrants relatively difficult in the early stage. With the increase of the crowding effect, fierce competition also makes early entrants face greater survival risks. Evidence that a positive correlation between the entry of newly entered firms and the exit of incumbent firms has been corroborated by Siegfried and Evans (1994). Another explanation focuses on the type of industry. Industries with a high entry rate tend to belong to certain markets that are supported and subsidized by governments. For instance, information technology, biotechnology technology, and new material technology have been identified as high-tech industries in many countries. Findings demonstrate that high-tech industries have a higher risk of failure (Audretsch, 1995). However, Gao et al. (2017) studied Chinese industrial enterprises and found that the low degree of industry competition and high degree of monopoly increases the probability of enterprise withdrawal. This was confirmed by Mata and Portugal (2000).

The second industry factor we consider is the industry growth rate. Generally, an industry with high output growth is regarded to be a fast-growing and well-expected industry. The fast-growing industry is likely to be the environment in which new firms have a lower probability of withdrawal. This is because a fast-growing industry tends to have a large market and higher profit, so new entrants do not need to spend to attract customers from incumbents (Schmalensee, 1989). The significant positive correlation between industry growth rate and firm survival has been further corroborated by several empirical studies (e.g., Audretsch & Mahmood, 1994; Hamilton & Chow, 1993). However, Mata and Portugal (2000) report that this correlation is insignificant because the competitive effects are not weakened and still bring challenges to enterprise survival. The industry growth rate will affect the optimal scale of the industry and the degree of industry concentration, and these two factors may also have an impact on the survival of enterprises. The expanding industry basically has a high minimum effective scale: The more difficult it is for a firm to achieve the minimum effective scale of the industry, the higher the probability of withdrawal (Gao et al., 2017). The influence of the degree of industry concentration on enterprise withdrawal is uncertain as Mitchell et al. (1994) found that it has a barely positive significance, Audretsch and Mahmood (1994) found it has a negative significance, and Mata and Portugal (2000) found that it is insignificant. Furthermore, McCloughan and Stone (1998) argue that this effect is a complex nonlinear correlation.

2.4. Determinants of the withdrawal of MNEs in region-level

There are many aspects of region-level factors, and the first consideration is the business environment in the region. The business environment proposed by Duncan (1972) refers to the institutional environment, hardware facilities, and infrastructure provided by a government for enterprises to produce, operate and carry out business activities. Transnational investment contains more uncertainty, and MNEs are particularly sensitive to the changes in the local business environment (Kougt & Kulatilaka, 1994). Generally, the more stable the political environment and economic development of the host country is, the less likely the foreign-invested enterprises will withdraw (Dai et al., 2013; Hamilton & Chow, 1993). In areas where the business environment is profitable, local governments play an important role in supporting enterprises, including but not limited to fiscal subsidies, bank loans, and streamlined approval processes (He & Yang, 2016). Local labour cost is also an important factor that likely becomes an entry barrier for FDI. However, the correlation between local labour cost and foreign investment withdrawal is uncertain. A positive significance is found by Belderbos and Zou (2006) and Berry (2013), a negative significance by Chen and Wu (1996), and insignificance by

Chen (1996) and Jiang and Zhang (2011). Another perspective is to consider local protectionism, which allows the existence of competitive effects between regions. A fierce competitive environment motivates the local government to adopt measures to protect the businesses within its jurisdiction (Young, 2000). The premise of such protection is that the local government has corresponding economic strength. Most of the regions with a good business environment are regarded as developed areas with obvious competitive advantages. For instance, it is a common practice for local governments in southern China to offer subsidies and income tax breaks to firms, including foreign-invested enterprises (Barbieri et al., 2012). As a result, regions with a profitable business environment will protect firms from competition, thereby diluting the competitive effect and increasing the chances of survival. The last factor is the change in public policy. A case study of Canada designed by Globerman and Shapiro (1999) demonstrates that the change of public policy, such as free-trade agreements, significantly increased levels of both inward and outward FDI. However, changes in public policy generally involve the behaviours of a country, which is regarded as a macro instrument that rises further from the region-level to the nation-level.

CHAPTER 3
SURVIVAL ANALYSIS MODEL

Taking the survival time of the foreign-invested enterprises as the duration, we study the withdrawal behaviours based on the event history analysis. First, we use nonparametric estimation for qualitative analysis. Then, we use the continuous-time parametric estimation for quantitative analysis. Since it is difficult to determine the specific distribution of parametric regressions, we finally use semi-parametric estimation as a more accurate method.

3.1. Nonparametric estimation

The two most used nonparametric estimation methods of survival analysis are the Kaplan-Meier method and the Nelson-Aalen method: The former describes survival functions, and the latter describes cumulative risk functions. The present paper adopts the Kaplan-Meier method.

Suppose that T is a continuous random variable that describes the occurrence of the withdrawal of foreign-invested enterprises, and t belongs to an integer set $t \in \{1,\ 2,\ 3, \ldots\}$ to describe our observation period. We denote the failure function $F(t)$ to represent the probability of withdrawal of enterprises in time t or within time t:

$$F(t) \equiv P\ (T \leq t) \tag{1}$$

Then, we denote the survival function $S(t)$ to represent the probability that enterprise i has not exited until $T = t$:

$$S_i(t) \equiv P(T > t) = 1 - F_i(t) \tag{2}$$

The Kaplan-Meier estimator for the survival function can be expressed as

$$\hat{S}(t) = \prod_{k=1}^{t} \left(\frac{n_k - w_k}{n_k} \right) \tag{3}$$

where n_k represents the total number of firms in period k, w_k represents the number of enterprises withdrawing in period k.

Assuming that the enterprise survives at time t, the probability of withdrawal occurring between t and $t + \Delta t$ can be expressed as

$$P(t \le t + \Delta t | T \ge t) = \frac{P(t \le T \le t + \Delta t)}{P(T \ge t)} = \frac{F(t + \Delta t) - F(t)}{S(t)} \tag{4}$$

since the hazard function is essentially the conditional density function given survival to time t. According to equation (4), the hazard function can be expressed as

$$h(t) = \lim_{\Delta t \to 0} \frac{P(t \le t + \Delta t | T \ge t)}{\Delta t} = \frac{1}{S(t)} \lim_{\Delta t \to 0} \frac{F(t + \Delta t) - F(t)}{\Delta t} = \frac{f(t)}{S(t)} \tag{5}$$

We denote the cumulative hazard function that can be more accurately estimated to describe the probability of withdrawal occurring until time t.

$$H(t) = \int_0^t h(t) ds = -\ln S(t) \tag{6}$$

The Kaplan-Meier estimator for the cumulative hazard function is the sum of partial hazard rates. It can be expressed as

$$\widehat{H}(t) = \sum_{k | t_k \le t} \widehat{h_\iota}(t) = \sum_{k | t_k \le t} \frac{w_k}{n_k} \tag{7}$$

where n_k represents the total number of firms in period k, w_k represents the number of enterprises withdrawing in period k.

Finally, the figure of the hazard function can be transformed from a step function to a smooth curve by the kernel smoother. The kernel smoother formula can be completed by an econometric software and is expressed as

$$\hat{h}(t) = \frac{1}{nb} \sum_{j=1}^{n} K(\frac{t_j - t_0}{b}) \tag{8}$$

where b is bandwidth to define the size of the neighbourhood around t_0, $K(\cdot)$ is the kernel function and t_j is the number of times for the event occurs between $t_0 - b$ and $t_0 + b$.

3.2. Parametric estimation

To quantitatively examine the impact of various factors on the withdrawal behaviours of foreign-invested enterprises, we applied the continuous-time parameter estimation of survival analysis as the benchmark estimation. The results obtained by the discrete-time method and continuous-time method should be theoretically nearly identical. The continuous-time method does not require the observation time of each individual to be divided into a group of different units, which is more convenient in calculation and operation.

Three typical models are usually considered for parametric survival analysis: exponential distribution, Gompertz distribution, and Weibull distribution. The difference between them is the form of the hazard function. The Exponential model has a constant hazard rate γ that does not vary with time t:

$$h(t) = \gamma \tag{9}$$

However, establishing a constant hazard rate is too restrictive in practice. One approach is to relax the constant hazard constraint by making the natural logarithm of hazard rate γ rise or fall linearly over time t. That is the Gompertz Model:

$$h(t) = \gamma e^{\alpha t} \tag{10}$$

Another approach is making the natural logarithm of hazard rate γ rise or fall linearly over the natural logarithm of time t. That is the Weibull Model:

$$h(t) = \gamma \alpha t^{\alpha - 1} \tag{11}$$

We can rewrite the Exponential, Gompertz and Weibull in logarithmic form ($\gamma = e^{x'\beta}$):

$$\ln h(t) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_i x_i \tag{12}$$

$$\ln h(t) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_i x_i + \alpha t \tag{13}$$

$$\ln h(t) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_i x_i + \alpha \ln t \tag{14}$$

Generally, maximum likelihood estimation is used to estimate unknown parameters:

$$\ln L(\theta) = \sum_{i=1}^{N} [\delta_i \ln f(t_i|x_i, \theta) + (1 - \delta_i) \ln S(t_i|x_i, \theta)] \tag{15}$$

where θ represents parameter, δ_i is a censoring indicator, $\delta_i = 0$ represents right-censoring (survival), while $\delta_i = 1$ represents no censoring (withdrawal), and t is observed duration.

Then, the MLE functions for three models can be written as

$$\ln L = \sum_{i=1}^{N} \left\{\delta_i x_i'\beta - e^{x_i'\beta} t_i\right\} \quad (16)$$

$$\ln L = \sum_{i=1}^{N} \left\{\delta_i [x_i'\beta + \ln \alpha + \ln t_i] - (\frac{e^{x_i'\beta}}{\alpha})(e^{\alpha t_i} - 1)\right\} \quad (17)$$

$$\ln L = \sum_{i=1}^{N} \left\{\delta_i [x_i'\beta + \ln \alpha + (\alpha - 1) \ln t_i] - e^{x_i'\beta} t_i^{\alpha}\right\} \quad (18)$$

In the benchmark analysis, we report the estimated results for each of the three models.

3.3. Semi-parametric estimation

The three proportional hazard models mentioned above are parametric models, which need to set the specific form of the hazard function and then estimate by the MLE method. However, parametric regression has excessively strong constraints on the distribution of the hazard function, which may lead to setting errors when we are not sure about the accurate form of the hazard function. This will result in inconsistent for the MLE.

The Cox proportional hazard model that does not assume a specific form of baseline hazard function. It is a semi-parametric model with the former part unspecified and the latter part fully specified.

$$h(t|x, \beta) = h_0(t)\phi(x, \beta) \quad (19)$$

In practice, $\phi(x, \beta)$ is usually defined as $e^{x_i'\beta}$.

$$\frac{h(t|x_i, \beta)}{h(t|x_j, \beta)} = \frac{h_0(t)e^{x_i'\beta}}{h_0(t)e^{x_j'\beta}} = e^{(x_i - x_j)'\beta} \quad (20)$$

The ratio of the hazard function of individual i to individual j is related to explanatory variables x rather than time t. Thus, there is no necessary to estimate β with the specific form of baseline hazard functions $h_0(t)$.

We can also rewrite the Cox PH Model in logarithmic form:

$$\ln h(t) = \ln h_0(t) + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_i x_i \tag{21}$$

Similarly, partial likelihood estimation (PLE) is used to estimate unknown parameters:

$$\ln L_p = \sum_{i=1}^{N} \delta_i \left[\ln \phi(x_i, \beta) - \ln \left(\sum_{j \in R(t_i)} \phi(x_j, \beta) \right) \right] \tag{22}$$

$$\ln L_p = \sum_{i=1}^{N} \delta_i \left(\frac{e^{x_i' \beta}}{\sum_{j \in R(t_i)} e^{x_j' \beta}} \right) \tag{23}$$

Finally, whether the model is the Exponential, Gompertz, Weibull, or Cox PH, they all belong to proportional hazard models, which need to satisfy the proportional hazard assumption. Usually, Schoenfeld residuals test is used for the PH test. The formula is as follows:

$$r_{kj} = x_{kj} - \sum_{i \in R_j} \left(x_{ki} \frac{e^{x_i' \beta}}{\sum_{i \in R_j} e^{x_i' \beta}} \right) \tag{24}$$

CHAPTER 4
DATA AND VARIABLES

4.1. Data sources

The data used in this paper are from the National Enterprise Credit Information Publicity System, *China Statistical Yearbook*, *Business Environment Index for China's Provinces*, and other statistical data of the National Bureau of Statistics of China.

The firm-level data comes from the National Enterprise Credit Information Publicity System. As an important achievement of China's business system reform since 2015, this system provides enquiry services to the public according to the *Regulation of the People's Republic of China on the Disclosure of Government Information* and *Interim Regulation on Enterprise Information Disclosure*. The publicly disclosed information is provided directly by the commercial subject and the administrative department of industry and commerce, and it primarily includes registration information, record information, administrative punishment information, and enterprise annual report. The data used in the present study mainly includes the type of enterprise, date of establishment, date of withdrawal (cancellation record or revocation record), legal form, ownership structure, the type of industry, the address (province) of enterprises, total assets, operation revenue, and operation profit.

Previous studies have used China Industry Business Performance Data (CIBPD); however, the present research does not use this data for several reasons. First, CIBPD only includes industrial enterprises above designated size. It is not the optimal choice to study the influence of firm size and industry characteristics on the withdrawal behaviour of foreign-invested enterprises. Second, CIBPD only includes data from 1998 to 2013 with some indicators and data exhibiting serious deficiency and omittance after 2008, which limits the feasibility of long-term tracking study and data matching. Third, the data that comes from the National Enterprise Credit Information Publicity System is registered and verified by government administrative departments, so the data set has a wider scope and higher authenticity.

The industry-level data comes from the *China Statistical Yearbook*. According to the standard of the *National Economic Industrial Classification of China*, industries are divided into

20 categories (not including the international organizations in our paper). Under this classification, the industry entry rate was computed using the data from the section *Number of Legal Entities in Major Industries* and the industry growth rate using the data from the section *Employment in Urban Areas by Industries.* The results are shown in Section 4.2.

Part of the region-level data is also derived from China Statistical Yearbook. The provincial GDP growth rate was computed using the data from the section *GDP by region*, and the provincial wage growth rate was computed using the data from the section *Average Wages of the Employed in Urban Private Units by Industry.* The ranking of regional business environment by province was derived from *Business Environment Index for China's Provinces* by Wang et al. (2020). The index is a series of reports that have been published since 2011 based on the survey of thousands of enterprises in China. Given the comprehensive nature of the data collection, its results are relatively accurate and stable.

4.2. Data cleaning

Previous studies using CIBPD often exhibit some matching problems because there are two inconsistent identifying indicators: business entity code and enterprise name. Common matching errors include but are not limited to one business entity code maps to multiple enterprise names, one enterprise name maps to multiple business entity codes, two enterprises with the same name are mistaken for the same one, and an enterprise is mistaken for two different enterprises before and after the name change.

These matching errors do not appear in this paper because enterprises were identified through Social Unified Credit Codes. The code consists of 18 numbers or English letters, including one-digit registration management department code, one-digit institution category code, six-digit administrative division code, nine-digit commercial subject code and one-digit check code. Like the resident ID card, the Social Unified Credit Codes is the unique ID for enterprises. The new code has gradually replaced the original business entity code since 2015.

As an important process of China's business system reform, the government has changed the information disclosure mechanism for enterprises from the annual inspection system to the annual report publicity system since March 2014. The system requires an enterprise to submit the annual report of the previous year to the industrial and commercial administration department from January to June of the current year; thus, the report includes information such as total turnover, operating profit, and the record of equity change. The earliest trial batch of annual reports on record was filed at the end of 2013 (2012 report), and the latest batch of annual reports is filed in 2020 (2019 report). In other words, the available annual data starts from 2012. The firm-level data was confirmed through the annual reports from 2012 to 2019.

The growth volume was divided by the base period as the ratio calculation method and the industry entry rate and industry growth rate was computed from 2013 to 2019 (see Appendix A and B). The business environment by province is based on the data of the three survey years of 2012, 2016 and 2019. The missing values in the remaining years are computed by mean value interpolation (see Appendix C). The economic growth rate and wage growth rate by provinces from 2013 to 2019 were also calculated by the ratio calculation method, like the industry entry rate and industry growth rate (see Appendix D).

4.3. Sampling and matching process

Since the annual report data available from 2013, the research objects were determined as foreign-invested enterprises established between 2003 and 2012. The sampling process can be divided into two steps. The first step involves determining the timing of the entry and withdrawal of foreign-invested enterprises. Foreign capital can not only establish a new enterprise in China through greenfield investment but also hold or become a shareholder of an original Chinese enterprise through international mergers and acquisitions. Regardless of the method of entry, these enterprises are required to be registered with the local industry and commerce administration. The types of enterprise are identified or updated as foreign-invested and published on the National Enterprise Credit Information Publicity System simultaneously. There is no doubt that the time when the foreign capital enters is the time when the foreign-invested enterprise is registered and recognized.

The definition of foreign capital withdrawal is more complicated. Thus, it is important to consider four scenarios. First, if there is a cancellation or revocation record in a sample, the time of registration will be regarded as the time of withdrawal. This sample is identified as “closure.”

Second, if a sample has both cancellation and revocation records, the earlier one is used as the time of withdrawal. Certainly, this sample is still identified as "closure." Third, if there is a reduction record of foreign equity in the annual report of a sample, the time when the record appears will be regarded as the time of withdrawal. Different from the above two cases, this sample is identified as "divestment." Fourth, if any one of the three situations mentioned above does not occur until the end of the observation period, this sample is identified as "survival."

Note that an enterprise that does not take the initiative to apply for cancellation for more than six months will have its business license revoked according to the *Company Law of the People's Republic of China*. An enterprise that submits the annual report overdue will be listed in the Abnormal Operations Directory, the List of Serious Illegal and Untrustworthy Enterprises or even have its business license revoked. It is unusual for an enterprise to fail without a cancellation and revocation record or divest the capital without a record on its annual report for a long time. This makes our method of defining the withdrawal time of foreign capital fairly accurate.

The second step is to identify the status when the withdrawal of foreign capital takes place, including the enterprise itself, the industry in which it belongs to, and the region where it is located. The principle of proximity proposed by Mata and Portugal (2000) considers the recent observation values of variables are the determinants of the withdrawal decision. The present study adopted this principle to match the samples with the data that was calculated. A "closure" sample with the record of cancellation or revocation between moment $t-1$ and t is matched with the data at moment $t-1$ or $t-2$. In special cases, the data at moment $t-2$ was extracted if no data existed at moment $t-1$. Although this was not common, the cancellation procedure does exceed one year in some cases. When the cancellation procedure spans from moment $t-1$ to t, the enterprise is closed and cannot provide annual reports for those two years. Therefore, it is reasonable to match this kind of special sample with the data at moment $t-2$.

A "divestment" type of sample requires the equity change procedure before divesting its foreign capital. Generally, this procedure can be completed in five to ten working days. As previously noted, an enterprise should submit its annual report for the previous year between January and June of the current year. This leads to three possibilities. First, an enterprise that completed the equity change procedure between July and December in a year discloses this change in the annual report the next year. Second, an enterprise that submitted the annual report first and then completed the equity change procedure between January and June in a year discloses the change in the annual report the next year. Third, an enterprise that completed the equity change procedure first and then submitted the annual report between January and June that year discloses the change in the annual report of the current year. The present study surmises that a "divestment" sample with the record of equity change between moment $t-1$ and t is matched with the data at moment $t-1$ or t.

4.4. Variables setting

The explanatory variables in the present study are divided into three types. The first type is the firm-level variable including operation profit, legal form, equity structure, enterprise scale. The second type is the industry-level variable including entry rate and growth rate. The third type is the region-level variable, which includes business environment, GDP growth rate, and wage growth rate. Based on the literature review, the definition, calculation method, and expected symbol of each variable are outlined in Table 1.

Table 1

Definition, Calculation Method and Expected Symbol of Variables

Variable	Definition	Calculation Method	Expected Sign
profit	operation profit	Add the absolute value of the lowest negative value to all, then plus 1 to all. Take Logarithm.	-
equity	equity structure	Dummy variable which takes 1 if the firm is a wholly-owned company, 0 otherwise.	-
size	firm scale	Gross assets. add the absolute value of the lowest negative value to all, then plus 1 to all, and finally take Logarithm.	-
age	enterprise age	Current year minus established year, then plus 1. Take Logarithm.	uncertain
ind_ent	industry entry rate	Growth rate of the number of legal entities by industry. Take Logarithm.	+
ind_grow	industry growth rate	Growth rate of employment by industry. Take Logarithm.	uncertain

pro_benv	business environment	Business environment grades by province.	-
pro_gdp	GDP growth rate	Normal GDP growth rate by province. Take Logarithm.	-
pro_wage	wage growth rate	Average wage growth rate of employed persons in urban units by province.	uncertain

CHAPTER 5
EMPIRICAL ANALYSIS

5.1. Descriptive analysis

According to Table 1, the expected symbols of operation profit, equity structure, firm size, industry entry rate, business environment by province, and GDP growth rate by province are relatively clear. A Kaplan-Meier nonparametric was performed to create estimates for these six variables for qualitative analysis (see Figure 3 and Figure 4). While the equity structure is a dummy variable that can be directly grouped by 1 and 0, other variables are divided into high and low groups according to their median as the boundary. The results observed from the hazard curves are basically consistent with our expectations.

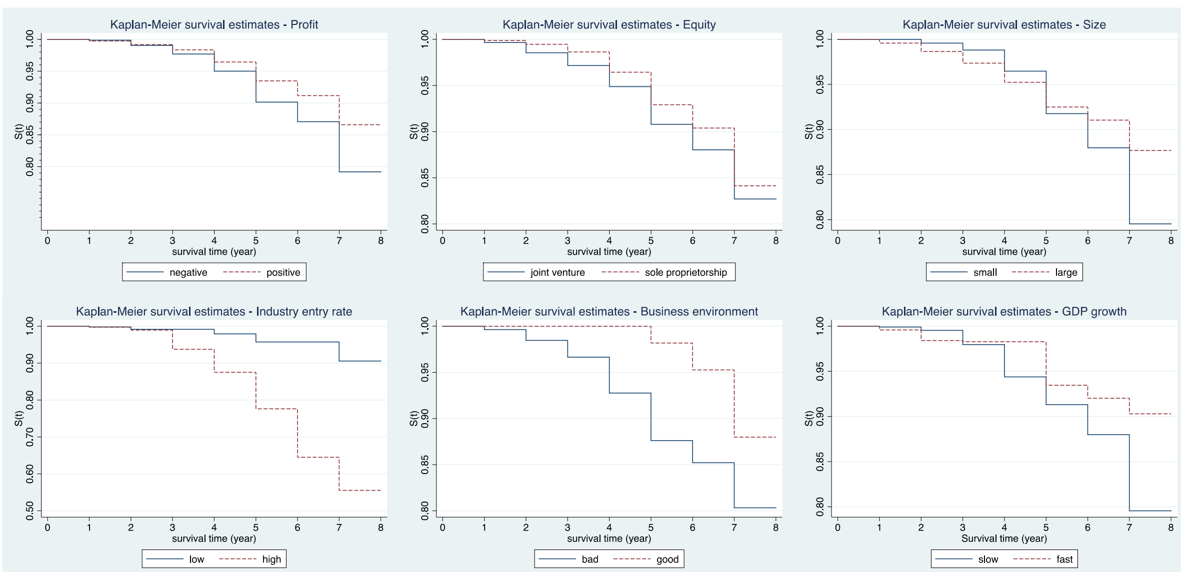

Figure 3. Kaplan-Meier Survival Functions

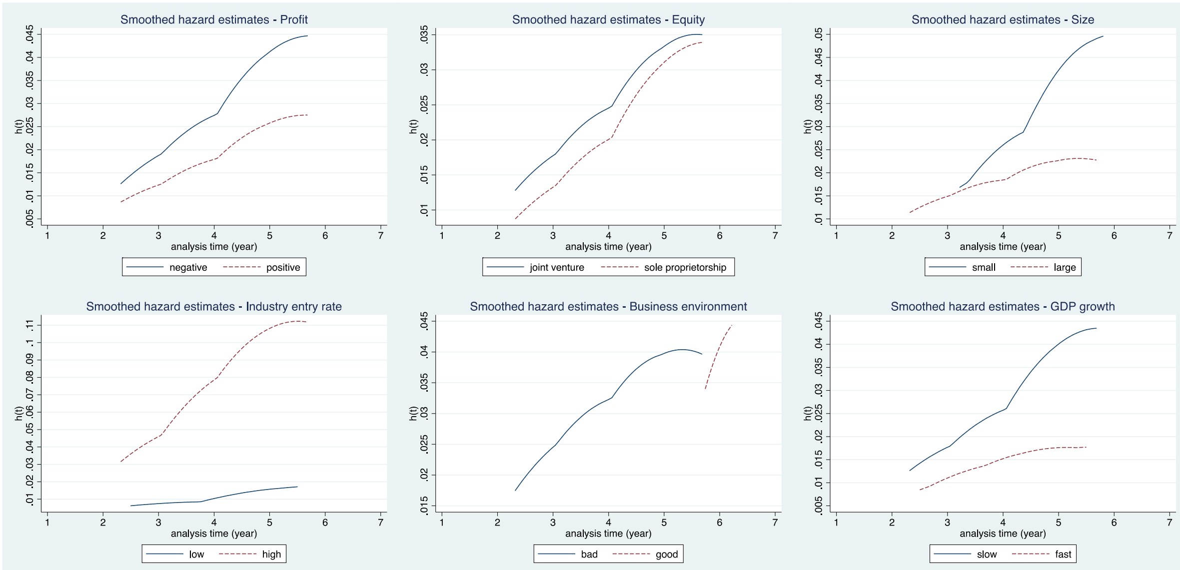

Figure 4. Kaplan-Meier Hazard Functions

5.2. Results of benchmark analysis

Table 2 presents the results of parametric estimations using the Exponential model, Gompertz model and Weibull model. Considering that some studies have reported the non-linear effect of enterprise age on survival, the quadratic term of enterprise age was introduced into parametric estimations to observe whether there is a robust inverted U-shaped relationship. In columns (1), (4) and (7) of Table 2, only the firm-level factors were considered. The industry-level, specifically columns (2), (5), and (8) and region-level characteristics, columns (3), (6), and (9), were then respectively introduced. The signs and significance of the estimated coefficients of the three models are generally consistent, which indicates that the influence of most explanatory variables on the withdrawal of foreign-invested enterprises is not different from the assumption of the distribution of hazard function. Therefore, the obtained estimation results are relatively robust. Precisely, both net profit and firm size have significant negative impacts on enterprise withdrawal. This conclusion is consistent with the previous literature. The equity structure of sole proprietorship has a positive but insignificant relationship with enterprise survival. With the sign and significance of enterprise age and its quadratic term change in three models, it is not possible to draw robust conclusions on the impact of enterprise age in the benchmark analysis.

Table 2.

Estimated Results of the Exponential, Gompertz and Weibull Models (N=3858)

Variable	Exponential			Gompertz			Weibull		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
profit	-0.298***	-0.302***	-0.258***	-0.331***	-0.339***	-0.296***	-0.323***	-0.330***	-0.278***
	(0.082)	(0.082)	(0.083)	(0.082)	(0.082)	(0.083)	(0.082)	(0.083)	(0.083)
equity	-0.111	-0.119	-0.080	-0.122	-0.128	-0.092	-0.116	-0.123	-0.090
	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)
size	-0.074***	-0.074***	-0.108***	-0.073***	-0.073***	-0.106***	-0.069***	-0.068***	-0.093***
	(0.021)	(0.581)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.020)
age	-1.034*	-1.001*	2.413***	-3.790***	-3.822***	0.710	-5.707***	-5.739***	-1.137*
	(0.577)	(0.581)	(0.664)	(0.552)	(0.557)	(0.631)	(0.592)	(0.597)	(0.662)
age^2	-0.373***	-0.392***	-1.017***	0.112	0.102	-0.769***	0.517***	0.508***	-0.380**
	(0.144)	(0.145)	(0.159)	(0.139)	(0.138)	(0.152)	(0.144)	(0.145)	(0.157)
ind_ent		-0.467***	-0.445***		-0.519***	-0.524***		-0.513***	-0.530***
		(0.751)	(0.067)		(0.075)	(0.067)		(0.076)	(0.067)
ind_grow		-0.040	-0.096		-0.075	-0.084		-0.063	-0.064
		(0.089)	(0.078)		(0.085)	(0.074)		(0.086)	(0.075)
pro_benv			-3.533***			-4.912***			-5.541***
			(0.261)			(0.283)			(0.297)
pro_gdp			0.265***			0.340***			0.355***
			(0.093)			(0.087)			(0.087)
pro_wage			0.770***			1.167***			1.488***
			(0.159)			(0.171)			(0.183)
constant	1.554	3.885	10.13307	3.201	5.953	14.597	3.369	6.039	15.806
	(0.605)	(0.781)	(1.121)	(0.554)	(0.750)	(1.107)	(0.560)	(0.756)	(1.119)

Note: *, **, *** represent significant at the level of 10%, 5% and 1% respectively. Numbers are coefficients, Numbers in brackets are standard error. The following table is the same without special instructions.

The characteristics of the industry and region in which the enterprise is located will also influence the withdrawal behaviour. Industry entry rate also have a significant negative impact on enterprise withdrawal. This is similar to the findings of Mata and Portugal (2000) and Gao et al. (2017), and it can be interpreted as that competition effect reduces the negative impact of high monopoly. A higher industry growth rate is more conducive to the survival of enterprise, but this correlation is insignificant. A better business environment can improve the likelihood of enterprise survival, which is in line with our expectations. As the proxy variables of economic development level and labour cost in a region, both GDP growth rate and wage growth rate have significant positive correlations with enterprise withdrawal. Observations of regional economic growth are inconsistent with traditional opinions, perhaps because developed regions have fiscal surplus to support local firms. This kind of local protectionism squeezes the living space of foreign-invested enterprises. The rise of regional wage growth means the weakening of comparative advantage of low labor cost, leading to the withdraw decision of foreign capital.

5.3. Results of extended analysis

As noted in chapter 3, parametric estimation has a strong limitation on the baseline hazard function. It is unclear which specific function is more realistic. The logarithmic likelihood of three models were compared: the Exponential, Gompertz, and Weibull model. As shown in columns (3), (6), and (9) of Table 2, the values are -1617, -1317 and -1236 respectively. According to the AIC criterion, the Weibull model was chosen because it demonstrated the highest logarithmic likelihood value as the result of parametric estimation (see Table 3).

Table 3.

Estimated Results of the Cox and Weibull Models (N=3858)

Variable	Weibull			Cox		
	(1)	(2)	(3)	(4)	(5)	(6)
profit	-0.323***	-0.330***	-0.278***	-0.399***	-0.305***	-0.239***
	(0.082)	(0.083)	(0.083)	(0.077)	(0.077)	(0.079)
equity	-0.116	-0.123	-0.090	-0.116	-0.123	-0.101
	(0.083)	(0.083)	(0.083)	(0.078)	(0.078)	(0.080)
size	-0.069***	-0.068***	-0.093***	-0.063***	-0.062***	-0.085***
	(0.021)	(0.021)	(0.020)	(0.021)	(0.021)	(0.020)
age	-5.707***	-5.739***	-1.137*	-5.428***	-5.403***	-1.263*
	(0.592)	(0.597)	(0.662)	(0.671)	(0.675)	(0.661)

age^2	0.517***	0.508***	-0.380**	0.497***	0.481***	-0.302**
	(0.144)	(0.145)	(0.157)	(0.161)	(0.161)	(0.159)
ind_ent		-0.513***	-0.530***		-0.445***	-0.452***
		(0.076)	(0.067)		(0.033)	(0.038)
ind_grow		-0.063	-0.064		-0.014	-0.015
		(0.086)	(0.075)		(0.048)	(0.052)
pro_benv			-5.541***			-5.419***
			(0.297)			(0.306)
pro_gdp			0.355***			0.337***
			(0.087)			(0.065)
pro_wage			1.488***			1.503***
			(0.183)			(0.190)
constant	3.369	6.039	15.806			
	(0.560)	(0.756)	(1.119)			

Table 3 also presents the results of semi-parametric estimations using the Cox model. Since the Cox model does not rely on specific distribution assumptions, the result is more robust than the parametric estimation. After comparing the estimation results of the Cox model with the Weibull model, the previous conclusions remain stable. Four key factors can significantly improve the probability of enterprise survival: higher profitability, larger scale, higher industry entry rate, and better regional business environment. Higher GDP growth and wage growth in the region where the enterprise is located can significantly reduce the probability of enterprise survival. A significant negative correlation between enterprise age and withdrawal is found, indicating that the older the enterprise, the higher the probability of survival. However, this conclusion is not robust. Although the quadratic term of enterprise age is significant in both models, the change of sign suggests that its effect is also not robust.

CHAPTER 6

ROBUSTNESS TEST

The robustness test was carried out from the following two sides. First, the withdrawal modes were further divided into "closure" and "divestment." Then, the competitive hazard model was used to estimate the hazard ratio. This is because many studies have reported differences in the influence of different factors on different withdrawal patterns. Table 4 presents the result.

Table 4.

Estimated Results of Cox Model with Different Withdrawal Patterns

Variable	**Closure (N=3690)**			**Divestment (N=3394)**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
profit	-0.353***	-0.351***	-0.306***	-0.134	-0.104	-0.204
	(0.091)	(0.091)	(0.092)	(0.156)	(0.159)	(0.152)
equity	-0.023	-0.034	0.012	-0.455***	-0.458***	-0.343***
	(0.094)	(0.094)	(0.097)	(0.154)	(0.157)	(0.156)
size	-0.233***	-0.232***	-0.233***	0.191***	0.192***	0.127***
	(0.027)	(0.028)	(0.026)	(0.024)	(0.024)	(0.026)
age	-10.939***	-10.905***	-6.702***	-1.925**	-1.414	0.991
	(1.340)	(1.334)	(1.589)	(0.981)	(2.045)	(0.860)
age^2	1.742***	1.715***	0.872**	-0.505**	-0.578**	-0.843***
	(0.295)	(0.293)	(0.346)	(0.263)	(0.277)	(0.218)
ind_ent		-0.447***	-0.440***		1.031**	0.271
		(0.031)	(0.037)		(0.450)	(0.337)
ind_grow		-0.124***	-0.067		0.808***	0.393**
		(0.043)	(0.054)		(0.223)	(0.238)
pro_benv			-4.411***			-6.877***
			(0.405)			(0.532)
pro_gdp			0.333***			0.385***
			(0.072)			(0.083)
pro_wage			0.745***			2.549***
			(0.199)			(0.380)

Second, the variables of "withdrawal," "closure," and "divestment" sets were test using the Schoenfeld residuals test. Some variables were expected to violate the proportional hazard hypothesis because they are obviously not permanent and ought to change over time. One approach to improve robustness is to introduce their interaction terms with time *t* as time-varying explanatory variables. Table 5 presents the results.

Table 5.

Estimated Results of the Cox with TVC

Variable	Withdrawal (N=3858)			Closure (N=3690)			Divestment (N=3394)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
profit	0.787***	-0.189**	0.828**	0.736***	-0.307***	0.735***	0.816	-0.025	0.976
	(0.062)	(0.079)	(0.066)	(0.068)	(0.092)	(0.067)	(0.124)	(0.160)	(0.156)
equity	0.904	-0.136 *	0.873*	1.012	0.019	1.019	0.709**	-0.431***	0.650***
	(0.072)	(0.079)	(0.069)	(0.098)	(0.096)	(0.098)	(0.111)	(0.161)	(0.104)
size	0.918***			0.792***			1.134***		
	(0.019)			(0.021)			(0.029)		
age	0.283*			0.001***			2.693		
	(0.187)			(0.002)			(2.315)		
age^2	0.739**			2.392**			0.431***		
	(0.113)			(0.828)			(0.094)		
ind_ent	0.636***			0.644***	-0.431***	0.650***	1.311	0.465	1.592
	(0.025)			(0.024)	(0.034)	(0.022)	(0.586)	(0.434)	(0.690)
ind_grow	0.985			0.935			1.482**	0.529**	1.697**
	(0.051)			(0.050)			(0.353)	(0.222)	(0.377)
pro_benv	0.004***			0.012***			0.001***		
	(0.001)			(0.005)			(0.001)		
pro_gdp	1.400***			1.396***			1.469***	0.254***	1.289***
	(0.092)			(0.101)			(0.122)	(0.091)	(0.117)
pro_wage	4.497***			2.108***			12.791***	3.613***	37.061***
	(0.857)			(0.419)			(4.847)	(0.414)	(15.356)
*size * t*		-0.022***	0.979***		-0.042***	0.957***		0.031***	1.031***
		(0.004)	(0.004)		(0.005)	(0.004)		(0.005)	(0.005)

*age * t*	-2.896***	0.055***	-3.131***	0.044***	-1.678***	0.187***
	(0.182)	(0.010)	(0.258)	(0.011)	(0.374)	(0.070)
age^2 t*	0.519***	1.681***	0.572***	1.772***	0.234***	1.264***
	(0.040)	(0.068)	(0.056)	(0.099)	(0.085)	(0.107)
ind_ent t*	-0.076***	0.927***				
	(0.005)	(0.005)				
ind_grow t*	-0.011	0.989	-0.018**	0.981**		
	(0.008)	(0.008)	(0.009)	(0.008)		
pro_benv t*	-0.727***	0.483***	-0.594***	0.552***	-1.331***	0.264***
	(0.049)	(0.030)	(0.064)	(0.035)	(0.142)	(0.037)
pro_gdp t*	0.049***	1.050***	0.048***	1.049***		
	(0.011)	(0.011)	(0.011)	(0.012)		
pro_wage t*	0.197***	1.218***	0.099***	1.104***		
	(0.034)	(0.041)	(0.029)	(0.032)		

Note: *, **, *** represent significant at the level of 10%, 5% and 1% respectively. Numbers in column (2), (5), (8) are coefficients, others are hazard ratios. Numbers in brackets are robust standard error.

Comparing the two different withdrawal modes, the profit level has a restraining effect on the possibility of closure but has no significant effect on the divestment. The probability of divestment is lower in wholly foreign-owned enterprises, but it has no significant effect on closure. The influence of the scale of enterprise on closure and divestment is opposite: The larger the firm size is, the less likely it is to close but the more likely it is to divest. There is a significant negative relationship between firm age and closure probability. The positive coefficient of enterprise age quadratic term further indicates a U-shaped relationship, that is the probability of closure first decreases and then increases with the age of the enterprise. Because the significance of the quadratic term decreases slightly, the U-shaped relationship between firm age and closure probability is not as robust as the negative linear relationship. Unlike closure, there is no significant linear relationship between enterprise age and divestment probability, but there is a significant inverted U-shaped relationship. This is consistent with the conclusions from Hannan et al. (1998), Agarwal et al. (2002), and Yu et al. (2015). The industry entry rate significantly reduces the probability of closure while the industry growth rate significantly increases the probability of divestment. Finally, the impact of the three factors on firm survival at the region-level does not change with the mode of withdrawal. The conclusion is as robust as that in the "withdrawal" case.

The signs and significance before and after the introduction of time-varying explanatory variables are generally consistent, indicating that the previous conclusions are quite robust. Precisely, for the "withdrawal" sample, the significance level or sign of enterprise age and its squared term are different between column (6) of Table 3 and column (2) of Table 5. The coefficient of enterprise age is negative, indicating that enterprise age can improve the probability of enterprise survival generally. The sign of square term of enterprise age changes again so that it is still difficult to draw a robust conclusion on nonlinear correlation. As shown in column (3) of Table 4 and column (5) of Table 5, the sign and significance of variables did not change save one exception: The square term of enterprise age increased significantly. The conclusions for the "closure" sample can be considered fairly robust. According to column (6) of Table 4 and column (9) of Table 5, the conclusion about the inverted U-shaped age effect of the "divestment" sample is not robust again because of the change of sign; however, the rest of the previous conclusions are robust.

CHAPTER 7
CONCLUSIONS

Based on the data from the National Enterprise Credit Information Publicity System, China Statistical Yearbook, *Business Environment Index for China's Provinces 2020 Report*, this paper uses the continuous-time survival analysis method to comprehensively investigate the factors influencing the withdrawal behaviour of foreign-invested enterprises at enterprise-, industry-, and region-levels. A total of 3,858 foreign-invested enterprises established between 2003 and 2012 were randomly sampled, and their survival from 2013 to 2020 was observed. Through benchmark estimation, extended analysis, and robustness test, it was found that at the firm level, operation profit, firm size, and enterprise age have significantly negative impacts on the probability of enterprise withdrawal. At the industry-level and region-level, higher industry entry rate and better regional business environment can significantly improve the probability of enterprise survival. In addition, the rise of local GDP growth rate and wage rate can significantly increase the probability of enterprise withdrawal.

The differences of two withdrawal patterns were also studied: "closure" and "divestment." The equity structure of wholly-owned businesses can reduce the probability of divestment. Increasing the size of a firm reduces the likelihood of closure but increases the probability of divestment. The industry entry rate significantly reduces the probability of closure, while the industry growth rate significantly increases the probability of divestment.

The policy implications can be summarized as follows. First, foreign-invested enterprises should strive to improve their profitability and firm scale and make informed decisions choosing appropriate industries and locations. Second, the government should provide nurturing investment conditions. While maintaining a relatively stable political and institutional environment, the government needs to focus on improving the business environment and providing convenience to foreign-invested enterprises in terms of financing, subsidies, and approval procedures. Third, in the context of the loss of comparative advantage in labour costs, the government should pay attention to industry monopolies, local monopolies, and excessive competition, and should also avoid local protectionism while providing more relaxed access conditions for foreign investors. Finally, a set of early warning mechanisms for foreign capital outflows should be established to pay attention to the survival status of foreign-invested enterprises as well as the factors affecting the withdrawal of foreign capital. Especially under the current trade barriers and the uncertainty of the COVID-19 epidemic, it is necessary to avoid the "withdrawal wave" that may adversely affect economic growth, employment, and industrial upgrading.

REFERENCES

Agarwal, R. & Gort, M. (2002). Firm and product life cycles and firm survival. *American Economic Review*, *92*(2), 184-190. https://doi.org/10.1257/000282802320189221

Agarwal, R., Echambadi, R., Franco, A. M., & Sarkar, M. B. (2004). Knowledge transfer through inheritance: Spin-out generation, development, and survival. *Academy of Management Journal*, *47*(4), 501-522. https://doi.org/10.5465/20159599

Audretsch, D. B. (1995). Innovation, growth and survival. *International Journal of Industrial Organization*, *13*(4), 441-457. https://doi.org/10.1016/0167-7187(95)00499-8

Audretsch, D. B., & Mahmood, T. (1994). The rate of hazard confronting new firms and plants in US manufacturing. *Review of Industrial Organization*, *9*(1), 41-56. https://doi.org/10.1007/BF01024218

Audretsch, D. B., & Mahmood, T. (1995). New firm survival: New results using a hazard function. *The Review of Economics and Statistics*, *77*(1), 97–103. https://doi.org/10.2307/2109995

Barbieri, E., Di Tommaso, M. R., & Bonnini, S. (2012). Industrial development policies and performances in Southern China: Beyond the specialised industrial cluster program. *China Economic Review*, *23*(3), 613-625. https://doi.org/10.1016/j.chieco.2010.12.005

Belderbos, R., & Zou, J. (2006). Foreign investment, divestment and relocation by Japanese electronics firms in East Asia. *Asian Economic Journal*, *20*(1), 1-27. https://doi.org/10.1111/j.1467-8381.2006.00222.x

Benito, G. R. (1997). Divestment of foreign production operations. *Applied Economics*, *29*(10), 1365-1378. https://doi.org/10.1080/000368497000000027

Benito, G. R. G., & Welch, L. S. (1997). De-internationalization. *MIR: Management International Review*, *37*, 7–25. http://www.jstor.org/stable/40228430

Berry, H. (2013). When do firms divest foreign operations? *Organization Science*, *24*(1), 246–261. https://doi.org/10.1287/orsc.1110.0724

Boddewyn, J. J. (1979). Foreign divestment: magnitude and factors. *Journal of International Business Studies*, *10*(1), 21-26. https://doi.org/10.1057/palgrave.jibs.8490786

Boddewyn, J. J. (1983). Foreign direct divestment theory: Is it the reverse of FDI theory? *Review of World Economics*, *119*(2), 345-355. https://doi.org/10.1007/BF02706431

Bogner, W. C., Thomas, H., & McGee, J. (1996). A longitudinal study of the competitive positions and entry paths of European firms in the US pharmaceutical market. *Strategic Management Journal*, *17*(2), 85-107. https://doi.org/10.1002/(SICI)1097-0266(199602)17:2<85::AID-SMJ785>3.0.CO;2-D

Brüderl, J., Preisendörfer, P., & Ziegler, R. (1992). Survival chances of newly founded business organizations. *American Sociological Review*, *57*(2), 227–242. https://doi.org/10.2307/2096207

Burgelman, R. A. (1994). Fading memories: A process theory of strategic business exit in dynamic environments. *Administrative Science Quarterly*, *39*(1), 24–56. https://doi.org/10.2307/2393493

Chang, S. J. (1996). An evolutionary perspective on diversification and corporate restructuring: Entry, exit, and economic performance during 1981–89. *Strategic Management Journal*, *17*(8), 587-611. https://doi.org/10.1002/(SICI)1097-0266(199610)17:8<587::AID-SMJ834>3.0.CO;2-1

Chen, C. H. (1996). Regional determinants of foreign direct investment in mainland China. *Journal of Economic Studies*, *23*(2), 18-30. https://doi.org/10.1108/01443589610109649

Chen, T. J., & Wu, G. (1996). Determinants of divestment of FDI in Taiwan. *Review of World Economics 132*(1), 172-184. https://doi.org/10.1007/BF02707908

Dai, L., Eden, L., & Beamish, P. W. (2013). Place, space, and geographical exposure: Foreign subsidiary survival in conflict zones. *Journal of International Business Studies*, *44*(6), 554-578. https://doi.org/10.1057/jibs.2013.12

Dixit, A., & Pindyck, R. (1994). *Investment under uncertainty*. Princeton University Press.

Duncan, R. B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, *17*(3), 313-327. https://doi.org/10.2307/2392145

Dunne, T., Roberts, M. J., & Samuelson, L. (1989). The growth and failure of US manufacturing plants. *The Quarterly Journal of Economics*, *104*(4), 671-698. https://doi.org/10.2307/2937862

Dunning, J. H. (1980). Toward an eclectic theory of international production: Some empirical tests. *Journal of International Business Studies*, *11*(1), 9-31. https://doi.org/10.1057/palgrave.jibs.8490593

Ericson, R., & Pakes, A. (1995). Markov-perfect industry dynamics: A framework for empirical work. *The Review of Economic Studies*, *62*(1), 53-82. https://doi.org/10.2307/2297841

Evans, D. S., & Jovanovic, B. (1989). An estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy*, *97*(4), 808-827. https://doi.org/10.1086/261629

Gao, L., Qu, X., & Peng, J. (2017). Waishang touzi shifou you geng gao de tuichu fengxian [Do foreign firms have higher exit probability?] *The Journal of World Economy*, *40*(7), 52-77. http://jtp.cnki.net/bilingual/detail/html/SJJJ201707004

Globerman, S., & Shapiro, D. M. (1999). The impact of government policies on foreign direct investment: The Canadian experience. *Journal of International Business Studies*, *30*(3), 513-532. https://doi.org/10.1057/palgrave.jibs.8490081

Hamilton, R. T., & Chow, Y. K. (1993). Why managers divest—evidence from New Zealand's largest companies. *Strategic Management Journal*, *14*(6), 479-484. https://doi.org/10.1002/smj.4250140606

Han, M. and Zhang, L. (2015). Zhongguo zhizaoye FDI cheli de jiuye xiaoying he yingdui zhengce de xiaoguo [The impact of FDI withdrawal in manufacturing industries on Chinese employment and the effectiveness of responding policies.] *The Journal of Quantitative & Technical Economics 32*(9), 56-72. http://jtp.cnki.net/bilingual/detail/html/SLJY201509004

Harhoff, D., Stahl, K., & Woywode, M. (1998). Legal form, growth and exit of west German firms—empirical results for manufacturing, construction, trade and service industries. *The Journal of Industrial Economics*, *46*(4), 453-488. https://doi.org/10.1111/1467-6451.00083

Haynes, M., Thompson, S., & Wright, M. (2003). The determinants of corporate divestment: Evidence from a panel of UK firms. *Journal of Economic Behavior & Organization*, *52*(1), 147-166. https://doi.org/10.1016/S0167-2681(02)00167-1

He, C., & Yang, R. (2016). Determinants of firm failure: empirical evidence from China. *Growth and Change*, *47*(1), 72-92. https://doi.org/10.1111/grow.12116

Hennart, J. F. (1988). A transaction costs theory of equity joint ventures. *Strategic Management Journal*, *9*(4), 361-374. https://doi.org/10.1002/smj.4250090406

Hennart, J. F. (1991). The transaction costs theory of joint ventures: An empirical study of Japanese subsidiaries in the United States. Management Science, *37*(4), 483-497. https://doi.org/10.1287/mnsc.37.4.483

Hoskisson, R. E., Johnson, R. A., & Moesel, D. D. (1994). Corporate divestiture intensity in restructuring firms: Effects of governance, strategy, and performance. *Academy of Management Journal*, *37*(5), 1207-1251. https://doi.org/10.5465/256671

Hymer, S. H. (1960). *The international operations of national firms, a study of direct foreign investment* [Doctoral dissertation, Massachusetts Institute of Technology]. Massachusetts Institute of Technology. https://dspace.mit.edu/handle/1721.1/27375

Jiang, D., & Zhang, Q. (2011). Meiguo zaihua zhijie touzi de yinli moxing fenxi [Gravity model analysis of american direct investment in China.] *The Journal of World Economy* (5), 26-41. http://www.cnki.com.cn/Article/CJFDTotal-SJJJ201105003.htm

Jiang, L. (2016). Jiju hui jiangdi qiye shibai de fengxian ma? Laizi zhongguo weiguan qiye de zhengju [Will the agglomeration reduce the risk of firm failure? Firm-level evidence from China]. *Industrial Economics Research* (5), 1-12. http://www.cnki.com.cn/Article/CJFDTotal-CYJJ201605001.htm

Kindleberger, C. P. (1969). *American business abroad: Six lectures on direct investment*. Yale University Press.

Kogut, B. (1989). The stability of joint ventures: Reciprocity and competitive rivalry. *The Journal of Industrial Economics*, *38*(2), 183-198. https://doi.org/10.2307/2098529

Kogut, B., & Kulatilaka, N. (1994). Operating flexibility, global manufacturing, and the option value of a multinational network. *Management Science*, *40*(1), 123-139. https://doi.org/10.1287/mnsc.40.1.123

Kücher, A., Mayr, S., Mitter, C., Duller, C., & Feldbauer-Durstmüller, B. (2020). Firm age dynamics and causes of corporate bankruptcy: age dependent explanations for business failure. *Review of Managerial Science*, *14*(3), 633-661. https://doi.org/10.1007/s11846-018-0303-2

Li, J. (1995). Foreign entry and survival: Effects of strategic choices on performance in international markets. *Strategic Management Journal*, *16*(5), 333-351. https://doi.org/10.1002/smj.4250160502

Li, Y., Liu, X., & Yang, Z. (2016). Waishang touzi qiye chezi: Dongyin yu yingxiang jili – Jiyu dongbu yanhai 10 ge chengshi wenjuan diaocha de shizheng fenxi [Disinvestment of foreign-invested enterprises: Motivation and influence mechanism - An empirical analysis based on questionnaire surveys in 10 cities along the eastern coast.] *Management World* (4), 37-51. http://www.cnki.com.cn/Article/CJFDTOTAL-

GLSJ201604006.htm

Liu, Z., & Li, R. (2016). Kuaguo gongsi chechu zhongguo de dongyin fenxi – Jiyu kuaguo gongsi jingying de shijiao [An analysis of the causes of MNE's divestment in China - From the perspective of MNE's performance.] *Economic Survey 33*(2), 54-59. http://en.cnki.com.cn/Article_en/CJFDTotal-JJJW201602010.htm

Luo, C., & Chen, L. (2011). FDI shifou neng huanjie zhongguo qiye de rongzi yueshu [Could FDI alleviate the financing constraints of China's domestic firms?] *The Journal of World Economy 34*(4), 42-61. http://www.cnki.com.cn/Article/CJFDTOTAL-SJJJ201104005.htm

Luo, C., & Si, C. (2020). Waishang chezi de yingxiang yinsu: Jiyu zhongguo gongye qiye shuju de fenxi [Determinants of foreign divestment: Evidence from Chinese industrial enterprises]. *The Journal of World Economy 43*(8), 26-53. http://www.cnki.com.cn/Article/CJFDTOTAL-SJJJ202008003.htm

Mao, Y., Jiang, D., & Zeng, G. (2005). *Multinational corporation's divestment in China: Behavior, process, motivation and case*. Chinese Financial & Economic Publishing House.

Mariotti, S., & Piscitello, L. (1997). Is divestment as failure or part of a restructuring strategy? The case of Italian transnational corporations. In Macharzina K., Oesterle, M. J., & Wolff, J (Eds). *Global business in the information age* (pp. 381-404). Proceedings of the 23rd Annual EIBA Conference. http://hdl.handle.net/11311/525198

Mata, J., & Portugal, P. (1994). Life duration of new firms. *The Journal of Industrial Economics*, *43*(3), 227-245. https://doi.org/10.2307/2950567

Mata, J., & Portugal, P. (2000). Closure and divestiture by foreign entrants: the impact of entry and post-entry strategies. *Strategic Management Journal*, *21*(5), 549-562. https://doi.org/10.1002/(SICI)1097-0266(200005)21:5<549::AID-SMJ94>3.0.CO;2-F

Mata, J., & Portugal, P. (2002). The survival of new domestic and foreign-owned firms. *Strategic Management Journal*, *23*(4), 323-343. https://doi.org/10.1002/smj.217

Mata, J., Portugal, P., & Guimaraes, P. (1995). The survival of new plants: Start-up conditions and post-entry evolution. *International Journal of Industrial Organization*, *13*(4), 459-481. https://doi.org/10.1016/0167-7187(95)00500-5

McCloughan, P., & Stone, I. (1998). Life duration of foreign multinational subsidiaries: Evidence from UK northern manufacturing industry 1970–93. *International Journal of Industrial Organization*, *16*(6), 719-747. https://doi.org/10.1016/S0167-7187(97)00070-2

Mitchell, W. (1994). The dynamics of evolving markets: the effects of business sales and age on dissolutions and divestitures. *Administrative Science Quarterly*, *39*(4), 575-603. https://doi.org/10.2307/2393772

Mitchell, W., Shaver, J. M., & Yeung, B. (1994). Foreign entrant survival and foreign market share: Canadian companies' experience in United States medical sector markets. *Strategic Management Journal*, *15*(7), 555-567. https://doi.org/10.1002/smj.4250150705

Ouimet, P., & Zarutskie, R. (2014). Who works for startups? The relation between firm age, employee age, and growth. *Journal of Financial Economics*, *112*(3), 386-407. https://doi.org/10.1016/j.jfineco.2014.03.003

Schmalensee, R. (1989). Inter-industry studies of structure and performance. In Schmalensee, R., & Willig, R. (Eds.), *Handbook of industrial organization* (pp.951-1010). North-Holland. https://doi.org/10.1016/S1573-448X(89)02004-2

Siegfried, J. J., & Evans, L. B. (1994). Empirical studies of entry and exit: a survey of the evidence. *Review of Industrial Organization*, *9*(2), 121-155. https://doi.org/10.1007/BF01035654

Teece, D. J. (1985). Multinational enterprise, internal governance, and industrial organization. *American Economic Review*, *75*(2), 233-238. http://www.jstor.org/stable/1805602

Thompson, P. (2005). Selection and firm survival: evidence from the shipbuilding industry, 1825–1914. *Review of Economics and Statistics*, *87*(1), 26-36. https://doi.org/10.1162/0034653053327531

Vernon, R. (1966). International investment and international trade in the product cycle. *The Quarterly Journal of Economics*, *80*(2), 190-207. https://doi.org/10.2307/1880689

Wang, X., Fan, G., & Hu, L. (2020). *Business environment index for China's provinces 2020 report*. Social Sciences Academic Press.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171-180. https://doi.org/10.1002/smj.4250050207

Xu, J., & Mao, Q. (2016). Zhengfu butie, zhili huanjing yu zhongguo qiye shengcun [Government subsidy, governance environment and Chinese firms' survival]. *The Journal of World Economy 39*(2): 75-99. http://www.cnki.com.cn/Article/CJFDTotal-SJJJ201602005.htm

Young, A. (2000). The razor's edge: Distortions and incremental reform in the People's Republic of China. T*he Quarterly Journal of Economics*, *115*(4), 1091-1135. https://doi.org/10.1162/003355300555024

Yu, J., Lu, Y., & Liu, H. (2015). Chukou xingwei yu qiye shengcun gailv: Yige jingyan yanjiu [Export behavior and firm survival probability: An empirical study.] *The Journal of World Economy 38*(4): 25–39. http://www.cnki.com.cn/Article/CJFDTotal-SJJJ201504003.htm

APPENDICES

Appendix A. *Entry Rate by Industry from 2012 to 2019 (%)*

Industry	2012	2013	2014	2015	2016	2017	2018	2019
Agriculture, Forestry, Animal Husbandry and Fishery	37.30	-63.29	487.70	26.67	22.97	30.06	-87.92	707.45
Mining	2.00	-17.18	14.10	1.72	0.63	4.64	-35.55	1.13
Manufacturing	6.27	-5.40	16.18	7.05	7.79	15.38	-6.14	5.93
Electricity, Heat, Gas and Water Production and Supply	4.94	0.66	13.17	9.80	13.70	21.38	-8.30	2.65
Construction	13.11	-11.21	33.80	23.48	31.42	38.53	16.57	19.70
Wholesale and Retail Trade	15.57	6.84	25.01	19.52	20.07	24.02	3.95	10.11
Transportation, Warehousing and Postal Services	13.75	4.89	23.28	17.23	17.06	22.03	6.70	9.08
Accommodation and Catering	8.58	0.93	24.79	16.78	15.57	19.32	13.81	4.16
Information Transmission, Software, and IT Services	17.62	-7.96	27.89	34.13	30.90	41.66	27.91	13.86
Financial Industry	21.69	17.79	15.10	19.79	11.67	10.25	2.12	-4.49
Real Estate	10.10	-3.59	22.01	11.08	14.47	20.49	15.87	8.96
Leasing and Business Services	18.37	12.67	26.72	23.98	22.73	26.82	13.79	10.74
Scientific Research and Technical Services	14.50	40.27	19.42	21.44	23.03	27.29	23.22	9.03
Water, Environment and Public Facilities Management Industry	9.82	11.61	15.00	10.81	13.23	19.55	1.75	16.12
Residential Services, Repairs and Other Services	11.98	-3.14	27.04	23.41	20.40	16.87	18.22	5.15
Education	2.51	16.57	7.28	3.92	5.33	6.52	28.61	4.96
Health and Social Work	0.83	20.63	6.40	2.27	1.47	4.10	-5.00	2.44
Culture, Sports and Entertainment	17.86	90.33	14.24	12.87	14.77	21.63	36.54	3.29

Appendix B. *Growth Rate by Industry from 2012 to 2019 (%)*

Industry	2012	2013	2014	2015	2016	2017	2018	2019
Agriculture, Forestry, Animal Husbandry and Fishery	-5.73	-13.01	-3.46	-5.13	-2.52	-2.96	-24.59	-30.37
Mining	3.17	2.46	-7.73	-8.50	-10.06	-7.23	-9.00	-11.27
Manufacturing	4.25	23.36	-0.28	-3.31	-3.47	-5.28	-9.86	-8.29
Electricity, Heat, Gas and Water Production and Supply	2.96	17.38	-0.20	-1.91	-2.12	-2.73	-2.07	1.06
Construction	16.55	45.35	-0.02	-4.29	-2.55	-2.99	2.56	-16.25
Wholesale and Retail Trade	9.93	25.15	-0.25	-0.60	-0.94	-3.68	-2.31	0.81
Transportation, Warehousing and Postal Services	0.71	26.77	1.80	-0.81	-0.57	-0.66	-2.95	-0.43
Accommodation and Catering	9.23	14.82	-4.96	-4.56	-2.32	-1.41	1.47	-1.70
Information Transmission, Software, and IT Services	4.70	46.90	2.75	4.04	4.06	8.60	7.31	7.31
Financial Industry	4.45	1.91	5.28	7.15	9.62	3.55	1.52	18.13
Real Estate	10.10	36.54	7.63	3.75	3.45	3.03	4.77	9.51
Leasing and Business Services	1.99	44.34	6.28	5.71	3.04	7.00	1.32	24.72
Scientific Research and Technical Services	10.79	17.27	5.21	0.64	2.19	0.19	-2.12	5.54
Water, Environment and Public Facilities Management Industry	5.86	6.32	3.82	1.56	-1.35	-0.41	-2.94	-6.18
Residential Services, Repairs and Other Services	3.67	16.43	4.29	-0.27	0.27	3.71	-1.02	11.50
Education	2.20	2.04	2.38	0.53	-0.42	0.07	0.30	10.01
Health and Social Work	5.92	7.05	5.25	3.85	3.02	3.56	1.61	10.28
Culture, Sports and Entertainment	2.00	6.75	-1.02	2.47	1.14	0.93	-3.68	3.14

Appendix C. *Business Environment by Provinces from 2012 to 2019*

Province	2012	2013	2014	2015	2016	2017	2018	2019
Beijing	3.17	3.31	3.45	3.58	3.72	3.71	3.71	3.7
Tianjin	3.44	3.51	3.58	3.64	3.71	3.69	3.66	3.64
Hebei	2.97	3.11	3.26	3.40	3.54	3.56	3.57	3.59
Shanxi	2.94	3.04	3.14	3.23	3.33	3.40	3.46	3.53
Inner Mongolia	3.01	3.10	3.20	3.29	3.38	3.42	3.45	3.49
Liaoning	3.05	3.18	3.30	3.43	3.55	3.59	3.62	3.66
Jilin	3.11	3.23	3.35	3.46	3.58	3.57	3.57	3.56
Heilongjiang	3.11	3.23	3.36	3.48	3.6	3.59	3.58	3.57
Shanghai	3.25	3.42	3.59	3.75	3.92	3.91	3.89	3.88
Jiangsu	3.14	3.27	3.40	3.53	3.66	3.73	3.80	3.87
Zhejiang	3.15	3.32	3.50	3.67	3.84	3.82	3.81	3.79
Anhui	3.04	3.18	3.33	3.47	3.61	3.63	3.65	3.67
Fujian	3.06	3.22	3.39	3.55	3.71	3.74	3.77	3.8
Jiangxi	2.94	3.10	3.27	3.43	3.59	3.63	3.66	3.7
Shandong	3.07	3.21	3.35	3.49	3.63	3.67	3.71	3.75
Henan	3.05	3.16	3.27	3.38	3.49	3.54	3.58	3.63
Hubei	3.01	3.18	3.34	3.51	3.67	3.68	3.70	3.71
Hunan	2.98	3.13	3.28	3.42	3.57	3.58	3.59	3.6
Guangdong	3.07	3.21	3.36	3.50	3.64	3.70	3.77	3.83
Guangxi	3.09	3.24	3.39	3.53	3.68	3.68	3.69	3.69
Hainan	3.01	3.13	3.24	3.36	3.47	3.47	3.47	3.47
Chongqing	3.12	3.28	3.43	3.59	3.74	3.74	3.75	3.75
Sichuan	3.05	3.15	3.25	3.34	3.44	3.53	3.61	3.7
Guizhou	2.99	3.12	3.24	3.37	3.49	3.52	3.54	3.57
Yunnan	2.86	2.99	3.12	3.25	3.38	3.46	3.55	3.63
Shaanxi	3.01	3.14	3.27	3.40	3.53	3.56	3.60	3.63
Gansu	2.84	2.98	3.12	3.25	3.39	3.45	3.50	3.56
Qinghai	2.95	3.04	3.14	3.23	3.32	3.35	3.39	3.42
Ningxia	2.98	3.11	3.23	3.36	3.48	3.50	3.52	3.54
Xinjiang	2.8	2.93	3.06	3.19	3.32	3.36	3.41	3.45

Appendix D. *GD and Wage Growth Rate by Provinces from 2012 to 2019 (%)*

Province	2012		2013		2014		2015		2016		2017		2018		2019	
	GDP	Wage	GDP	Wage	GDP	Wage	GDP	Wage	GDP	Wage	GDP	Wage	GDP	Wage	GDP	Wage
Beijing	10.01	25.26	10.75	12.00	7.73	10.15	7.89	10.94	11.53	12.25	9.14	7.37	8.23	8.72	16.66	10.86
Tianjin	14.02	19.50	12.01	18.37	8.90	14.46	5.16	11.53	8.15	7.24	3.71	4.41	1.40	4.31	-25.02	3.57
Hebei	8.40	15.78	7.03	11.83	3.44	11.81	1.31	8.34	7.60	7.11	6.07	4.46	5.86	3.61	-2.52	8.62
Shanxi	7.79	23.39	4.56	17.60	0.76	5.88	0.04	3.40	2.22	1.01	18.99	4.08	8.31	8.79	1.24	8.59
Inner Mongolia	10.59	14.54	6.52	11.71	5.05	4.61	0.35	2.11	1.66	1.70	-11.21	1.42	7.41	9.26	-0.44	8.68
Liaoning	11.79	15.17	9.53	14.65	5.19	6.25	0.25	5.26	-22.48	2.37	5.22	3.00	8.13	7.33	-1.60	9.28
Jilin	12.97	12.91	9.27	10.35	5.80	7.82	1.88	6.25	5.07	8.68	1.14	10.02	0.87	5.47	-22.21	7.43
Heilongjiang	8.82	10.90	5.58	13.78	4.04	8.93	0.29	6.03	2.00	6.81	3.36	6.19	2.89	7.34	-16.80	5.38
Shanghai	5.14	11.66	8.11	13.60	8.02	13.86	6.60	11.73	12.16	12.97	8.71	10.30	6.68	9.64	16.75	12.57
Jiangsu	10.08	16.61	10.54	13.22	8.93	10.10	7.72	9.29	10.37	7.94	10.96	4.64	7.83	9.76	7.60	7.68
Zhejiang	7.26	16.48	8.92	9.92	6.40	9.59	6.75	6.68	10.18	9.04	9.56	7.30	8.56	8.85	10.95	7.27
Anhui	12.49	15.92	11.72	11.85	8.42	14.24	5.55	5.33	10.92	5.28	10.69	5.34	11.06	9.14	23.69	7.78
Fujian	12.20	21.69	11.00	17.85	10.00	11.34	8.00	6.30	10.90	6.78	11.70	5.41	11.25	8.40	18.38	7.96
Jiangxi	10.65	11.77	11.29	18.35	9.05	8.38	6.42	10.55	10.61	10.62	8.15	9.34	9.89	8.49	8.06	5.96
Shandong	10.25	17.90	10.43	17.50	7.60	13.39	6.02	12.07	7.97	10.43	6.79	7.97	5.27	6.46	-7.06	0.23
Henan	9.91	13.37	8.76	12.61	8.53	14.53	5.91	11.42	9.38	9.06	10.08	10.26	7.86	9.47	12.91	7.42
Hubei	13.34	10.82	11.42	12.81	10.44	9.79	7.93	8.82	10.54	10.04	8.61	8.71	10.96	8.03	16.42	8.50
Hunan	12.63	13.56	11.14	13.28	9.81	10.61	6.90	8.06	9.17	4.69	7.45	6.93	6.91	8.65	9.67	4.57
Guangdong	7.25	19.91	9.47	15.74	8.54	11.78	7.38	8.58	11.05	7.58	10.95	10.60	8.44	9.21	10.68	7.32
Guangxi	11.21	22.54	10.85	17.63	8.46	7.22	7.21	5.95	9.01	7.67	6.58	6.06	4.25	4.37	4.35	7.51
Hainan	13.20	14.89	11.28	22.73	10.17	9.02	5.77	13.41	9.46	9.66	10.10	12.21	-1.80	8.55	21.15	7.87
Chongqing	13.97	18.22	12.04	14.92	11.57	12.54	10.20	10.15	12.87	7.08	9.51	6.56	4.82	4.18	15.92	4.35
Sichuan	13.54	16.85	10.55	15.12	8.13	9.52	5.31	7.52	9.59	7.50	12.28	6.15	10.00	8.14	14.60	8.35
Guizhou	20.18	12.85	18.02	13.13	14.59	11.63	13.34	9.94	12.13	8.36	14.98	7.01	9.35	4.27	13.26	4.46
Yunnan	15.93	5.37	14.77	27.63	8.30	19.89	6.28	9.23	8.59	9.05	10.74	6.48	9.19	7.21	29.88	7.44
Shaanxi	15.52	20.74	12.12	16.27	9.16	15.23	1.88	12.26	7.64	4.25	12.88	5.03	11.60	8.84	5.54	6.61
Gansu	12.55	25.05	12.04	16.31	7.99	12.08	-0.68	14.00	6.04	14.78	3.60	5.66	10.54	5.65	5.73	4.72
Qinghai	13.36	11.67	12.07	13.75	8.54	15.68	4.94	6.30	6.43	8.25	2.03	4.81	9.16	5.09	3.52	3.32
Ningxia	11.37	14.30	10.09	24.73	6.77	3.53	5.80	9.31	8.82	4.42	8.68	2.78	7.60	4.11	1.17	8.15
Xinjiang	13.51	19.03	12.53	13.30	9.83	8.35	0.55	3.86	3.48	3.11	12.77	3.07	12.10	4.55	11.46	9.77

VITA AUCTORIS

Zhihao Wang was born in 1998 in Jiaxing, China. He graduated from Zhejiang Yuanji High School in 2016. From there he went on to the Zhejiang Sci-Tech University where he obtained a B.A. in Economics in 2020. He is currently a candidate for the M.A. degree in Economics at the University of Windsor and hopes to graduate in Summer 2022. He will go on to the University of Calgary for the Ph.D. degree in Economics from Fall 2022.

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