

Determinants of survival and growth of Listed SMEs in China

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Abstract

This paper investigates the important factors in determining the survival and growth of Chinese listed SMEs for the period of 1990-2003. Our findings are as follows. Firm survival tends to increase with firm size, and firm growth tends to decrease with firm age but increase with firm size; firm performance and operation stability helps listed firms be more competitive and more likely to survive and grow; the type of activity in which the firm engages is an important determinant of its growth, but no evidence shows that it is likely to affect firm survival; state-ownership appears to increase the probability of large firm survival but not growth, indicating that it cannot help firms to increase their competitiveness to grow in the market; SMEs in inner and remote areas are more likely to survive, while the firms in coastal areas are more likely to grow; R&D activities have been found to influence firm survival but not growth, indicating the overwhelming problem of intellectual property protections in China; and finally and most importantly, seasoned equity offering (SEO) plays a crucial role in sustaining SME survival and growth, and a lack of seasoned equity raised in markets has proved to have weakened SME performance and become a major constraint on the growth of the Chinese listed SMEs, indicating that public listing does not facilitate SME survival and growth. The paper's findings carry policy implications that are related to the state-ownership reform, development of SME Board and enforcement of intellectual property protections in China.

JEL Classification: C33; C34; P34;G32; O53

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1. Introduction

Small and medium-sized enterprises (SMEs) in China have formed the backbone of the Chinese economy since the launching of the economic reform in 1979, and helped achieve many important socio-economic objectives of the country. According to the National Development and Reform Committee (NDRC, 2004), by the end of 2003, formally registered SMEs represent more than 99.6 percent of all the enterprises in the country, accounting for 55.6 percent of GDP and 62.3 percent of imports and exports, and contributing 46.2 percent of tax revenues in the national economy. SMEs provided 75 percent of employment in urban areas, increasing by 24 times compared to 1989. As a result of the economic reforms and market opening policies, SMEs have grown to become an important force in contributing towards sustained and rapid economic growth in China.

Given the importance of SMEs in the economy, the Chinese government has begun placing special emphasis on supporting and strengthening the SMEs through a variety of supporting institutions and programs. Action plans to improve the SME sector environment have been actively pursued and the priority of SME sector and private economy is clearly reflected in the *PRC Small and Medium-size Enterprise Promotion Law*, which was put into force in 2004. The government has introduced measures to promote the growth of SMEs to operate in almost all types of industries and commerce. SME promotion, particularly in rural areas, is also referred to as a priority area of the Chinese government to underpin the economic growth process. Accordingly, the government has established various agencies to support SME development, namely: China Centre for Business Cooperation and Coordination (CCBCC), China International Cooperation Association of Small and Medium Enterprises (CICASME), Department of Township Enterprises under the Ministry of Agriculture, "Spark Plan" Office under the State Commission of Science and Technology responsible for the promotion of the development of township enterprises, and the National Development and Reform Commission, with objective to improve industrial structure, promote various types of ownership, build an integrated SME service system and promote cooperation and coordination between the SMEs and the private economy.

SMEs need these supports to overcome the economic and competitive disadvantages that they face because of their size. It's generally believed that many of these SMEs do not survive their first years in business (Altman, 1983; Persson, 2004), and as such, do not provide their benefits to society. Macroeconomic conditions and firm-level characteristics, such as, size, age, resource-based arguments, management, governance, capacity to obtain

external finance to start and expand, and stability in production and operations, are of fundamental importance in explaining a SME's long-term survival and growth. Among these, financing is often cited as bottleneck restricted the development of SMEs in China (Chow and Fung, 2000). To help ease SME finance, the Shenzhen Stock Exchange officially inaugurated a board for small and medium-sized enterprises in 2004. The SME Board was opened to growing SMEs with outstanding main business or innovative high-tech start-ups. The new board is designed to facilitate financing by the emerging SMEs, which badly need funds but have few fund-raising channels. According to Chen (2000), the average survival rate of SMEs in China is 2.9 years. The listed SMEs will need to show a three-year profit record to acquire market entry. This indicates that the listed firms are the pioneers of the Chinese SMEs. However, the questions arise: Can the listed SMEs sustain their pre-listing growth? Does public listing help the SMEs' survival and growth, and does the current environment facilitate SMEs to survive and grow?

The survival of SMEs is widely examined in developed economies, such as Mata et al. (1995) on Portuguese firms, Harhoff et al. (1998) and Audretsch et al. (1999) on Germany and Italy, Kimura and Fujii (2003) on Japan, Doms, Dunne and Roberts (1995) on America and Tveteras and Eide (2000) on Norway. These studies primarily find that the size of a firm seemed to positively affect its survival. Some researches have been conducted to understand the relationship between firm size and survival in the economies in transition (McPherson, 1995; Tybout, 2000). However, the relationships have not yet fully been confirmed. In addition, none of studies have analyzed the determinants of the survival and growth of SMEs in China. The potential and significance of the SME sector in the national economy stand, therefore, in marked contrast to the lack of detailed understanding of the factors behind firm growth and survival in this fastest growing economy in the world. Moreover, for the Chinese economy, the problems of SMEs are believed to be related to the existence of serious structural problems in the financial sector and macroeconomic management, and hence it's interesting to examine how these constraints influence the existence and growth of SMEs.

This paper makes a contribution to the literature by studying the relationship between firm size and survival and growth of the listed SMEs in China using a firm level of listed firms for the period of 1990–2003. In this paper, we investigate how well the observed firm-characteristics predict the survival and growth of SMEs, and how structural impediments have constrained the development of the SME sector in China. Recently, reforms in state sectors led to massive unemployment in the Chinese economy. Results of this study provide

relevant implications which can be important in solving the problems of SMEs as SMEs have been shown to be a main engine for job creation in China.

The remainder of the paper is organized as follows. Section 2 reviews the existing theoretical and empirical literature on firm survival and growth. Section 3 describes data and methodology and provides various descriptive statistics on firm dynamics in China. Section 4 presents results, and Section 5 provides the conclusion of this study.

2. Empirical evidence on firm dynamics

Economists view a firm as a type of contract, which aims to maximise resource allocation and achieve market efficiency, but firm performance is constrained by various internal and external factors that are critical to its existence and growth. The empirical evidence on firm dynamics is substantial, and majority of studies have identified that size and age are the two of the chief determinants of firm survival and growth. Jovanovic (1982) models firm survival and growth as a function of the efficiency level of a firm. The firm learns about its own efficiency level after its market entry. And it takes time for the firm to learn about its ability to compete. Once the firm learns about themselves, the model predicts that firm survival will increase with its age and size. Supporting evidence to this hypothesis has been found by various researchers. Hall (1987), Evans (1987a, 1987b) and Dunne et al. (1988, 1989) find that larger firms have lower growth, but a larger probability of survival. Doms et al. (1995) show that older and larger firms in the US manufacturing sector have higher survival rates and lower growth rates. Sutton (1997), Caves (1998), and Audretsch and Klepper (2000) find that small firms have a lower likelihood of survival, but firm size is found to be negatively related to growth. Most studies on firm survival find that age matters. Dunne et al. (1988) using census data of manufacturing, find a positive relation between firm age and survival throughout the observed age range. Baldwin and Gorecki (1991) consider entry in Canadian manufacturing industries, and find high infant mortality among entrants as new firms are taken to be unsure about exactly what their competencies are and how appropriate they will be prior to entry, but hazard rates generally decline with age. This result has been confirmed by Phillips and Kirchhoff (1989) and Audretsch (1991), who find small firm survival rates increase with age. The general consensus of these studies is that (i) firm survival tends to increase with firm age and firm size and (ii) firm growth tends to decrease with firm age and firm size.

Apart from the traditional factors, other factors that are considered to affect the likelihood of the firm status are widely examined. Theoretical models were developed to examine the

relation between firm survival and technological activity (Ericson and Pakes, 1995), and the stylized facts identified that firm level innovations and technological activity have been recognized as important determinants of firm survival, growth and exit. Gort and Klepper (1982) show that technological and knowledge conditions determine the relative ease with which new firms are able to innovate and therefore survive. Audretsch and Mahmood (1995) find that in industries where small firms have a relatively higher innovation rate as compared to larger firms, the survival rate of small firms is higher. Agarwal (1998) examine the relation between firm survival and technological activity, showing that technological activity can both help and hinder survival. While entrant survival is higher in a high-tech environment, the hazard rate is also higher, reflecting the adverse effects of technical uncertainty and obsolescence of incumbent knowledge. Klepper (1996) argues that firm size and the ability to appropriate returns from innovations may be related, and highlights the importance of firm size in appropriating returns from innovations and survival and growth. Agarwal and Audretsch (2001) also suggest that the relationship between the likelihood of survival and firm size is dependent on technology and on the stage of the industry life cycle. Furthermore, Hytinen et al. (2005) examine the relationship between external finance and firm growth, and find that excess firm growth is highly dependent on external finance. Many works examining corporate financing under market imperfections have reached the consensus that in the presence of asymmetric information, firm investment are unequally financially-constrained (Hubbard, 1988). Due to the lack of available means of external finance, small firms rely more heavily on bank loans than their larger counterparts. However, as small firms have congenital defects by birth, such as, lower level of collateralizable assets relative to their total assets, lack of track-records for external investors and less diversified activities, they often face higher hurdles in accessing external funds; in the face of severe adverse selection and hazard problems, they may be excluded from bond and share markets (Carpenter et al, 1994), which result in valuable investment opportunities to be missed (Stiglitz and Weiss, 1981). Especially when firms are in financial difficulties, they are experiencing a more difficult time raising external financing for working capital to maintain the ongoing operations (Whited, 1992). Even though these firms are economically viable in the long run, they may not escape going bankrupt in the short run, leading to a higher probability of corporate failures (Hunter and Isachenkova, 2003; Liu, 2004). Baldwin (1995) finds that the length of survival is a function of industry characteristics associated with efficiency, concentration, ownership and asset structure. Since asset risk and asset type specific to the industry and requirements for external funds are important

determinants in firm capacity of raising funds externally (Myers, 1984), firms operating in the industries with fixed assets high in collateral values should confront lower probabilities of exit than their counterparts. Audretsch (1991) identifies the extent to which the survival of new firms varies across sub-sector of manufacturing industries, and shows that the presence of substantial scale economies and a high capital-labour ratio tends to lower the likelihood of survival. Audretsch (1995) further points out that firms that are more capital intensive often grow faster. Additional empirical studies that support the theory of a lower likelihood of survival in industries with a high degree of scale economies are Dunne and Hughes (1994) and Mata and Portugal (1994).

There is clear interest in research of the macroeconomic conditions on the performance and survival of SMEs. The researchers recognise that macroeconomic conditions can affect the health of the corporate sector. Tight monetary policy and an increase in the effective interest rate can sharply alter the cost of borrowing for companies, worsen the corporate sector's financial situation, and hence destabilize the corporate sector (Gordon, 1988). Changes in the level of inflation can affect the volatility of cash flows and reduce the firm's ability to pay interests on its debt in the case of higher inflation, thus increasing the risk of financial distress, and even threatening the viability of many firms (Wadhvani, 1986). The general economic fluctuations can also be directly related to the company's survival. Economic recession creates financial distress by narrowing the margin between cash flow and debt services in general. The onset of recession strains the system by reducing the flow of income available to meet current obligations and by increasing uncertainty about future liquidity needs (Bernanke, 1983). If a firm is highly responsive to the ups and downs in the economy, fund providers may perceive a greater risk of liquidation and/or distress and demand a higher return in compensation for gearing. This increase in the investment costs inevitably reduces net cash flows, which becomes critical to the firm's continuance, particularly for the firms that have to service high levels of debt finance.

The studies on SMEs in developing countries have identified various factors that are related to SME survival and growth. Legal system, institutions and financing are the most claimed factors that have impacts upon the survival and growth of firms. Thorsten et al. (2002) in a survey study of 54 countries, find that firm growth is determined by legal institutions, corruption and financing, and small firms are affected most. Perfect legal system facilitates firm growth, while corruption and lack of finance adversely affects firm survival and growth. Their study suggests that countries, especially the developing countries where these problems are more prevalent, need to improve their financing environment and reform legal system as

well as take proper measures to reduce corruptions to minimum to create an environment suitable for SME growth. Gonzalez (2002) examines the effect of economic control on firm growth, and finds that the economic development and efficient financial system are positively correlated with firm growth. He also looks at the relationship between firm growth and such factors as bank control, corporate law, bankruptcy law, accounting standards and fair market competition, and concludes that a highly effective legal environment not only can protect investors' interests and help growing firms raise equity capital from the market, but also can influence the financial market development, which, in turn, facilitate firm growth. Liedholm and Mead (1998, 1999) examine the data of eight African countries and confirm that firm age and firm size are important variables in analyzing the enterprise life cycle. Their results further show that location, composition of activities, labor force characteristics and gender of the entrepreneur also turn out as important determinants of firm survival and growth. However, Daniels and Mead (1998) show that location and access to credit do not seem to influence the levels of profit significantly in Kenya. Liedholm (2002) investigates the determinants of survival and growth of SMEs in Africa and Latin America, and find that firms located in urban and commercial areas are more likely to survive, while sector, location and gender are central features in describing firm growth prospects. Hansen et al. (2004) examines a survey of Vietnam firms and their study clearly shows that location is of significant importance in determining firm survival. Some country studies on the evolution of SMEs, such as industrial structure changes and government and non-government institutions support for SME development in Korea (Nugent and Yhee, 2002), importance of external financing and economic conditions in firm performance (Fu et al, 2002) and process of market selection in determining SME development (Aw, 2002) in Taiwan, trade liberalization of economy and SME dynamism in China (Wang and Yang, 2002), public policy support for fostering SME cluster formation in Indonesia (Berry and Edgard, 2002), government supports and coordination in SME development in Malaysia (Rasiah, 2002), and economic growth and SME development in Thailand (Paitoon, 2002), suggested that marked differences in political and institutional contexts have played a significant role in the explanation of differential SME performances in these emerging economies. These issues are particular of relevance to the development of SMEs in the current China in transition. In a nutshell, the above review suggests that characteristics regarding the firm (business sector, production, innovation and capital intensity), and external environment (legal system, financing environment and macroeconomic conditions) play important roles in explaining

firm dynamics. In what follows, we rely on the above framework to examine SME dynamics in China and discuss how SMEs in China fits into the general pattern.

3. Methodology

3.1. Model

This section briefly introduces Kaplan-Meier Procedure (Kaplan and Meier, 1958) and Proportional Hazards Cox model of survival analysis (Cox, 1972; Cox, 1975) and dynamic panel analysis of firm growth, which will be used to examine potential factors in relation to survival and growth of Chinese listed SMEs.

Kaplan-Meier Product-Limit Estimation method

The Kaplan-Meier Product-Limit Estimation method provides a descriptive view of the overall survival functions, and allows us to compare survival status of SMEs and large firms in the Chinese stock markets over time. The Kaplan-Meier procedure generates a step-function estimate of survival over listing age of the firm. This estimator, $S(t)$, is expressed as

$$\hat{S}(t) = \prod_{i|t_i < t} \left(1 - \frac{E_i}{R_i} \right) \quad (1)$$

Equation 1 estimates the likelihood of survival at age t_i based on information at t_i and prior periods by calculating the probability of occurrence of an event, i.e., net loss, on a given age based on the number of events occurring, E , and the number of firms at-risk, R , at age, t_i . A firm is removed from the at-risk pool if the observation is censored or removed due to the occurrence of net loss. For all survival analyses, each firm enters the risk on the listing date in the Shanghai Stock Exchange or Shenzhen Stock Exchange and ends on the date when the firm incurs its first loss in net profit, or the end of the sample period was reached (censored). We follow the firm until the first loss in corporate net profit up to December 2003.

The estimation results are displayed as a Kaplan-Meier curve, where the survival rate is plotted against the listing age of the firms. The Breslow test of homogeneity is then applied to test whether the survival pair distributions of the SMEs and large firms are equal.

Proportional Hazards Cox model

The Kaplan-Meier estimation, while informative, does not enable us to examine some of the factors that may account for the differences in hazards between SMEs and large firms.

The Proportional Hazard Cox model analyzes the relationship between the probability of event/failure occurrence and various covariates, based on the concept of hazard function, and

allows us to examine how external business conditions, financing constraints and firm-related factors influence the survival of the Chinese listed SMEs. Thus Cox regression model can be written as

$$h\{(t), (X_t)\} = h_0(t) * \exp(X_t \beta) \quad (2)$$

where $h\{(t), (X_t)\}$ denotes the resultant hazard, given the values of the covariates for the respective case in X , and the respective survival time (t), and X is a matrix, which contains the potential determinants, i.e., growth rate in net profit, operation risk, refinance, type of industry, state ownership and R&D activities in this study. The term, $h_0(t)$, is called the *baseline hazard*; it is the hazard for the respective firm when all independent variable values are equal to zero. All the categorical variables in the regression were recorded as 0/1 dummy variable. Hazard ratio (HR) is estimated as e^β , and β is the regression coefficients. Thus, a negative coefficient means that the explanatory variable is associated with higher survival probability, while a positive coefficient suggests that the explanatory variable accelerates the hazards of firms.

Panel data analysis of firm growth

To investigate the determinants of firm growth, we use a linear regression model below.

$$Growth_t = X_t \beta + \varepsilon_t \quad (3)$$

$Growth_t$ is expressed as growth rate in net profit; X is a vector of potential determinants; and ε_t is a white noise error term. In addition, to examine the dynamic property of this equation, we add the lagged dependent variable to account for dynamic adjustment of the actual net growth rate to the desired growth rate. In the panel estimation, we also control for unobservable firm-specific fixed effects and time effects in estimation (Bond and Meghir, 1994). The general specification for our estimation equation, thus, become,

$$Growth_{i,t} = X_{i,t} \beta + \alpha_i + \alpha_t + \varepsilon_{it} \quad (4)$$

where the parameter α_i represents an unobserved firm-specific effect, and α_t is a time dummy variable. To examine the dynamic impact of seasoned equity offering on firm growth, we include the current SEO and two lagged SEO variables. We also conduct separate analysis by estimating the equation for the different size of firms.

Generalised Method of Moments (GMM) estimation approach suggested by Arellano and Bond (1991) will be used to estimate the model to control heteroskedasticity, serial correlation and survivorship bias. This is to test the null hypothesis of the validity of the “extra” instrumental variables, given that a subset of the instrumental variables is valid and exactly identifies the coefficients in the equation. Sargan tests were used to test the validity of instrumental variables when we have more instruments than parameters to estimate. The use of endogenous variables dated t-2 and back in the first differenced equation ensures exogenous instruments of the equations, tested by m1 for the first order serial correlation in disturbances and m2 for the second order serial correlation in disturbances. All the possibilities of moment conditions for the estimation are considered with the available instruments.

3.2. Data

In examining the survival and growth of SMEs in the Chinese capital markets, this study uses a full history of firm-level financial accounts of the Chinese listed firms since the Shanghai Stock Exchange and Shenzhen Stock Exchange were established. Firms are distributed across 12 types of industry, excluding financial institutions, and difference sizes of both active and inactive. All firms, which traded in A shares only, were included in this study. Our sample ends up with 1247 companies for this analysis. The period from 1990 to 2003 was characterized by a move from a controlled economy towards a market economy focusing on gradually increasing competition. The approval of the amended *Enterprise Law* in 1993 and amended *Company Law* in 1997 provided further impetus to the development of the non-state enterprise sector, and a firmer legal basis for SME operations was created. As we intend to investigate how the external factors and internal factors determine firm survival and growth in this period, the potential explanatory factors are listed below.

- 1) Hazard: hazard is measured as the probability of the first net profit loss that a firm incurs for two consecutive years.
- 2) Firm growth rate: firm growth rate represents a firm’s efficiency in production and the capacity of maintaining growth, and thus a firm with a higher growth rate would have stronger competitiveness to survive and grow. As this study covers 14 years from 1990 to 2003, a firm’s production may have been affected by the ups and downs in the economy. To take into account of the effect of macroeconomic fluctuations on the individual firm performance at the time of entry and at each moment thereafter, the variable, measured as

growth rate in net profit, is derived after adjusting calendar year- and industry-specific GDP growth rate shown in Table 1.

Table 1. GDP growth rate (GDP of the previous year=100)

	Primary industry	Secondary industry	Tertiary industry
1990	107.3	103.2	102.3
1991	102.4	113.9	108.8
1992	104.7	121.2	112.4
1993	104.7	119.9	110.7
1994	104.0	118.4	109.6
1995	105.0	113.9	108.4
1996	105.1	112.1	107.9
1997	103.5	110.5	109.1
1998	103.5	108.9	108.3
1999	102.8	108.1	107.7
2000	102.4	109.4	108.1
2001	102.8	108.4	108.4
2002	102.9	109.8	108.7
2003	102.5	112.7	107.3

Source: National Statistics Bureau of China

- 3) Firm's operation risk: the variable, measured as a ratio of standard deviation to mean of net profit, is intended to capture the degree of business risk. A high level of business risk could largely affect its cash outflow, and then affect firm survival and growth, therefore the variability of the firm's future income is the chief factor in *ex ante* estimates of its ability to meet fixed charges and sustain the stability of growth. We expect that a firm performance is a decreasing function of the volatility of earnings due to uncertainty inherent in projections of future operating income. As firm operations are easily influenced by macroeconomic disturbance, the variable has been adjusted using GDP growth rate shown in Table 1.
- 4) Public equity offering: SEO represents seasoned issues, rights issues and new issues of other types of securities after the firms are listed in the market, and the variable is expressed as ratio of SEO over total assets. Firms in the markets need capital in order to finance their further growth, and a lack of financial resources is a major impediment for SMEs (Davidson and Dutia, 1991). Moreover, in China, SMEs usually are unable to issue securities in financial markets. This constraint on financial capital might have a significant impact on their profitability, and thus, are assumed to be crucial in determining firm survival and growth.
- 5) R&D activities: this determinant represents firms' competitiveness and technological intensity to the extent of the level of technology used in production. The firms operating in the telecommunication industry and high-tech SMEs listed in the SME Board are

classified as high-tech firms. According to the previous studies (Audretsch and Mahmood, 1994; 1995), it's likely that R&D would have a positive effect on firm survival. The inclusion of this variable allows us to test the possible effects of R&D on the survival and growth of Chinese SMEs.

- 6) Ownership: the state ownership ratio indicates whether or not firms are state-owned. The firms were classified based on the percentage of state ownership over total shares within a firm. If state shares account for more than 50 percent of total shares a firm holds, or less than 50 percent, but state shareholder or state legal shareholder is the top 1 shareholder, the firm is classified as state-owned enterprises (SOEs), otherwise non-state-owned enterprises (Non-SOEs). SOEs are generally believed to be favourably treated in terms of resource allocations and maintenance of institutions and can receive protection from the government in the case of bad performance and even when they incur a high level of loss. We, therefore, expect a positive coefficient on the state-ownership variable, depending on how closely the firms are related to the state and government.
- 7) Age: age represents life time of a firm in each calendar year, and is expressed as the attained age

$$\text{attained age}_i = t - \text{incorporation date}_i \quad (4)$$

where t : calendar year
incorporate date: date of birth of firm i

Age is the drivers of the changes in the hazard rates over time, and so the hazard function is estimated with age effects to account for the evolution of the hazard rates that accompany the ageing of firms. Young firms are believed to be lack of operational and managerial experiences, and the ability to attract financial capital, which subsequently determine their probability to survive. However, if a young firm is listed in the stock market, this reflects its ability to attract financial resources, which may signify its capacity to growth. Therefore, we expect that new firms have better growth prospects than older firms.

- 8) Size: firm size is often claimed to be closely correlated with firm performance. It's generally believed that small firms have less resource in terms of finance, technology and personnel and high risk in operations, and hence, are less able to achieve economics of scale making them competitive in market (Aaby and Slater, 1989). At the extreme case, they are forced out of the market. However, once SMEs become stable in the market, they tend to grow faster than their older counterparts (Jovanovic, 1982). We would

expect a positively relationship with firm survival and negative related to firm growth. To test the size effect, we classify firms according to China's National Statistics Bureau size classification (国经贸中小企 [2003]143 号), which is presented in Table 2. The total number of employees was not used because the employee statistics are not comparable as the figure is reported either at the subsidiary level or at the consolidated level.

Table 2. Size classification

Industry	Index (10th yuan)	Large	Medium	Small
Hotel, Restaurant	Sales	≥ 15000	$< 3000-15000$	< 3000
Agriculture, forestry, fishing	Sales	≥ 15000	$< 3000-15000$	< 3000
Industry*	Sales	≥ 30000	$< 3000-30000$	< 3000
	Total assets	≥ 40000	$< 4000-40000$	< 4000
Construction	Sales	≥ 30000	$< 3000-30000$	< 3000
	Total assets	≥ 40000	$< 4000-40000$	< 4000
Wholesale	Sales	≥ 30000	$< 3000-30000$	< 3000
Retailing	Sales	≥ 15000	$< 3000-15000$	< 3000
Transport, communication	Sales	≥ 30000	$< 3000-30000$	< 3000
Posts	Sales	≥ 30000	$< 3000-30000$	< 3000
Hotel, Restaurant	Sales	≥ 15000	$< 3000-15000$	< 3000
Media, conglomerates	Sales	≥ 15000	$< 3000-15000$	< 3000

Source: National Statistics Bureau of China.

*: Industry includes mining, manufacturing, utilities and construction.

- 9) Type of industry: the type of business in which a firm operates is believed to influence firm's performance and growth (Poterba, 1988). A common observation is that the more capital-intensive the industry where the firm operates is, the faster the firm tends to grow (Audretsch, 1995). However, the real sector in China has long been characterised by the government intervention in terms of implicit industry policy targeted at the strategic industry. In recent years, as the Chinese government has aspired to have a multi-tiered industrial structure, the market-oriented policy is more inclined towards the development the tertiary industry aimed at improving the competitiveness of Chinese industry. To test the industry effect associated with industry policies, we classified the firms based on the tiers of industry, i.e., primary, secondary, and tertiary industry. The three industries were generated based on the 1-digit level of China's National Statistics Bureau Industry Classification (GB/T4754-2002), shown in Table 3.

Table 3. Industry classification

Type of industry	
Primary industry	Agriculture, Hunting, Forestry and Fishing
Secondary industry	Mining and Quarrying Manufacturing Utility Construction
Tertiary industry	Transport and Storage Telecommunications Wholesaling and Retailing Real-estate business Public service Media and Education Conglomerates

Source: National Statistics Bureau of China.

10. Location

Location: location is modelled using indicator variables representing openness of each region or city. Since the open policy was pursued in late 1978, the Chinese government has decided to reform the national economic setup. The basic state policy has focused on the formulation and implementation of overall reform and opening to the outside world. During the 1980s, China established special economic zones (Shenzhen, Zhuhai and Shantou in Guangdong Province and Xiamen in Fujian Province, and Hainan Province), opened 14 coastal cities and areas to overseas investment (Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang and Beihai), and extended into an open coastal belt the open economic zones of the Yangtze River Delta, Pearl River Delta, Xiamen-Zhangzhou-Quanzhou Triangle in south Fujian, Shandong Peninsula, Liaodong Peninsula, Hebei and Guangxi, and designating open inland and coastal economic and technology development zones. In June 1990 the government opened the Pudong New Area in Shanghai to overseas investment as its "dragon head." Since 1992, the State Council has opened all the capital cities of the provinces and autonomous regions. In early 1995, the State Council granted Beijing the privilege to enjoy all the preferential policies given to open coastal cities. The establishments of these special cities/regions are characterised of special economic systems and policies. The government gives these cities/regions special policies and flexible measures, allowing them to utilize a special economic management system, which characterised by special tax incentives for foreign

investments, greater independence on international trade activities, and market-driven economic activities.

To test the effect of location on firm performance, we group the firms, based on the openness to the outside world, into coastal regions, which contain the firms situated in open cities and regions as discussed above, inner regions, which contain Heilongjiang, Jilin, Shanxi, Shannxi, Henan, Aihui and Jiangxi, and remote regions, which contain northwest region, i.e., Ningxia, Qinghai, Gansu, Inner Mongolia, Tibet, Xiangjiang, and southwest region, i.e., Guizhou and Yunnai.

Table 4(a) and Table 4(b) present size distributions by industry and ownership, summarizing idiosyncratic characteristics of Chinese listed SMEs for the period of 1990-2003. It's evident that more than half of SMEs operate in the secondary industry, mainly in manufacturing. More SMEs than large firms belong to primary industry and, in particular, tertiary industry. For the detailed size distribution across the unified industry classification, Table 5 in the Appendix provides a clear picture. Taking a look at size distribution by ownership shown in Table 4(b), the majority of SMEs are non-state-owned, while most of large firms are state-owned.

Table 4(a). Number of firms by size and industry

	Primary industry n (%)	Secondary industry n (%)	Tertiary industry n (%)	Total
SMEs	10 (0.03)	186 (0.58)	125 (0.39)	321
Large firms	18 (0.02)	620 (0.67)	288 (0.31)	926

Table 4(b). Number of firms by size and ownership

	Non-SOEs n (%)	SOEs n (%)	Total
SMEs	254 (0.79)	67 (0.21)	321
Large firms	575 (0.36)	351 (0.64)	926

It's interesting to observe the evolution of new listing of the SMEs over the sample period by looking at several important indices. The overall picture in Table 6 indicates that averaged liquid share market capitalisations of SMEs present a similar increasing pattern to those of large firms but at a faster pace, which corresponds well with the economic reform process in China in general and the introduction of the 1998 *Security Law* in particular. The SME sector shows a greater increasing trend in averaged total assets than large firms, indicating SMEs are expanding on a larger scale in terms of their assets. However, the growth rate of the annual averaged turnover of SMEs is no greater than that of large firms, although it is still averaged at 32 percent over fourteen years. It is evident that new SMEs in the market account for half of the newly listed firms each year on average, and the averaged turnover, liquid

Table 6. Status of newly listed firms in capital market: 1990-2003

	Turnover (RMB million)		Total assets (RMB million)		Liquid market capitalisation (RMB million)		New SMEs	New large firms	Total listed SMEs	Total listed large firms
	SME	Large firms	SMEs	Large firms	SMEs	Large firms				
1990	58.2	524.6	43.6	1170	0.0	1.0	7	1	7	1
1991	24.9	438.9	351	636	0.3	0.9	2	2	9	3
1992	128.2	1001	303	1860	1.1	4.9	29	11	36	16
1993	143.7	1035	470	1560	1.6	3.5	71	52	100	75
1994	186.5	944.4	463	1390	0.8	1.6	54	53	142	140
1995	134.1	2738	421	3950	0.6	5.4	16	8	144	162
1996	170.1	1055	370	1320	1.0	3.0	139	64	288	221
1997	179.9	1114	498	1690	1.4	3.5	101	105	349	365
1998	162.7	1225	553	1850	1.8	3.6	37	67	366	452
1999	181	1286	737	2020	2.0	4.0	33	64	371	544
2000	195	1346	924	2060	3.6	5.4	54	82	387	664
2001	182.9	7416	674	10100	2.5	13.4	27	52	370	757
2002	193.8	2026	521	5550	1.5	5.1	26	44	342	847
2003	194.2	1533	487	3490	1.1	4.6	23	41	321	926
average growth ^a	0.32	0.47	0.59	0.46	0.80	0.51				
market shares ^b	0.10		0.19		0.24					

Data source: CSMAR Financial Database, GTA, 2004.

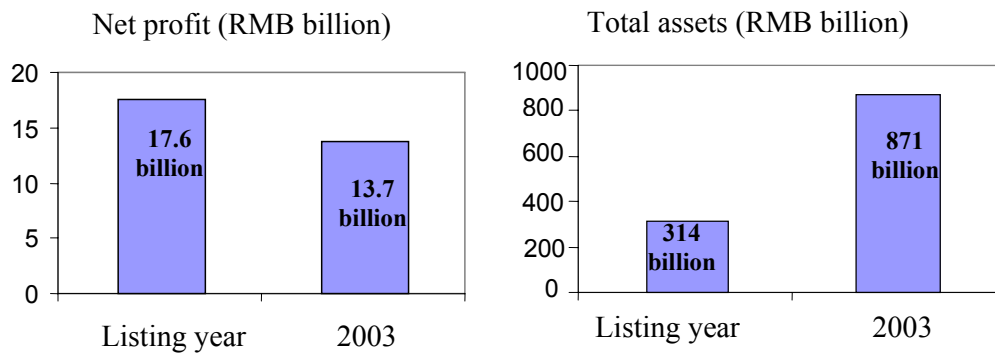
a. Average growth represents annual average growth rate of each variable in the period of 1990-2003.

b. Market shares represents the percentage of turnover, total assets and liquid market capitalisation of the new listed SMEs out of the total of each of these variables in the period of 1990-2003.

market capitalisation and total assets also account for 10 percent, 20 percent and 25 percent of the total market for the new listed firms, respectively. The overall pattern in Table 6 suggests that the newly-listed SMEs play an important role in the Chinese capital markets.

To explore the SME performance, Figure 1 further shows the comparative figures on net profit and total assets in the year of listing and at the end of 2003 for the firms being initially classified as small and medium-size at the time of capital market entry. One striking pattern emerges: total assets of SMEs increased by more than twice, but the net profit decreased by nearly 30 percent. The performance of SMEs has been overshadowed by a general decline in business turnover after their listing. The success rate in NASDAQ is 35 percent, but the unsuccessful rate of SMEs in China is 45 percent (Chen, 2004), which is much higher than the international practice. The question is why SME listing generally fail to deliver better performance, and this will be the focus of the next section.

Figure 1. Change in net profit and total assets between the listing date and the end of 2003.



Data source: CSMAR Financial Database, GTA, 2004.

Table 7 presents medians and standard deviations of the key variables used in the econometric analyses. SMEs tend to be young and present lower growth rate, with median value being -0.11, but higher operation risk (=0.82) than large firms. And the SEO to total assets ratio of SMEs shows a much lower level than large firms, and this may indicate that SMEs have encountered difficulties to resort to more new equity capital after their initial public offering. Thus, it's interesting to examine how these variables influence SME survival and its potential growth in the following econometric analysis.

Table 7. Basic statistics of the key variables in regression

	Firm Growth	Refinance	Stability
SMEs	-0.112 (0.32)	0.008 (0.04)	0.958 (1.89)
Large firms	0.0107 (0.18)	0.015 (0.02)	0.726 (1.59)

Standard deviations are presented in parentheses.

China underwent dramatic transitional changes from 1990 to 2003, which have had an influence on the firm status during this period. Transition matrices are often used as a powerful tool to evaluate the economic mobility of firms, and they provide an indication of the high degree of dynamics in the Chinese SME sector.

Table 8 (a). Transition rate of size classification (%)

	SMEs	Large firms
SMEs	82.93	17.07
Large firms	5.02	94.98

Table 8 (b). Transition rate of ownership classification (%)

	Non-SOEs	SOEs
Non-SOEs	98.09	1.91
SOEs	7.41	92.59

Table 8 (c). Transition rate of industry classification (%)

	Primary industry	Secondary industry	Tertiary industry
Primary industry	100.00	0.00	0.00
Secondary industry	0.00	100.00	0.00
Tertiary industry	0.00	0.00	100.00

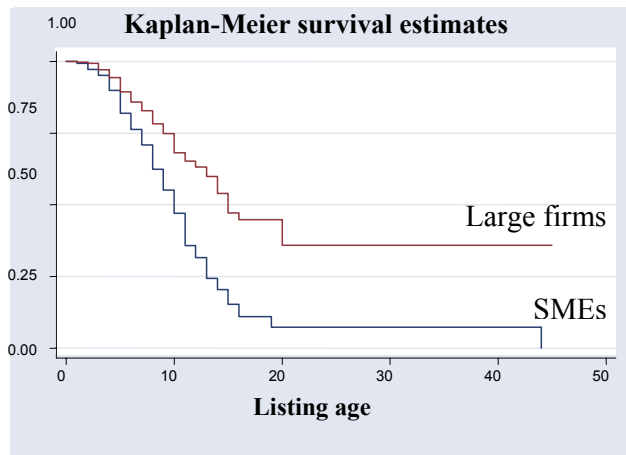
Table 8 (a) – Table 8 (c) illustrate firm dynamics in terms of size, industry and ownership. The percentage in the column reflects the percentage changes in each classification. On average, 17 percent of SMEs turn into large firms, with 83 percent of firms remained at the same level, indicating that SME business environment is in general highly dynamic. But large firms demonstrate a relatively strong tendency to stay among its own category, with only 5 percent of firms becoming SMEs. State-ownership is also changing over time, and it's shown that 1.91 percent of non-SOEs changed into SOE status, while SOEs have a 7.41 percent of chance of becoming non-state-owned, as a result of the state-ownership reform which is currently undergoing in the Chinese stock markets. We have found no evidence that company changes its industry types over the sample period. To investigate the dynamics of SMEs, it's crucial that all variables are time-dependent in the estimations. We, therefore, allow firms to switch between different status over time, to take into account of their changing nature in terms of ownerships and size.

4. Empirical analysis of firm survival and growth

4.1. Firm survival

We begin the analysis by an examination of the hazards of listed SMEs using Kaplan and Meier's estimation. Figure 2 plots the baseline survival curve for SMEs and large firms in the Chinese stock markets.

Figure 2. Firm hazard by size



The survival rates for SMEs are perceived to be well below the corresponding rate for large firms throughout the time series, indicating that SMEs are more likely to incur loss. The cumulative survival rate of SMEs is 80 percent, and that of large firms are 90 percent within the first 5 years, indicating that 20 percent of SMEs incur loss within 5 years of life after being listed, with only 10 percent of large firms having such a problem. Furthermore, it takes 10 years for the hazard rate to accumulate up to 50 percent in the case of SMEs, while it takes 16 years in the case of large firms. The Breslow log-rank test for equality of survivor functions shows that $\chi^2 = 46.35$ ($P < 0.001$). Therefore, we can reject that the survival functions for SMEs and large firms are identical. The overall result from the Kaplan-Meier analysis indicates that the SMEs are more likely to incur loss than large firms and the loss has been accumulated at an accelerating pace in the case of Chinese listed SMEs.

So far, we have not controlled for factors that may influence firm survival, and we'll explore this possibility further by undertaking Cox regression that controls for industry, ownership, financing, risk, location and R&D activities that may underpin the above findings.

Table 9 presents the results of analysing survival-time data by Proportional Hazards Cox regression for the full sample, SME sample and large sample. First of all, for the full sample, the coefficient on size is highly significantly at 5 percent level, indicating that firm size is positively related to firm survival. This corresponds well with the results obtained in most of the theoretical and empirical literature on firm dynamics. We'll further explore the hazards of firms by size in the next section. However, the probability of hazard does not appear to be

positively related to ownership and type of industry. This may suggest that China has its distinct economic system and institutional mechanism that are different from other countries. The study reveals that firms situated in more remote regions tend to survive than those in the coastal areas. There is a statistically significant indication that firm survival is dependent on firm's capability of raising seasoned equity from the market, and that the probability of hazard is negatively related to net profit growth. We also find that R&D is important for firm survival, although its impact on survival is not overwhelming. However, we record the reverse result regarding operation risk as it shows the negative impact upon firm survival, implying that Chinese firms operate in a rapidly evolving and unstable environment.

Turning to the second panel and third panel in Table 9, we can see differential effects of these determinants on hazard probabilities for SMEs and large firms. It appears that state-ownership is an important determinant of hazard for large firms, indicating state-ownership has a protective effect on the survival of large firms that is mainly composed of SOEs, while a similar mechanism of protection does not work for SMEs. But industry type didn't show a statistically significant effect on firm hazard, suggesting that, for firm survival, it matters little in which sector the firms operate. We found that the coefficients on R&D for both SMEs and large firms are statistically significant, with the smaller value on large firms. This indicates that the SMEs that are active in R&D activities are likely to experience higher survival rates than the large firms that are active in R&D activities, implying that the business environment for SMEs is tougher, so that SMEs need to keep up with high-tech innovation and updates to survive in the market. Moreover, it is clearly shown that corporate operation stability is of significant importance in determining firm survival, and the effect is stronger in the case of SMEs, indicating that SMEs' ability to sustain their operations is far more important than that of large firms. The study further reveals the important effect of location on SME survival. The survival probability of the firms in more remote parts of China is higher than that of the firms in the coastal areas, as the hazard rate is decreasing when we move away from the coastal areas to inner regions and then to remote regions. This suggests that competition in coastal areas is far more pronounced. This result may also reflect the fact that there are administrative and structural barriers to entry in inner and remote regions where local governments are distinctly protective of existing firms, and firms in these regions are also more oriented towards serving local markets and therefore tend to escape some of the survival risks inherent in the outward oriented coastal areas. However, we didn't find a statistical significance on the coefficient of location for large firms, and this indicates that location is not a determinant in large firm survival, further providing evidence that size is

important in determining firm survival in China. Finally, the study confirms that SEO is an important determinant of SMEs' success; and it's important to point out that SEO has a larger impact on SME survival than any other variables in the regression, suggesting that listed SMEs in China encounter great difficulty in raising new funds from stock markets, and this has become critical to SMEs' continuance in the market. But we didn't find that SEO is statistically significant for large firms, suggesting that large firms have other external financing channels than stock markets, so that they do not need to rely upon equity capital to survive.

Table 9. Hazard ratios (HR) in relation to the factors by Cox regression

		All firms	SMEs	Large firms
Net profit		0.52*** (0.04)	0.63*** (0.08)	0.53*** (0.07)
Type of industry	Primary industry	1	1	1
	Second industry	0.74 (0.34)	0.75 (0.45)	0.70 (0.51)
	Tertiary industry	0.65 (0.30)	0.72 (0.43)	0.54 (0.40)
Location	Coastal areas	1	1	1
	Inner regions	0.63** (0.06)	0.66** (0.07)	0.60 (0.35)
	Remote regions	0.61** (0.07)	0.54** (0.05)	0.52 (0.31)
R&D activities	Non-R&D	1	1	1
	R&D	0.07** (0.03)	0.13** (0.06)	0.09** (0.04)
Size	SMEs	1	—	—
	Large firms	0.30*** (0.05)	—	—
Ownership	Non-SOEs	1	1	1
	SOEs	0.11 (0.18)	0.13 (0.25)	0.18*** (0.077)
SEO		0.82** (0.09)	0.89** (0.10)	0.76 (0.46)
Operation risk		1.16 *** (0.02)	1.28*** (0.08)	1.15*** (0.024)
χ^2		140.70	41.74	36.25
P		< 0.0001	< 0.0001	< 0.0001

Note. Standard errors are presented in parentheses.

(*, *) denotes rejection of the hypothesis at 10% (5%, 1%) significance level.

Size: size is coded to be 1 if a firm is large, otherwise 0. Industry: secondary industry and tertiary industry 0/1 dummy variables were generated. Ownership: ownership is coded to be 1 if a firm is a SOE, otherwise 0. R&D: R&D is coded as 1 if a firm belongs to a high-tech company, otherwise 0. Location dummy variable: location=1 if it is either in inner regions or in remote regions, otherwise 0 if a firm is in the coastal areas.

We'll conduct a GMM analysis to explore these identified factors further to see how they influence the growth of Chinese listed firms in the next section.

4.2. Firm growth

The results of our growth analysis are presented in Table 10. The regression for the full sample shows a significantly positive size impact on firm growth, which, different from majority of previous studies, reflects the current status of the listed SMEs in the capital market. But consistent with other studies, the older the firm is the less likely it is to grow. We find evidence that firms located in coastal areas grow more rapidly than their remote counterparts. The operation risk shows its negative impact on firm growth, which confirms that stable corporate operations are crucial for sustaining firm growth. In line with our prior expectations, seasoned equity offering is proved to be an important determinant for the growth of Chinese listed firms. The result also shows that the firms operating in secondary industry tend to grow faster. In addition, the sign of the coefficient for the state-ownership is not significantly different from zero, suggesting that the prior belief that state-ownership also promotes firm growth is not supported statistically. Most notably, R&D is not statistically significant in the regression, although its sign is positive. This means that firm-level innovations cannot be regarded as a driving force behind firm dynamics. This result is contradictory to most of previous literature (Gort and Klepper, 1982).

We further divided the sample into two groups, SMEs and large firms, to observe how these factors influence the growth of firms by size. The regression results are presented in the second and third panel in Table 10 respectively. First of all, we find that the younger firms are more likely to grow than the older ones, and this applies to both SMEs and large firms, with the effect more evident in large firms. The evidence further shows that there is a differential effect on SMEs and large firms when it comes to operation risk. This is in all likelihood explained by the fact that there tends to have more competition and higher fluctuations in operations faced by SMEs, which is critical to their growth.

There is no evidence to show that state-ownership structure of the firm can be an important determinant for firm growth in China. This is not altogether surprising. State-ownership may provide protection for firm survival as shown in the survival analysis, but cannot substantiate firm growth. Firms that seek for long-term growth need genuinely to improve their competitiveness in the markets, instead of relying on the external, short-term government supports such as, fiscal subsidies, soft lending from state-owned banks and favoured tax treatment. In addition, the majority of listed SOEs, operating with a longer history, have already entered the mature period, and hence show a lower level of growth rate.

As regards the effect of industry, it appears that firms in secondary industry, operating in mining, manufacturing, utility and construction, have a higher growth rate compared to the

firms engaging in primary industry and tertiary industry, and large firms in secondary industry tend to grow more than those in tertiary industry, but this is not the case of SMEs. The firms operating in the secondary industry are capital intensive, and involve in high level of production. This result lends support to the Audretsch's argument that firms, which are more capital intensive, often grow faster. None the less, for China, large firms in these industries turn to hold a monopoly position, especially in utility and construction and mining. This is because the government tends to be relatively more protective, the higher the degree of capital intensity. Tertiary industry also stands out, which is of no surprise. This sector produces the mostly-needed daily goods and provides much-demanded service for the customers, which is crucial for economic development. We found that SMEs in tertiary industry experience significantly higher profit growth rates than themselves in secondary industry. One explanation is that SMEs in tertiary industry have more flexibility in operations, more easily adapt to changing markets and execute attack quickly in face of competitive attack (Chen and Hambrick, 1995) than those operating in other industries.

Turning to R&D activities, little of significance emerges. This is surprising in relation to other studies, but appears to reflect the dilemma of copyright protections which the Chinese corporate sector faces in China. The innovation SMEs often find their new products very quickly to be copied by domestic followers, such that the premium on innovating is limited, and the same goes for large firms. Under the circumstances that the patent and copyright laws, although in place, has not been strictly enforced, the firms active in R&D will either lose potential sales to piracy or are unable to sell enough new products to prosper. This inability has decreased the incentive of these firms to keep themselves on high-tech tide and hence hobbled their development. Hence, R&D activities in China have not yet, as expected, developed into a driving force in enhancing firm growth.

In terms of effects of location, there is an indication that the firms in coastal regions experience higher growth rates as compared to inner and remote regions. As the coastal cities are accredited with preferential policies and benefit from special managerial systems, they have been developed into market-oriented areas, which integrate science and industry with trade, and assumed to play the dual roles of "windows" in developing the foreign-oriented economy, and of "radiators" in accelerating inland economic development. The evidence that there are no significant differences among the three regions in this study indicates that China has experienced broad-based growth in the last 15 years, which provide firms of different size with markets and opportunities to expand across various regions, although there tends to be more competition in coastal cities as discussed above.

Finally the determinant describing raising new funds from capital markets produce some interesting results. SEO has been identified to play a positive role in promoting SME growth, and the magnitude of the coefficients increases as firm size decreases. In contrast, SEO appears to have only a marginal impact on the growth of large firms. The result confirms the widely shared perception that new capital raised from capital markets plays a crucial role in sustaining SME growth, and a lack of seasoned equity capital raised from the markets has proved to be a major constraint on the growth of the Chinese listed SMEs. This calls for the capital market development to keep pace with SME growth.

Table 10. GMM regression on firm growth

	All firms	SMEs	Large firms
Lagged net profit growth	-0.012 *** (0.005)	-0.07*** (0.02)	-0.03*** (0.01)
SEO	0.296** (0.150)	0.351*** (0.132)	0.160* (0.091)
SEO-lag1	0.246** (0.124)	0.276*** (0.103)	0.107* (0.061)
SEO-lag2	0.106* (0.061)	0.219** (0.109)	0.109* (0.063)
Age	-0.212** (0.109)	-0.207** (0.106)	-0.235** (0.121)
Operation risk	-0.16** (0.079)	-0.27** (0.129)	-0.13** (0.058)
Second industry	0.020** (0.01)	0.022** (0.011)	0.028** (0.013)
Tertiary industry	0.03** (0.012)	0.036** (0.016)	0.016** (0.007)
R&D	0.027 (0.023)	0.012 (0.050)	0.011 (0.013)
Size	0.04*** (0.01)	—	—
State ownership	0.036* (0.024)	0.031 (0.08)	0.050 (0.07)
Inner regions	0.16 (0.13)	0.29 (0.24)	0.19 (0.16)
Remote regions	0.13 (0.12)	0.24 (0.19)	0.15 (0.12)
Wald test	17766.79	2197.58	53236.83
Sagan test	$\chi^2(409)=434.97$ P=0.1807	$\chi^2(316)=229.74$ P=0.9999	$\chi^2(335)=242.65$ P=1.0000
m1	-3.24 (P = 0.0012)	-2.74 (P = 0.0062)	-2.12 (P = 0.042)
m2	-0.42 (P = 0.6760)	-1.22 (P = 0.266)	-1.46 (P = 0.1429)

Note. Standard errors are presented in parentheses.

*(**, ***) denotes rejection of the hypothesis at 10% (5%, 1%) significance level.

Size dummy variable: size=1 if a firm is large, otherwise 0. Industry dummy variable: industry=1 if it is either in secondary industry or tertiary industry, otherwise 0 if a firm is in primary industry. Ownership dummy variable: ownership=1 if a firm is a SOE, otherwise 0. R&D dummy variable: R&D=1 if a firm belongs to high-tech company, otherwise 0. Location dummy variable: location=1 if it is either in inner regions or in remote regions, otherwise 0 if a firm is in the coastal areas.

5. Conclusion

We have studied the association between determinants in relation to the characteristics of Chinese listed SMEs and their probability of survival and growth potential. Using company accounts data for the period of 1990-2003, we've confirmed the findings of previous empirical studies on size and age effects on firm survival and potential growth, except that firm growth tends to increase with size, indicating that public listing does not help the SMEs to survive and grow. Firm performance, measured as growth rate in net profit, is an important factor to increase the likelihood of SME survival. The type of activity in which the firm engages is a significant determinant of firm growth. Lower level of business risk is found to help Chinese firms to be more likely to survive and grow in the market. SMEs in inner and remote areas are more likely to survive, while the firms in coastal areas are more likely to grow. In addition to the traditional indicators explaining firm dynamics, we analyzed the effect of state-ownership on the survival and growth of the SMEs. Our results, which are specific to China, indicate that state-ownership of the firms has substantiated the survival of large firms, but not their growth. The real problem with the current Chinese state-ownership is that an SOE has no real owner in terms of property rights, and management lacks strong incentives to be efficient in using capital, supervise the quality of undergoing projects and monitor firm performance to maximise shareholder's wealth. To correct this situation, state-ownership needs to be reformed gradually to introduce a more diversified ownership structure so that economic activities are undertaken subject to market scrutiny, and the efficiency of corporate governance can be enhanced to create value for firms and the society. Hence, the impact of strategic state-ownership reform, which is currently undergoing, appears to have important implications for the Chinese firms in terms of the efficient allocation of resources and improvement of firm competitiveness. One interesting result obtained from this study is that R&D is a determinant of SME survival, but not of SME growth, and this is also the case of large firms. We'd argue that this is partly due to the deficient intellectual property protection in China. For example, trademark counterfeiting, which involves creating products that are meant to duplicate brand-name products as closely as possible, is arguably the most common intellectual property violation in China. It is estimated that 15-20 percent of brand goods in China are counterfeit. The influx of cheap, low quality counterfeits hurts innovation companies both by limiting the market demand for legitimate products and by destroying the goodwill for products that depend on reputations for good quality. Although, in China, the Trademark Law of 1982 confers ownership rights to trademark owners, it does limit protection of "famous marks" to those that are already

"famous" in China. In addition, the Patent Law of 1983 granted new rights to owners of patents, although until the law was amended in 2000, computer programs were not included in it. The Copyright Law of 1990 also sought to bring China in accordance with international standards, although it included a broad "fair use" exemption to copyright protection. While China has many laws to protect intellectual property, the enforcement of such laws has been problematic as the court system is still in the process of reform, and relevant administrative bureaus have problems delegating authority. While purposely not offering a definite resolution to the problem of intellectual property protection in China, we propose that Chinese government must take the enforcement of its intellectual property laws seriously, and a combination of stronger government enforcement of current laws and a focus on educating people about the need to respect intellectual property rights will help improve the situation in future.

Finally, our study shows the importance of SEO for SME survival and growth. This issue is more of relevance to the current situation in the Chinese capital market. The difficulty in raising funds is a long-term bottleneck that hampers the development of SMEs. The SME Board in Shenzhen Stock Exchange made its debut as an experimental reform on equity finance targeting high-tech SMEs. Although it enjoys high growth, which is one of the highlights of the market economy, the new Board cannot accommodate the needs of SMEs in their financing and SEO activities. Statistics from the Shenzhen Stock Exchange show that the approximate number of enterprises that are close to the standard is 3000. However, there are only 50 firms on the Board so far, indicating that the scale of the Shenzhen SME Board cannot yet adapt to the tremendous financing demand of fast-growing SMEs. And the majority of SMEs find it too difficult to get onto the stock markets, due to strict criteria for market entry¹. For listed SMEs, the SEO requirements appears to be even more stringent, as they are required to show net return on assets meeting a certain level for three consecutive years, the same requirements for large firms on the Main Board. In addition, the SEO procedures are lengthy and costly. These restrictions have inevitably caused many listed SMEs find difficult to raise new funds from the market. This study indicates that more

¹ Companies seeking listings on main board and SME Board are subject to the following qualitative and quantitative requirements:

- 1) IPO granted by the China Securities Regulatory Commission;
- 2) a minimum three-year operating history;
- 3) positive earnings in each of the past three years;
- 4) public holding of no less than 25%;
- 5) gross capital stock of 50 million shares; and
- 6) good credit records in the past 3 years.

reforms in the financial sector may have further limited the supply of external finance to SMEs. To correct this situation, first is to adopt measures to gradually expand the scale of the SME Board. Second is to press forward with innovation. The “express way” and more flexible criteria need to be designed to enable the listed firms on the SME Board to raise new funds, in view that many SMEs often need quick capital to finance their immediate projects. Third is to continue to implement stringent supervision. Supervision serves as the lifeline for the Chinese capital markets, especially when the vast majority of firms in the stock exchanges are private firms. Hence, these active policies, which are considered to be conducive to SME development, are a necessary complement to the overall reform in the economy in order to maintain social stability and economic growth.

The analysis conducted in this paper utilizes firm-level data and effectively investigates, at the micro level, the determinants of the survival and growth of small and medium-sized listed firms in the Chinese stock markets, as little research has been done in this aspect for the Chinese economy. This paper adds value to the researches on firm dynamics, by identifying the roles of various determinants in the survival and growth of the Chinese listed SMEs. Additional research is clearly needed on the behavioural aspects of the decision-making processes within Chinese SMEs’ management in terms of listing, financing, R&D undertaking and risk management, and its potential role in determining the development of SMEs in the context of idiosyncratic Chinese economic system, market microstructure and corporate governance.

Appendix

Table 5: Size distribution of firms across 2-digit industry classification

	A	B	C	D	E	F	G	H	J	K	L	M	Total
SMEs	10	2	168	14	2	14	19	11	18	18	4	41	321
Large	18	18	544	38	20	39	60	67	33	19	5	65	926
Total	28	20	712	52	22	53	79	78	51	37	9	106	1,247
Percentage of firms out of its own type													
SMEs	0.03	0.01	0.52	0.04	0.01	0.04	0.06	0.03	0.06	0.06	0.01	0.13	1.00
Large	0.02	0.02	0.59	0.04	0.02	0.04	0.06	0.07	0.04	0.02	0.01	0.07	1.00
Total	0.02	0.02	0.57	0.04	0.02	0.04	0.06	0.06	0.04	0.03	0.01	0.09	1.00

Note: A: Agriculture, Hunting, Forestry and Fishing; B: Mining and Quarrying; C: Manufacturing; D: Utility; E: Construction; F: Transport and Storage; G: Telecommunications; H: Wholesale and Retail; J: Real-estate business; K: Public service; L: Media and Education; M: Conglomerates.

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