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Growth of private and state-owned listed businesses in China: the effects of finance and ownership structure on performance and potential

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Abstract

Purpose. This study analyses the growth patterns of listed Chinese companies in China during the 2000s and 2010s. Two key questions are considered: firstly, does finance affect firm growth in China? And, secondly, do private enterprise grow more quickly than state-owned enterprises.

Design/Methodology/Approach. A multi-year longitudinal approach is taken in order to provide a time-sensitive analysis of growth. Financial data were obtained from Compustat Global. The sample includes publicly listed non-financial companies in China's two domestic stock exchanges - Shenzhen and Shanghai - between 1999 and 2022. Hypotheses were developed in order to test whether finance affects growth and also to determine whether private enterprises, which tend to be smaller and younger, grew faster than state-owned enterprises, which tend to be larger and older.

Findings. Growth was positively affected by investment opportunities, and constrained by debt, supporting the view that financing continues to be a critical factor in China. In the 2000s, companies at both ends of the size spectrum, namely the smallest and largest, outgrew companies in the middle. In the 2010s, smaller, younger companies continued to grow rapidly, while larger, mature companies significantly slowed down in terms of growth. Given the former are more likely to be private than state-owned enterprises (SOEs), this

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indicates that Chinese private enterprises have retained their vitality, despite ongoing constraints to their finance. SOEs continued to grow, but at a slower rate, indicating China's economy is shifting to a more dynamic and entrepreneurial private sector alongside an established, but slower-growing, state sector. Claims that the state sector is pushing out private enterprises are not supported.

Originality. The longitudinal use of financial and firm data over more than two decades provides a long-term perspective on firm growth in China. Studies taking a longer-term time-based consideration of firm growth and changing patterns are rare in the literature, but important for China due to continued economic growth and restructuring. The paper confirms ongoing issues around financing of growth firms and evidence that an entrepreneurial private sector has outgrown the state sector especially since 2011.

Practical Implications. China is becoming more of a private economy, and the mixed models proposed by the Chinese government are becoming less representative of the country's economic structure. As a consequence, future growth in China will increasingly be driven by private enterprises. State-owned, even where they dominate certain sectors, will contribute less to economic growth and activity.

Keywords: Growth, China, publicly listed companies, private enterprises, state-owned enterprises.

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I. INTRODUCTION AND RATIONALE

Since the early 1990s, the private sector has become increasingly dominant in China, accounting for much of the economy and most of the economic growth and export values in recent years (Atherton and Newman, 2018; Atherton et al., 2021). From this perspective, China has shifted from being a state-controlled economy to a mixed but largely marketised economy, mainly because of emergence from the 'bottom up' of private enterprises (Naughton, 2018; Nee and Opper, 2012). As a consequence, private businesses have come to dominate the domestic economy, and increasingly have developed as global businesses (Buckley et al., 2018; Gabriele, 2010; Kung and Ma, 2018).

At the same time, a government policy of supporting state-owned enterprises (SOEs) has led to concerns that private enterprises are being squeezed out by SOEs (Johansson and Feng, 2016). Preferential policies towards SOEs have led some to propose that "the state sector advances and the private sector retreats" (Du et al., 2014, p. 459).

This is despite statistical data indicating that the private sector accounts for a larger, and increasing, share of economic activity than the state-owned sector. These two observations raise a question as to whether the continued emergence of the private sector is being hampered by preferential treatment of the state sector (Lardy, 2019).

The literature broadly indicates ongoing issues of inefficiency and under-performance in the state sector through the period of this study (e.g. REF). Most notably, SOEs have continued to have efficiency problems and poor returns on capital investment after 2008 and during the 2010s (Lardy, 2014; Liu et al., 2023; Sun and Li, 2016; Zhang and Zhang, 2016). Over the period, debt levels

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became increasingly concentrated in state-owned enterprises, despite their lower efficiency and tendency to hold higher levels of liabilities, than in private enterprises (Huang and Jing, 2019). SOEs also under-perform in innovation compared to private enterprises (Zhan and Zhu, 2020).

Following the literature (e.g., Wang et al. 2008; Wei 2021), SOEs are defined as firms whose ultimate controlling shareholder is either the central government (legally, the Ministry of Finance or the State Assets Supervision and Administration Commission (SASAC)), or a local government (legally, a local bureau of SASAC or a local finance bureau). Private enterprises are businesses that are majority owned by non-state investors and that have a leadership team that is not appointed by government entities. Although there are examples of mixed ownership enterprises, and patterns of state minority investment in enterprises with overall private ownership, the key trend in China has been the shift of economic dominance from the state sector to private enterprises (Atherton and Newman, 2018).

This study analyses the growth of private and public companies listed on China's two domestic stock exchanges in Shanghai and Shenzhen, covering the period between 1999 and 2022. These listed firms include both state-owned and private enterprises, offering a useful data set to compare these two forms of ownership. The focus on publicly listed companies as financial information is accessible, and generally more reliable than other forms of corporate data in China (Jiang et al., 2015). This is especially significant in China, where non-listed private enterprises are either reluctant or not willing to disclose their financial information. Listed firms file financial data for sustained periods, allowing for longitudinal analysis of growth, which is relevant to our analysis of

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growth over time. Possible relationships between finance and growth can only be tested when sufficient financial data at firm level are available.

Our theoretical starting point is to apply two strands of literature on firm growth. The first is the literature on dynamics and patterns of business growth, which has tended to consider the emergence of young firms (e.g., Acs, 1996). In general, this literature has found that smaller, newer firms are more likely to grow faster than larger, older firms (e.g. Jovanovic, 1982; Stam, 2010). Many of China's emerging companies are recently established, especially those that are privately-owned (Atherton and Newman, 2018). The period of analysis was selected to coincide with the rapid expansion of the private sector, which happened after wholesale privatisation in the 1990s and the introduction of a regulatory and legal environment that recognised private enterprise and ownership (*ibid*.; Atherton, 2008).

The second strand is the literature on finance and firm growth. Businesses that generate surpluses and are able to raise external finance are more likely to grow than companies that can do neither (Myers, 1984). This is an especially important consideration in China, where finance has been difficult to acquire due to the lack of a fully developed finance sector during the early period of reform and variable performance of this sector over the period (Bai et al., 2021). Typically, private enterprises have been excluded from state bank finance in favour of SOEs (Tsai, 2002). In recent years, there has been some tightening of credit constraints for under-performing State-Owned Enterprises, but larger SOEs in strategic industries continue to receive preferential funding (Chan et al., 2012).

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The paper seeks to apply these two theoretical frameworks in China, because a private sector of new firms has emerged without full access to funding and over a period when state policy has favoured SOEs over private enterprises. This is a conundrum and pertinent research question, because private sector expansion should have been constrained by a general lack of funding.

The contribution of the paper is two-fold. Firstly, the findings demonstrate that finance affects business performance, with investment enabling growth, and debt constraining expansion. The latter result is important in the Chinese context, where lack of access to finance has been considered a constraint on growth (Tsang, 1996; Tsai, 2002; Huang, 2003; Guariglia and Poncet, 2008). This result supports these previous studies and confirms availability of finance affects growth for listed businesses, regardless of ownership, size and age.

Secondly, the relationship between age and size changes over time. Before the financial crisis in 2008, both the smallest and largest firms grew rapidly and at greater paces than mid-sized firms, with the smallest and newest firms growing most rapidly. After 2008, the newest and smallest firms considerably outgrew other firms, and the growth trajectories of the largest and oldest firms fell. Previous studies have tended to find private enterprises to be more productive than state-owned enterprises, and hence more likely to perform well financially. This conclusion is supported in this analysis, but with a recognition that larger firms, which as we note are much more likely to be SOEs, grew rapidly in the first period of consideration, and continued to growth over the whole period. This explains the apparent contradiction between the two groups

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of firms: larger firms continued to grow after 2008, but not at the pace of smaller firms.

The structure of the paper is as follows. In the next section, a series of hypotheses are developed, which are summarised in the paper's theoretical framework. Following on from development of the hypotheses and framework, the research design is presented, and results analysed and discussions. Finally, implications are highlighted and their significance is explored.

II. LITERATURE REVIEW

Research on business growth in China has tended to focus on that country's particular development context, and in particular relationships between the entrepreneur and the state, party. Previous relevant studies have highlighted the following aspects of these dynamics: whether government relations improve resource acquisition and access to growth opportunities (Wank, 1996; Zhou, 2013; Chen et al., 2015; Filatotchev et al., 2016; Zhao and Lu, 2016); how local government acts as an institutional entrepreneur to foster regional entrepreneurship (Xing et al., 2018); whether state corruption constrains growth (Sun, 2004); whether guanxi, i.e. social relations, helps or constrains growth (Park and Luo, 2001; Kung and Ma, 2018); whether a lack of finance prevents private businesses from growing (Guariglia et al., 2011).

Although interactions between state and entrepreneur can be considered an important aspect of entrepreneurial activity in China, growth of the private sector has been due to multiple variables and not just interactions with the state in China (Atherton and Newman, 2018). Multiple studies have shown that a re-positioning of the state away from direct intervention in enterprise management

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to overall macroeconomic policy development and promotion of industries and sectors has enabled the growth of non-state owned enterprises, even where the state continues to be preoccupied with the performance of SOEs (e.g. Lardy, 2014; Lardy, 2019). In recent years, the financial performance, and in particular productivity of SOEs, has continued to fall, as the importance to the economy of the private sector has grown considerably (Lin et al., 2020; Song et al., 2011).

Wider studies of firm growth identify a large range of factors that affect firm growth, many of which are explained by the motivations, psychologies and characteristics of entrepreneurs, and the availability of key inputs, including knowledge, skills, finance and technology (see Davidsson and Wiklund, 2017, and Davidsson, 2006, for reviews of the firm growth literature that indicate multiple factors affecting the growth of private firms). From these perspectives, considerations of both relations between entrepreneurs and the state, and government support for SOEs, are not major or fundamental determinants of the entrepreneurial growth of private enterprises.

Having noted these wider considerations, the context within which private enterprises have developed is particular to China. In line with previous studies, this paper considers China a distinctive development context in its own right and therefore one that requires theory development to be driven by its particular conditions (Whetten, 2009). There is a growing interest in theory-building and analysis that considers context not only as a way of considering research result implications, but also as a means of motivating research questions and operationalizing research methodologies (Bamberger, 2008).

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This study extends previous studies by considering two key questions relating to China's particular context. The first is whether China's fast growth firms are newer and smaller. The emergence of the private sector is a relatively recent phenomenon in China, suggesting many businesses are likely to be young (Atherton and Newman, 2018). The second is whether finance constrains growth, especially for private businesses.

Age and size

Successive studies have found that growth is more likely to occur in younger, smaller ventures (Jovanovic, 1982; Evans, 1987a; Sutton, 1997; Almus, 2000; Calvo, 2006; Stam, 2010). Much of this literature rejects Gibrat's Law, which proposes that growth is randomly distributed across a business population (Audretsch et al., 2004; Stam, 2010). In a developed economy context new and young firms tend to be small. In China, where growth has been rapid, many young firms have scaled up rapidly to become large within a short period after start-up (Nahm and Steinfeld, 2014; Jules et al., 2022). Some new enterprises have sustained hyper-growth over an extended period, indicating an ability to scale in China that is less evident in more mature economies and emerging nations where the institutional framework is under-developed (Atherton, 2021). Rapid scale-up in turn allows access to China's stock markets, which offer a source of funding in a country where other forms of finance are less available (Kai et al., 2023). These wider observations suggest that newer firms, which are well represented in China's stock exchanges, are likely to be faster-growing:

Hypothesis 1: Smaller, younger firms are likely to grow faster than larger, older firms in China.

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Investment

Investment opportunities are projects that a firm has the discretion, when circumstances are right, to undertake in the future, in order to generate business growth and financial return (Myers, 1984). Firms with good investment opportunity sets will thus grow strongly, while those without these sets have weak growth prospects. To the extent that stock markets anticipate firms' growth prospects reasonably well, Tobin's Q has been widely used to measure investment opportunities as perceived by investors (Blose, L. and Shieh, J. (2005); Gugler et al., 2004; Scewczyk et al., 1996; Wernerfelt, B., and Montgomery, C., 1988):

Hypothesis 2a: Future firm growth is positively associated with perceived investment opportunities.

An important caveat to measuring Chinese firms' investment opportunities, however, is that China's stock markets are not as mature as their western counterparts (Carpenter and Whitelaw, 2017). As a result, share prices and, by extension, Tobin's Q may not give a full account of future growth prospects. To complement price-based measures, the literature has measured investment opportunities by actual investments. Analysis of investments made rather than announced but not made is a recurring consideration in the finance literature, because of the distinction between perceptions of investing by observers and impacts of investment on performance and financial return (Luehrman, 1998). Firms making capital investments are likely to grow faster (Kallapur and Trombley, 1996; Anderson and Garcia-Feijoo, 2006). Besides tangible assets, investments in intangible assets, such as research and development (R&D), brand building, human resource development, have become increasingly

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important in China as firms move up the value chain. This indicates the following hypothesis:

Hypothesis 2b: Future firm growth is positively associated with actual investments.

Access to finance

In China, many firms have taken on significant levels of debt, even though the costs of servicing are high (Li et al., 2008). This appears to be due to a lack of alternate formal financing options for private enterprises, and low expectations that loans will be fully repaid by SOEs (Chan et al., 2012; Tsang, 1996; Huang, 2003).

Successive studies have found that many private enterprises cannot access funding from banks and so seek out informal and alternative financing to fund business growth (Elston et al., 2016). However, informal financing has experienced ongoing and repeated clampdowns by government, and has limitations in terms of the amount of available funding (Lardy, 2014; Tsai, 2002). Even studies that find some positive relationship between formal finance and informal finance highlight ongoing challenges to accessing finance by private enterprises (Hou et el., 2020). Moreover, some key studies do not sufficiently differentiate between alternate funding, which is often formal but from other sources than bank loans and credit, and informal finance, which is derived from unrecognised institutions and governed through relational and non-legal governance (Tang, 2019).

As well as an ongoing challenge in accessing finance debt has become an increasing constraint on firm performance. High levels of debt have created greater financial stress, pushing a growing number of businesses into

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bankruptcy or liquidation. High levels of debt constrain investment by Chinese companies, due to financial stress, limiting opportunities for growth even when decisions to invest become more efficient (Ding et al., 2020):

Hypothesis 3a: Future firm growth is negatively associated with levels of debt.

According to pecking order considerations of financing, a firm would prefer to fund growth from its own surpluses before pursuing more costly external debt or equity (Jensen and Meckling, 1976). Without an ability to generate sufficient surpluses from its own operations, a firm's growth prospects are reduced (Carpenter and Peterson, 2006). In China, where external funding is scarce or expensive for private enterprises, internal funds are likely to be even more important to fund growth. SOEs tend to generate lower levels of profit than private firms, constraining their growth potential (Harrison et al., 2019). This leads to the following hypothesis:

Hypothesis 3b: Future growth is positively correlated with the availability of internal funds.

Efficiency

Chinese firms generally operate in highly competitive sectors with high price discounting due to high levels of both business competition, subsidised pricing and new entrants (Bu et al., 2019; Chen et al., 2020; Li et al., 2000). In China, increased price competition generally reduces profitability, so placing greater emphasis on cost control (Tan, 2019). Moreover, highly competitive domestic markets push incumbent companies to compete through price reductions, pushing firms to seek to control costs tightly (Porter, 1980). As a result, utilisation of assets becomes an important means of managing costs. However, high levels of competition increase the likelihood of price discounting, leading

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to a negative association between asset utilization and future growth in highly competitive

As such, the following hypothesis is proposed:

Hypothesis 4: Asset utilization is negatively correlated with future growth.

Past growth trajectory

In most studies, prior growth does not have a significant relationship with future growth (Almus and Nerlinger, 1999; Daunfeldt and Halvarsson, 2014; Demir et al., 2017; Geroski and Mazzucato, 2002; Garnsey and Heffernan, 2005). Two contextual considerations suggest that this general finding should hold in China.

Firstly, external shocks can be sufficient to halt growth even in businesses with the capability and resources to grow in more benign conditions. Shocks are relatively common in China, with major economic downturns leading to widespread business closures, especially of smaller, private enterprises; for example, in 2008 and 2012 (Atherton and Newman, 2018).

Secondly, high levels of domestic competition increase volatility for businesses. As noted, aggressive price-cutting has been a common feature in China over recent decades, reducing profitability (Li et al., 2000). High numbers of new entrants coming into many sectors have led to hyper-competition and then widespread retrenchment, creating boom and bust conditions (Ma, 2014).

These two factors indicate the China has a volatile and turbulent business environment, and as such prior growth is unlikely to be a reliable indicator of future growth:

Hypothesis 5 (the null form)*: Prior growth is not correlated with future growth.*

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Theoretical framework

The theoretical framework developed in this paper, based on the review of the literature above, is presented in Figure 1. In summary, the framework proposes a multi-faceted explanation of growth in listed companies, reflecting the lack of a single, unified model of firm growth in the wider literature O'Farrell and Hitchins, 1998; Davidsson and Wiklund, 2006; Coad, 2009).

The framework identifies variables that are proposed to have positive effects on growth, and indicators that are negatively related. Age (younger), size (smaller), investment opportunities, capital investment and internal funds are all positively correlated with growth. External debts and high asset utilization are negatively correlated, and prior growth is unlikely to have any correlation with future growth.

[Insert Figure 1 here.]

III. RESEARCH DESIGN AND KEY VARIABLES

To test these hypotheses, the following formula is developed as the basis for the *predictive* regression analysis[1]:

$$\begin{aligned} \textit{Future growth} = {} & \textit{Size} + \textit{Size}^2 + \textit{Age} + \textit{Age}^2 + \textit{Tobin's Q} \\ & + \textit{Capex} + \textit{RnD} + \textit{Leverage} + \textit{Cash margin} \\ & + \textit{Asset utilization} + \textit{Shareholder return} + \textit{Past growth}. \end{aligned} \qquad [1]$$

The dependent variable *Future growth* is measured in terms of sales revenue and employee number. Both measures are commonly used in the literature

[1] For presentational clarity, nonessential notations, such as firm and year subscripts, the intercept, and the error term, are omitted.

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(e.g., Evans 1987; Chan et al. 2003; Coad 2009; Gao and Wu 2014). Employment is reliable and not affected by inflation, but varies across sectors and by business model (labour intense vs. technology intense). Sales revenue is a key indicator of commercial success, but does not capture value-added from a firm's business activities.[2]

Future growth is measured over three years and five years, in order to assess growth trajectory, i.e., from years *t*+1 to *t*+3 or *t*+5). Three- and five-year growth periods have been standard ranges in the literature since Birch (1979) established the firm growth literature, and has since been adopted by the OECD and the broader literature (Anyadike-Danes et al., 2009; Audretsch, 2012; OECD, 2011). The simplest way to calculate this would be a ratio of the last year to the first year of a growth window. However, this simple ratio can be disproportionately affected by short-term fluctuations at either end of the window. To address this issue, the approach taken by Gao and Wu (2014) is adopted, regressing firm *i*'s three (five) year's sales revenue, after taking the natural logarithm, on the time mark *t*, as follows:

$$Ln(Sale_{i,t+\tau}) = a_{i,} + GR5_i \times \tau \text{, where } \tau = 1, \ldots, 3 \text{ (5).}$$

The slope of the time mark τ is firm *i*'s average rate of growth over three (or five) years, denoted as *GRS*3(5). This method of calculating the growth rate uses all data in a time window and so better reflects the trend over the period. Employment growth *GRE*3(5) is calculated similarly. The measurement of growth has a major influence on the sample size, which is described fully in the next section.

[2] For simplicity, the revenue growth in the reported results does not adjust for inflation. Inflation adjustment does not materially affect the results or inferences.

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The independent variables in Equation [1] are potential ex ante growth drivers, which are all measured at the prediction date prior to the start of a growth window. To test Hypothesis 1, the following variables are included: *Size*, the natural logarithm of sales revenue or employee numbers, depending on the future growth measure; and *Age*, the time span between the year of a firm's first legal registration and the current fiscal year. Based on this hypothesis, the coefficients for both *Size* and *Age* should be positive. Growth declines with firm age and size, albeit at a diminishing rate, suggesting non-linear relationships (Evans, 1987b). To consider this possibility, squared size ($Size^2$) and squared age (Age^2) are both also included.

To test Hypothesis 2a, *Tobin's Q* is used, as a ratio of firm market value to total assets. To test Hypothesis 2b, capital investment intensity (*Capex*) is deployed, which is a ratio of capital expenditure to net fixed assets and R&D intensity (*RnD*). As per the hypotheses, positive coefficients for all three drivers would be expected.

To test Hypothesis 3a, *Leverage* is considered, which is a ratio of total debt to shareholders' equity, and is expected to have a negative coefficient. To test Hypothesis 3b, *Cash margin*—a ratio of operating cash flow to sales revenue—is used to measure a firm's ability to generate funds internally. Because annual operating cash flows can be volatile, both the numerator and the denominator are aggregated over the previous three years. The expectation is that the coefficient will be positive.

To test Hypothesis 4, *Asset utilization* is included, which is measured as sales revenue divided by average total assets, and *Shareholder return*, measured as net profit divided by average shareholders' equity. The coefficient

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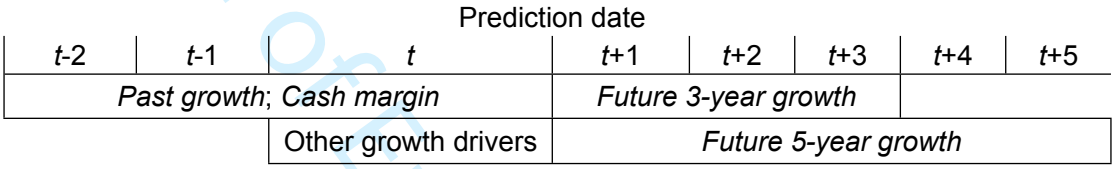
for *Asset utilization* is expected to be negative, while that for *Shareholder return* positive.

Lastly, to test Hypothesis 5, *past growth* is used, which is the growth rate over *past* three years (between year *t*−2 and *t*), using the same method for future growth. The following diagram illustrates the timeline of the predictive regression, which ensures growth drivers are measured prior to the start of the growth window, avoiding endogeneity:



IV. DATA AND SAMPLE

Financial data were obtained from Compustat Global.[3] The initial sample includes all publicly listed non-financial companies in China's two domestic stock exchanges, Shanghai and Shenzhen, between 1999 and 2022.

The final sample for regression analysis was determined by availability of data to measure growth. When both future and past growth are measured over three years, a (firm-year) observation must have at least six years of financial data, of which the first three years' data are used to calculate growth drivers and the subsequent three years' data are used to calculate future growth. When sales (employment) growth is analysed, the usable sample period for the

[3] Compustat Global provides fundamental and market information on over 33,900 publicly listed companies across the globe (except the U.S. and Canada) (more detail is available at https://www.spglobal.com). It has been widely used in research for its coverage, easy access, and high quality.

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regression analysis is between 2001 (2002) to 2019.[4] There was a slight difference in sample sizes in terms of consideration of growth by revenue or growth, as a result of the different years for which data on revenue and employment were available. Despite these parameters, the sample still includes a wide range of firms and allows us to test for growth. The final sample size ranges from 30,129 to 36,002, depending on the measurement of growth. Table 1 details the sample size by measurement and year.

[Insert Table 1 here.]

V. RESULTS

Descriptive statistics

Figure 2 plots long-term growth of Chinese firms over time (the summary statistics are reported in Panel A of Table 2). Panel A plots cross-sectional medians of annualized revenue growth over three and five years. For three-year growth (grey bars), the first low point is over the 2007-09 window, which spans the global financial crisis. Growth rebounded quickly, as seen in the 2009-11 window. The last low point is over the 2018-20 window, when overall economic growth slowed in China.

Five-year growth (dotted bars) appears to be smoother, as would be expected. In the first half of the sample period (up to the 2009-11 window), the growth remained above 10% (per annum), indicating that the firms sustained high long-term growth consistently over that period.[5] In the second half of the

[4] For our sample, the employment data starts one year later than the sales data. When future five-years growth is used, the usable sample loses additional two years and ends in 2017.

[5] The revenue growth here is on the gross terms. Adjusting for inflation does not materially change data patterns.

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sample period (from the 2010-12 window onwards), however, growth generally falls below 10%, except over the 2015-17 and 2016-18 windows.

[Insert Figure 2 and Table 2 here.]

Panel B plots employment growth. Three-year employment growth was nearly zero at the start of the sample period, steadily rose afterwards, and peaked over the 2010-2012 window. Since then, employment growth broadly traces the same pattern as revenue growth.

Figure 3 plots cross-sectional medians of growth drivers over time.[6] In Panel A, the median revenue (grey bars), a size indicator, increases steadily and more than triples over the sample period, demonstrating that the businesses have scaled up rapidly. Median employment (the solid line), another size indicator, generally rises in the 2000s, but exhibits noticeable fluctuations in the 2010s. The latter is partly due to changing compositions of listed companies. For example, the low point follows the opening of NASDAQ-style ChiNext in late 2009, where a large number of younger and smaller firms are listed. This suggests a move from the established exchanges in Shanghai and Shenzhen to the ChiNext exchange over the period.

[Insert Figure 3 here.]

In Panel B, Tobin's Q (grey bars) exhibits volatility, due to dramatic rises and falls in Chinese stock market prices over time. Capital investment intensity (*Capex*; dotted line) peaked in 2011 (22.9%), thanks in part to the government stimulus spending and related economic rebound, and has since been between 15% and 20%. R&D intensity (*RnD*; solid line) remained zero till 2013 and has since risen steadily, due to more listings of technology firms and a growing

[6] The data points are aligned at the year when growth drivers are measured.

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emphasis in Chinese businesses on innovation. Even in later years, however, the size of R&D spending is still small, at less than <5% of sales revenue.[7]

In Panel C, leverage (*grey bars*) peaks in 2004 (56.3%) and declines consistently afterwards. During the 2010s it fluctuates between 20% and 30%, indicating reducing reliance on debt financing. Asset utilization (dotted bars) peaks in 2008 (65.3%), and has since declined, reaching a low point in 2016 (46.3%).[8] The change may reflect the broad trend of Chinese businesses' moving up the value chain and adopting value-based, rather than volume-based, strategies. Cash margin (dotted line) is generally around 8%, except during 2011-15, when it dips below. Lastly, after initial fluctuations, shareholder return (solid line) stabilises to 6-8% in the second half of the sample period.

Panel C of Table 2 shows correlations between the key variables, including future growth measures. Overall, growth drivers are not highly correlated amongst each other, reducing concerns over multicollinearity in the regression analysis.[9]

Regression analysis

The results of predictive regressions are reported in Panel A of Table 3. Columns (i) and (ii) provide results for revenue growth. Both size and age have significant negative effects, indicating that smaller, younger firms grow faster. This confirms Hypothesis 1. In addition, the squared size and age are significant

[7] *Tobin's Q* is a firm's market value divided by total assets at the end of year *t*. *Capex* is a firm's capital expenditure divided by net fixed assets. *RnD* is a firm's R&D expense divided by sales.

[8] *Leverage* is a firm's total debts divided by its common equity; *Cash flow* is operating cash flow, averaged over past three years, divided by sales; *Asset utilization* is sales divided by total assets; and *Shareholder return* is net profit divided by shareholders' equity.

[9] In the regression analysis (more detail in the next subsection), the variance inflation factors (VIFs; untabulated) of the growth drivers are all around one, except for *Size*, *Age* and their squared terms. Without the squared terms, the VIFs of *Size and Age* also reduce to near one. Taken together, these statistics indicate no serious multicollinearity concern.

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and positive. This result indicates that after initially falling as size and age increase, growth rises again in the larger and older firms. This result of nonlinearity extends the firm growth literature, most of which tends to focus on a linear relation. Whereas the firm growth literature identifies a greater likelihood for newer and smaller firms to grow more rapidly, these squared variable effects indicate that the oldest and largest firms also grow more rapidly. The size group that has suppressed growth prospects are mid-scaled enterprises, whose growth trajectory was lower.

[Insert Table 3 here.]

For growth drivers related to investment, Tobin's Q is positively and significantly correlated with future growth, indicating that higher growth potential, as perceived by stock markets, leads to higher future growth. In contrast, measures of actual investments (*Capex* for tangible assets and *RnD* for intangible assets) are not significant, although they have the expected positive sign. These results support Hypothesis 2a but not 2b.

For growth drivers related to financing, leverage is significantly negatively correlated with future growth, indicating the detrimental consequence of over-indebtedness and supporting Hypothesis 3a. The coefficient for *Cash margin* is positive and statistically significant, suggesting that internally generated cash supports future growth, consistent with Hypothesis 3b.

For growth drivers related to efficiency (Hypothesis 4), the coefficient of *Asset utilization* is negative but insignificant, while that of *Shareholder return* is positive and significant, as indicated in Column (i). The results partially support the hypothesis, in that there is a significant relationship between demonstrated shareholder return and growth. It is important to note that a significant positive

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relationship does not indicate the direction of causality. It is equally conceivable that growth allows for enhanced dividends to be paid, or it is plausible that fast growing firms attract greater levels of shareholder investment. Lastly, *Past growth* has negative, but insignificant, coefficients and indicating that the null of Hypothesis 5 cannot be rejected.

The results of employment growth are reported in Columns (iii) and (iv) and are broadly consistent with those of revenue growth. Among divergent results, the coefficient on *RnD* is positive and significant (Column (iii)), while the coefficient on *Leverage* is insignificant. This is a surprising finding, as the broad view has been that high levels of debt constrain growth. Lastly, *Asset utilization* is positively correlated (significant at the 1% level) with future employment growth.

The regression analyses for the overall sample do not find statistically significant relations between investments (in both physical and intangible assets) and future growth. This is inconsistent with the general consensus that investments in innovation underpin growth (Ahlstrom, 2010). This may be due to sectoral differences in investment intensity. Because R&D activities and, to a lesser extent, capital investments, vary noticeably across industries, a supplementary analysis in select industries was added, with the results shown in Panel B. The focus is on three industries specifically: manufacturing, business equipment, and healthcare, which have more R&D spending than the average firm in the sample (see the mean statistics at the bottom of the Panel). When repeating the regression analysis by these industries, the coefficient of *RnD* is statistically positive in all three industries, with some variation in terms of which growth measure is used. The coefficient on *Capex*, however, still does

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not demonstrate the predicted sign consistently; nor is it always significant. This additional analysis partially confirms Hypothesis 3b.

As summarized below, the majority of our hypotheses, except for 2b, are confirmed:

No.	Hypothesis	Results
1	Smaller, younger firms are more likely to grow than larger, older firms.	Confirmed. Additionally, the largest firms grow faster than mid-sized firms, but slower than the smallest.
2a	Future firm growth is positively associated with (perceived) investment opportunities.	Confirmed.
2b	Future firm growth is positively associated with actual investments.	Confirmed for selected industries with significant R&D activities, but not across the overall sample.
3a	Future firm growth is negatively associated with levels of debt.	Confirmed.
3b	Future firm growth is positively associated with the availability of internal funds.	Confirmed, but the relationship is moderately significant.
4	Asset utilization is negatively correlated with future growth.	Partially confirmed.
5	Prior growth is not correlated with future growth.	Confirmed.

Analysis of the non-linear relation between growth and age/size

In this section, data analysis considers the "unexpected" result that growth is not linear by size or age, but is a curve with both smaller and larger firms growing more quickly than mid-sized companies. This supports a more inductive approach to data analysis that has arisen because of this finding.

In order to illustrate the non-linear relation between future growth and size, sample firms were placed into ten groups based on firm size (each group has the same number of firms), and then the mean future 3-year growth is

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calculated for each size group (e.g., Chan et al. 2003; Acemoglu et al. 2018).[10] As in Table 3, both revenue growth and employment growth are analysed, using their respective measure of size. Table 4 reports these statistics and Figure 4 plots them visually.

[Insert Table 4 and Figure 4 here.]

The non-linear relationship between future revenue growth and firm size (based on revenue) is apparent from Panel A of Figure 4 (the associated statistics are reported in Panel A of Table 4). For the full sample period (grey bars; with the solid fitted curve), median growth is highest in Group 1 (smallest firms), with 17.8% annualized rate of growth over three years. Growth gradually declines as firm size increases, reaching the lowest in Group 8 (8.9%). The relation so far is consistent with prior literature that growth declines with firm size. However, growth recovers in the remaining groups, with Group 10's being 9.5%. Thus, among larger firms in groups 9 and 10, growth increases with firm size. It should also be noted that all annualised growth rates are heathy across all groups.

The growth of firms of different sizes was tested, with Group 1 being the smallest, Group 10 the largest, and Groups 5 and 6 being mid-sized, as shown in the bottom three rows in Panel A of Table 4. The results show that in the 2000s, the growths between the smallest, largest and mid-sized firms are statistically different (at the significance level of 1%).

[10] The results for future five-years growth are qualitatively similarly.

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Growth was then examined over two subperiods, which correspond broadly to the first and the second decades of 2000.[11] The 2000s is marked by China's economic take-off, but ended with the 2008 Financial Crisis, which is generally considered a pivot event for the global economy and for China. The 2010s starts with a brief recovery from the Financial Crisis, but is then dominated by macro headwinds such as the pushback to globalization, the US-China trade wars, and increased global economic volatility.

In Panel A of Figure 4, striped bars (with the dashed fitted curve) and dotted bars (with the dotted fitted curve) are for the 2000s and the 2010s, respectively. The plots make it immediately clear how firms of different sizes grew distinctively in the two subperiods. For example, the median growth of Group 1 (smallest firms) increased from 16.9% in the 2000s to 18.1% in 2010s, in contrast to those in the other groups, which all experienced declines. The median growth of Group 10 (largest firms) saw the largest decline, which more than halved from 15.7% to 6.8%. Because of this change in growth rates, the sample-wide relation between size and growth shifts markedly between the two decades of the millennium. The curve is broadly U-shaped but with a skew to the smallest firms during the 2000s, and the mid-sized groups slowest growing. In the 2010s, the curve visibly slopes down to the right, from small to large firms, which is more in line with the linear relation identified in the firm growth literature.

Panel B of Figure 4 plots the results based on employment growth (the associated statistics in Panel A of Table 4). Whereas not as pronounced as in

[11] Because growth is measured over multiple years, the boundary of a subperiod is not clearcut. Despite this caveat, however, the two subperiods are distinctive enough to warrant being examined separately.

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Panel A, in the 2000s Group 10 has higher median growth than Groups 5 to 9. However, the growth is not statistically different between Group 10 and Groups 5 and 6, moderating the employment aspects of a growth U-curve.

Smaller, younger firms are more likely to be private, and larger enterprises more likely to be SOEs (Table 5). Table 5 indicates that, as measured by revenue, 12.4%—or one in eight—firms in the smallest decile were state-owned, whereas 56.7% of firms in the largest decile, again by revenue, were state-owned. This shows that seven out of eight of the listed companies in the smallest decile were private, but six out of ten in the largest decile were state-owned. It is notable that even in the largest decile, there is a healthy representation of private companies, attesting to the ability of these firms to scale up to significant size. What is of note is the increased representation of state-owned enterprises the larger the listed company.

The greater concentration of private enterprises in the smaller and younger size and age groups aligns with the wider literature on firm growth, which confirms that growth reduces with age and size (Evans, 1987b). These broader results, which are well established in the literature, have also been identified in China, where overall economic growth has been associated with smaller and younger firms (e.g. Lee and Shin, 2015).

However, before 2008, larger, older firms also grew at rapid rates, and, as noted above, these groups of firms were increasingly dominated by state-owned enterprises. This indicates that up to 2008, state-owned enterprises were growing rapidly alongside private enterprises. After 2008, growth rates fell overall, but less so for smaller firms, which are more likely to be privately-owned.

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This result shows a shifting dynamic of growth patterns by age and size, and as a consequence by ownership, over time. Table 4 and Figure 4 indicate a shift in growth towards private enterprises and away from SOEs after 2008, from which point smaller enterprises grew at a faster rate than larger enterprises. This finding is consistent with the composition-based view of firm growth proposed by Lou and Child (2015) that smaller enterprises can deploy a wider range of resources and opportunities to stimulate rapid growth. It is significant in China because these smaller companies are more likely to be private.

[Insert Table 5 here.]

This finding is interesting considering a concern in China that SOEs are supported by the state, and hence are dominant, and in certain sectors squeezing out the private sector (Gabriele, 2010). The findings indicate the opposite; that after 2008, growth in smaller listed companies almost doubled. Over the same period, growth in the largest listed firms more than halved. After 2008, smaller enterprises, which are more likely to be private, grew at six times the average rate of larger listed companies. This demonstrates that China's economic expansion is increasingly driven by private enterprises (Lardy, 2014), and that SOEs are growing more slowly, and hence are becoming less prominent in the economy.

Recent studies corroborate declining performance in SOEs, even when supported by government. Lin et al. (2020) identified falling returns for SOEs after 2007, aligning closely with our identification of 2008 as a watershed year in China in terms of growth performance, and hence the shift in the 'U' curve discussed above. At a structural level, Song et al. (2011) confirmed that private

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enterprises are more productive, even when lacking full access to external access offered to SOEs. This finding supports the conclusions discussed in this section of the paper.

VI. CONCLUSIONS

Overall, the analysis confirmed that smaller, younger firms are more likely to grow than larger, older firms. This supports the wider literature across multiple countries, where results typically confirm that younger, small firms grow faster (e.g. Dobbs and Hamilton, 2007). The analysis also indicated that external and internal funds had a positive impact on growth, supporting the proposition that finance enables firm growth in China, and debt and lack of finance constrain growth; both of which have been found in other countries although there are few articles on this issue in China (Beck and Demirguc-Kunt, 2006). These results are important in China because of a relative lack of funding for private enterprises, particularly, and a generally high level of indebtedness amongst Chinese companies. The conclusion is that these factors indicate that growth of firms is likely to be suppressed in China for most firms, even those growing rapidly.

Growth patterns of listed companies varied over the period considered in this study. In the first decade of the 21st century, companies at both ends of the size spectrum (in our sample) grew faster than those in the middle. A 'u-curve' of growth could be identified, where new, smaller firms grew rapidly, before growth slowed in mid-sized enterprises, and recovered in the largest companies. A 'market economy with Chinese, or socialist, characteristics' could therefore be identified, where both larger SOEs and generally smaller private

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enterprises both grew, and hence drove economic development, between 2000 and 2008. This indicates two key findings from this period: firstly, both large state-owned enterprises and smaller, private enterprises grew rapidly, indicating that the two-pronged policy of supporting SOEs and stimulating entrepreneurship were successful; and, secondly, SOEs were not 'crowding out' smaller, private enterprises due to state patronage and scale benefits.

From 2008 onwards, smaller listed companies continued to grow rapidly, and growth in larger companies slowed. As Table 5 shows, the largest companies in China are more likely to be state-owned enterprises, and the smallest much more likely to be private. As a result, there is a reversion to the relationships between size, age and growth found in studies in other countries; with smaller, younger companies growing faster than older, larger businesses. However, elements of the Chinese mixed economy persist after 2008, in the sense that larger firms continued to grow at positive rates at or above annual GDP growth, while smaller enterprises grew faster, and hence became more important to future economic development.

Although the majority of the largest companies were state-owned, there was a significant, but minority, population of very large private companies. This indicates that some smaller listed companies scaled up to become very large private enterprises. Across the size distribution, in other words, private enterprises have become more dominant and important, in terms of both growth rates and representation amongst China's largest companies.

As a result, over the period studied, growth has shifted from a position where both SOEs and private enterprises grew rapidly to a post-2008 period where privately-owned listed companies have grown more quickly than SOEs. This

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signals a shift towards an economy increasingly dominated by private sector growth, despite the government's focusing of government resources on state-owned enterprises (Huang and Veron, 2022; Lardy, 2019).

Limitations and Considerations

Although financial information for listed companies in China presents one of the best available data sources for considering the financial performance of firms in China, there continue to be concerns over the consistency and accuracy of corporate data registered with China's Shanghai and Shenzhen stock exchange (e.g. Yu et al., 2015). However, moves to digital finance, and the digital submission of financial data for listed companies has reduced the prevalence of submission of inaccurate, and in many cases, fraudulent data (e.g. Sun et al., 2023). As a result, the financial data provided via the Shanghai and Shenzhen stock exchanges can be considered increasingly accurate of actual performance in listed firms. The accuracy of data will have improved over the period of the study, given improvements in data governance and submission. However, the financial data of listed companies in the initial years of this study has a greater risk of not being as accurate as data for later years, when increased focus has been placed on data governance. This paper considers this risk by taking a longer-term longitudinal approach, identifying patterns over multiple years, across a large sample of companies, which mitigates these data concerns.

The second broad limitation can be considered a contextual factor affecting the wider expectations towards, and obligations, of state-owned enterprises; especially those owned directly by government in China. SOEs are expected,

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and indeed instructed, to carry out or support government policies, and so are subject to multiple tasks by the state, of which profit generation is one. As Bai et al., (2006) note, this can mean that in many situations, profits generated by SOEs are suppressed due to commitments to fulfil a wider set of objectives, some of which can increase costs and hence reduce profitability.

Although this has been the case for much of the post-1978 reform period, the non-market objectives and responsibilities of SOEs have reduced over time, as government has taken a less active role in day-to-day management, financial expectations have risen, and the role of SOEs in markets and industries has been prioritised (Jones and Zou, 2016; Lardy, 2014). As a result, although a case can be made that SOEs carry greater non-market obligations, and hence costs, than private enterprises, this difference has reduced considerably over the reform period.

VII. IMPLICATIONS

There are two major policy implications arising from these findings. The first is that the policies introduced by Xi to favour state enterprises have not halted expansion of the private sector, and instead have seen growth in SOEs fall further behind growth in private companies. As multiple authors have indicated (e.g. Atherton and Newman, 2018; Lardy, 2014), the underpinning reason for China's emergence as a major economic power has been a shift from public ownership of enterprise to private control and ownership. Our analysis demonstrates that this is the case for listed businesses in China. The key implication is that China is becoming more of a private economy, and the mixed

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models proposed by the Chinese government are increasingly less representative of the country's economic structure.

The second implication, arising from this observation, is that future growth in China will increasingly be driven by private enterprises. Lardy (2019) argues that without a shift in policy emphasis away from the state sector towards encouraging entrepreneurship, China's slowing growth will continue even though it could be reversed with a change to more favourable policies towards the private sector. Although the Party has stressed the importance of a 'level playing field' for private enterprises, in general by reducing favourable policies towards SOEs, this implication suggests that future economic growth would be accelerated if there was a shift to pro-private policies and interventions (Dickson, 2016).

There are two further firm-level implications in terms of entrepreneurship in China. The first is that even when policy conditions are not fully conducive, the more agile and innovative approaches of private companies drive superior and sustained growth. The second is that the overall financial health of the firms considered in this sample improved considerably over the period. As the listed firms grew, and especially as smaller enterprises grew most rapidly, they reduced debt, and so became less leveraged and as a result less vulnerable to cash flow issues. They also increased investment, indicating greater focus on research and development, and hence innovation.

Although insights and evidence from one country do not necessarily apply to other countries, because their context, cultural frameworks and institutions differ, some broader observations can be drawn from this study. The central role of the private sector in generating overall economic growth, and in

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particular export- and innovation-led growth, can be seen in China. This supports the broad proposition that economic growth in most economies is driven by private rather than public investment (Makuyana and Odhiambo, 2016). This is the case even where there is public investment, which tends to be less efficient and as a result generates lower growth than private entrepreneurial activity. If a country like China, which has a significant state sector and support of this sector by government, relies heavily on private sector development despite state intervention, then it is reasonable to conclude that the primary generator of growth in emerging and developed economies is private entrepreneurship.

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Figure 1. Theoretical Framework and Hypotheses

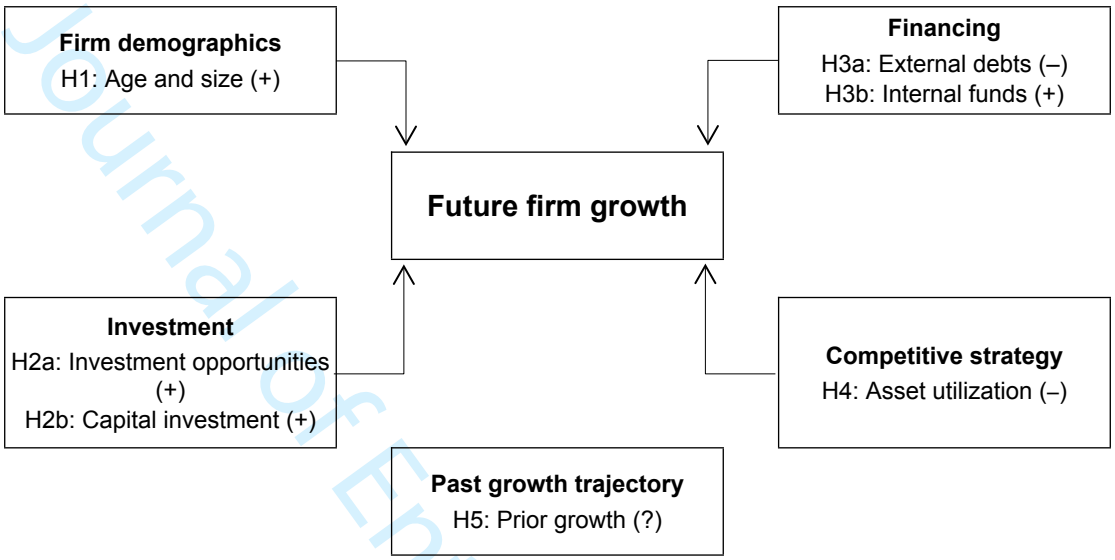

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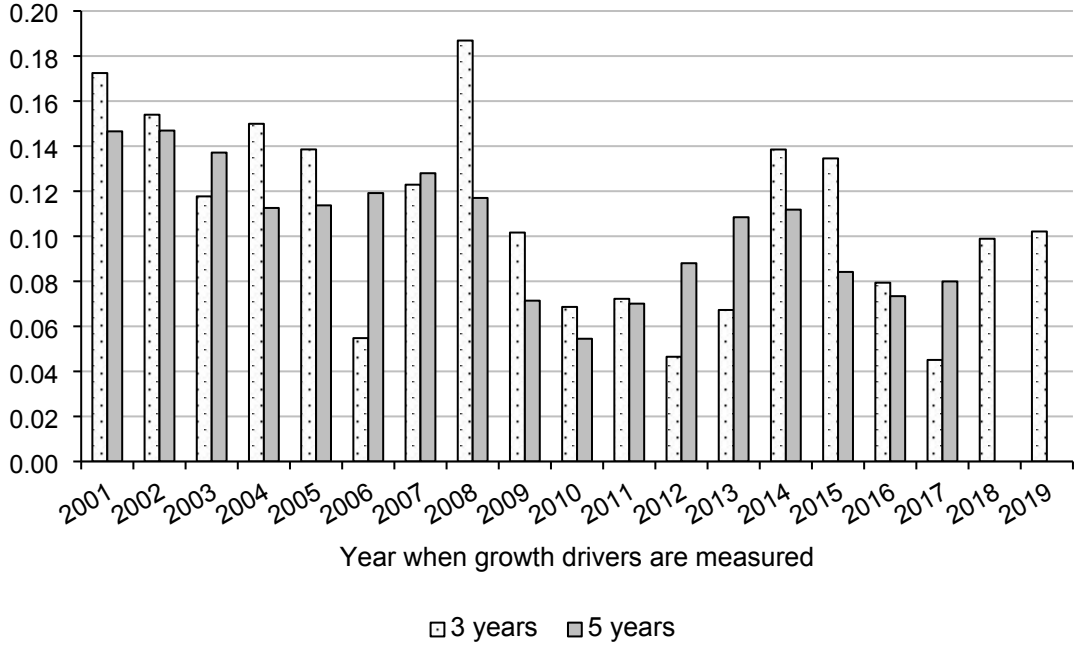
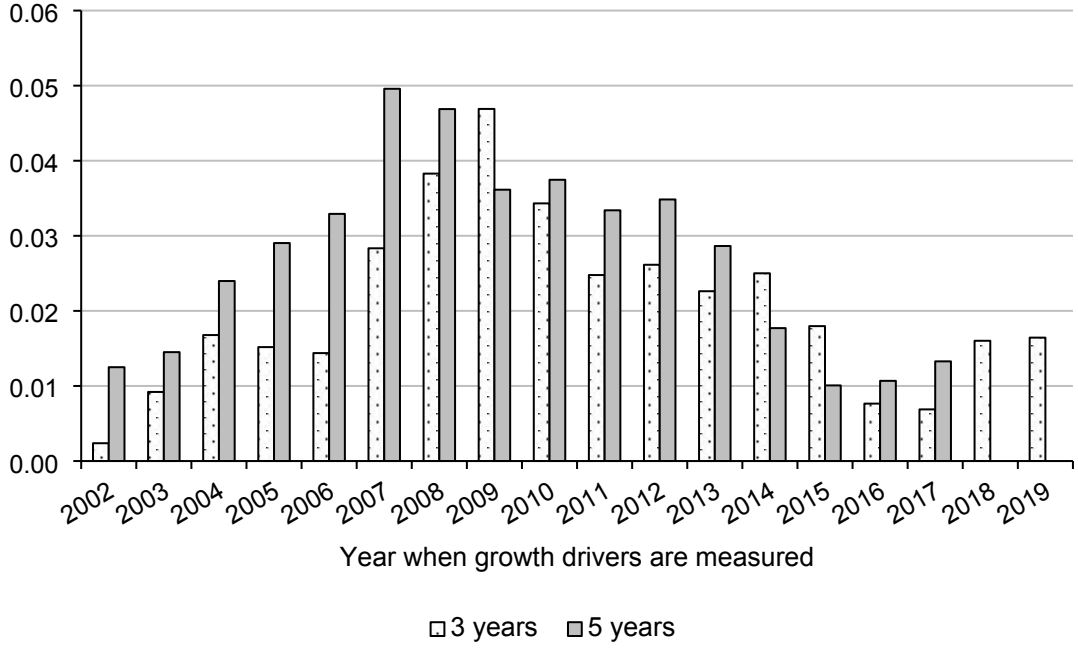
Figure 2. Long-term Growth of Chinese Firms over Time

Panel A. Future revenue growth, cross-sectional median



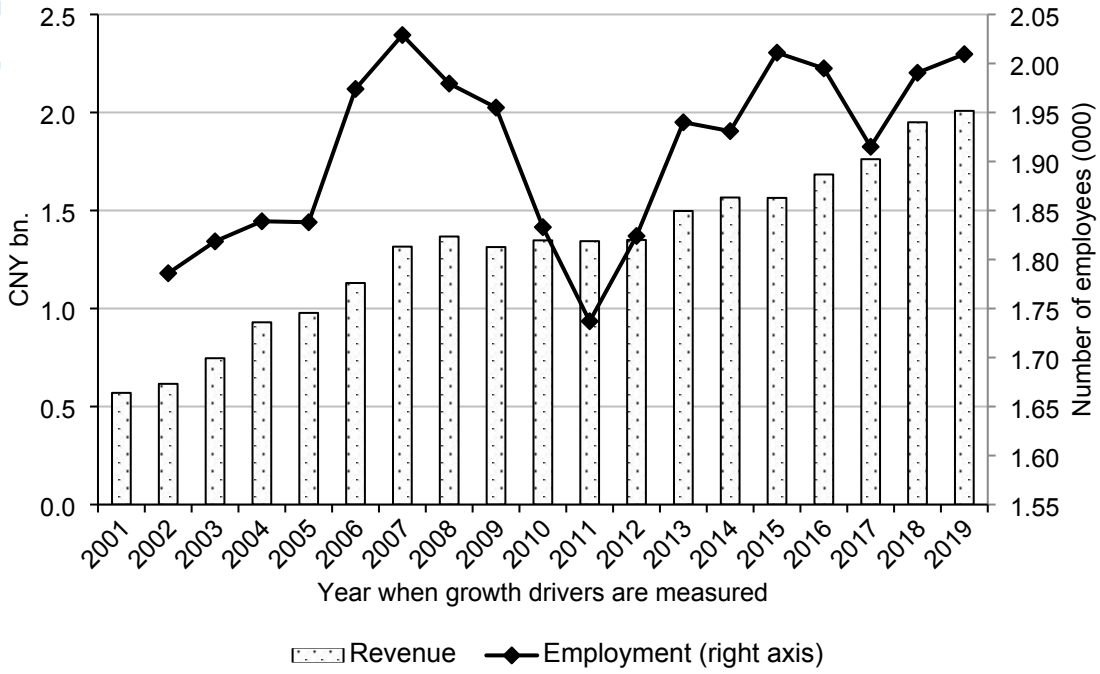
Panel B. Future employment growth, cross-sectional median



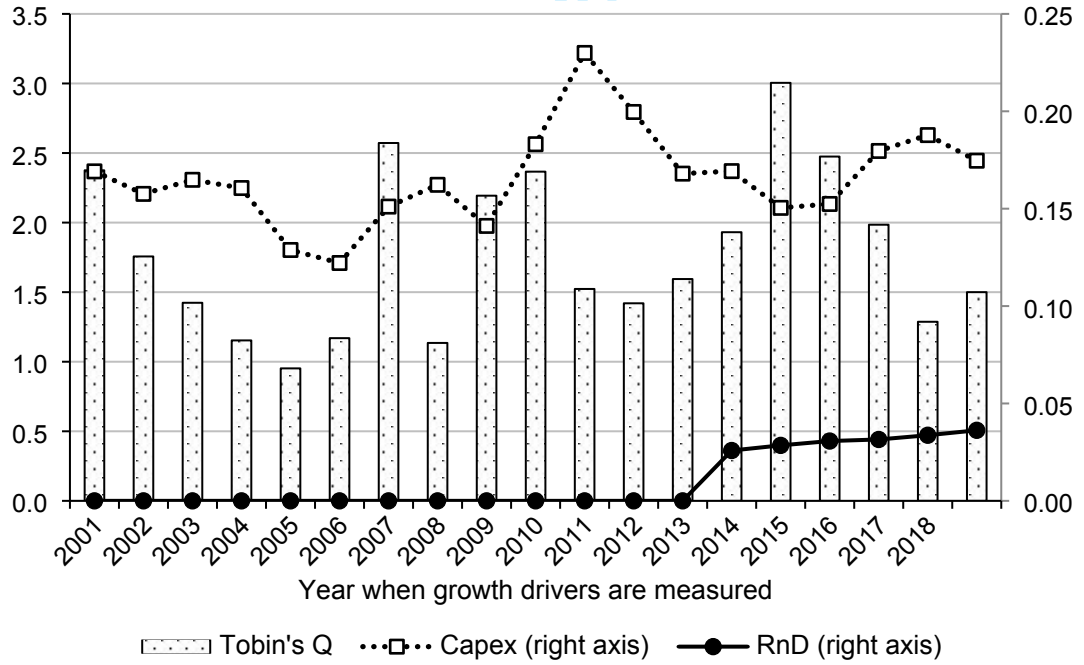
Future growth is over *t*+1 to *t*+3(5), where *t* is the year when growth drivers are measured. See Table 1 for the sample construction and the note for Table 2 for variable definitions.

Figure 3. Growth Drivers of Chinese Firms over Time

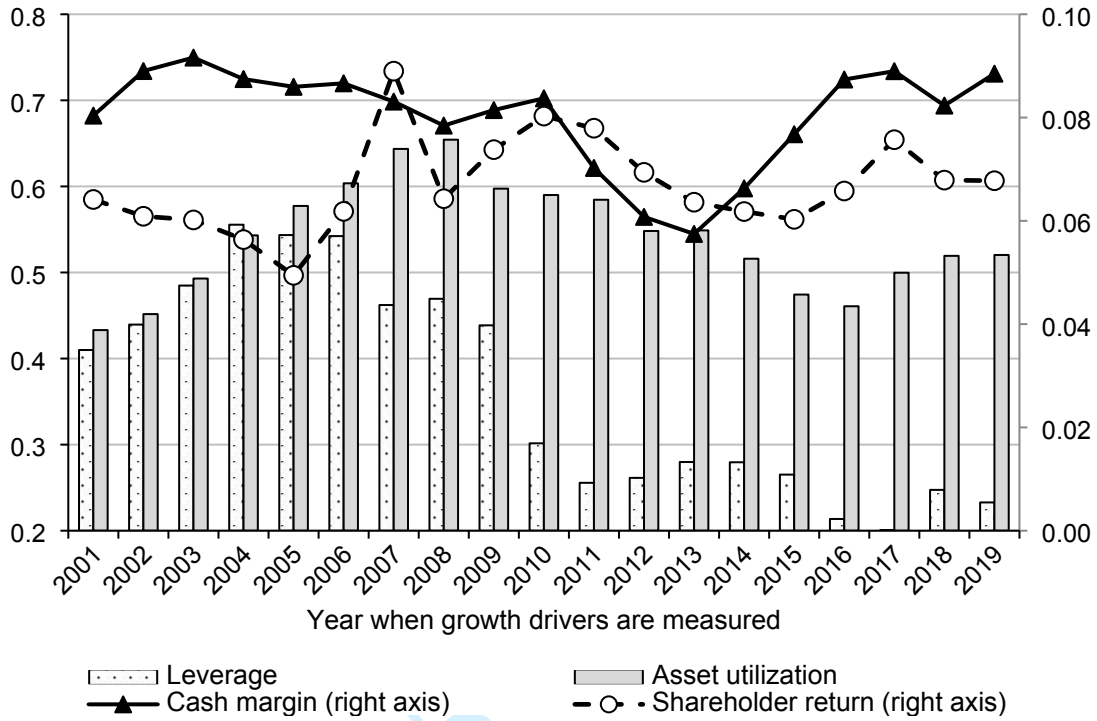
Panel A. Size



Panel B. Growth drivers related to investment



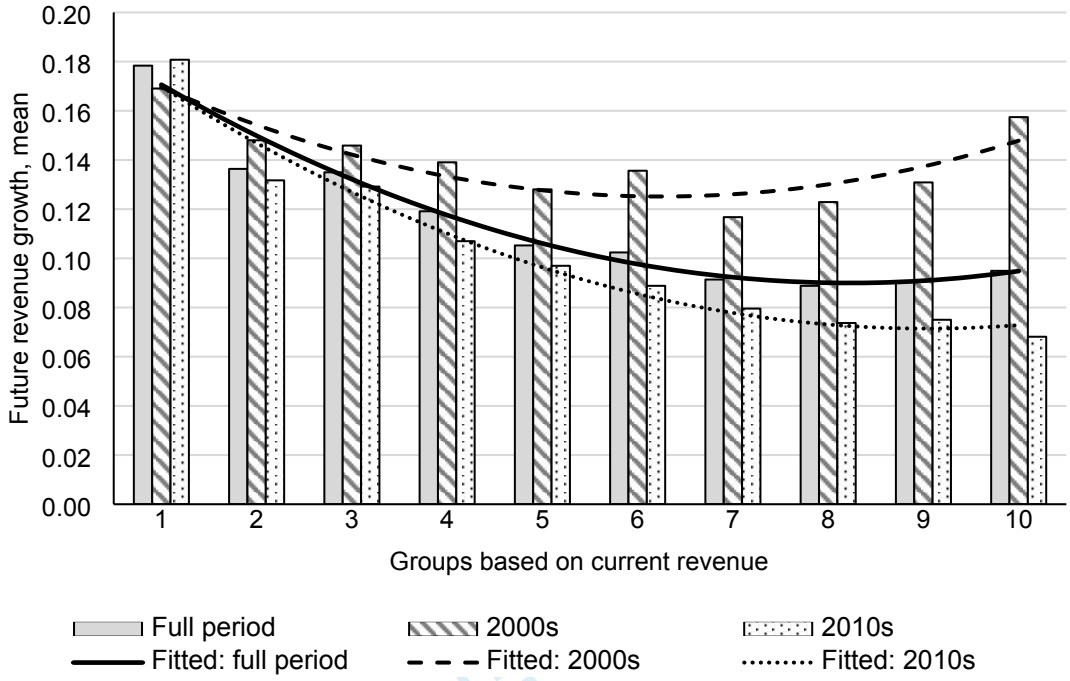
Panel C. Growth drivers related to financing and efficiency



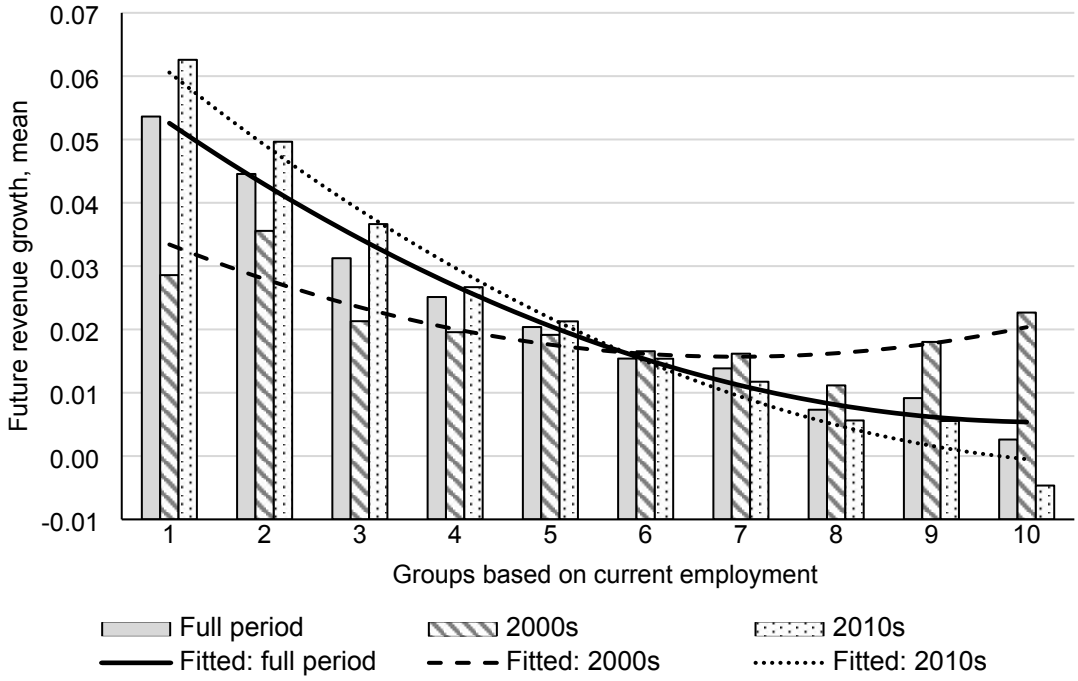
See Table 1 for the sample construction and the note for Table 2 for variable definitions.

Figure 4. Firm Size and Future Growth

Panel A. Firm size and growth measured by revenue



Panel B. Firm size and growth measured by employment



See the note for Table 4for the sample and variable definitions.

Table 1. Sample Selection

Year when growth drivers are measured	Measure of growth			
	Revenue		Employment	
	Sample size	% of population	Sample size	% of population
2001	929	82%	0	0%
2002	1,000	87%	805	70%
2003	1,047	83%	892	71%
2004	1,068	83%	952	74%
2005	1,052	72%	909	62%
2006	1,103	70%	1,034	65%
2007	1,163	61%	980	51%
2008	1,347	62%	1,160	53%
2009	1,428	61%	1,279	55%
2010	1,755	73%	1,340	55%
2011	1,991	69%	1,445	50%
2012	2,232	68%	1,836	56%
2013	2,241	63%	2,082	59%
2014	2,379	62%	2,221	58%
2015	2,549	64%	2,261	57%
2016	2,792	66%	2,387	57%
2017	3,213	72%	2,564	57%
2018	3,293	69%	2,830	59%
2019	3,420	71%	3,152	65%
2001-2019	36,002	69%	30,129	57%

The sample includes publicly listed, non-financial firms in the Shanghai and Shenzhen Stock Exchanges in China. The sample firms are required to have valid growth drivers, including past 3-year sales growth, and future 3-year sales growth.

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Table 2. Descriptive Statistics

Panel A. Future growth: annualized rates of growth

	Sample size	Mean	Std	Min	Q1	Median	Q3	Max
Future revenue growth								
3 years	36,002	0.100	0.253	-1.305	-0.013	0.099	0.214	1.412
5 years	29,029	0.097	0.193	-0.824	0.005	0.096	0.190	0.917
Future employment growth								
3 years	30,129	0.033	0.218	-1.031	-0.049	0.013	0.097	1.547
5 years	23,896	0.033	0.171	-0.669	-0.043	0.018	0.098	0.944

Panel B. Summary statistics of the growth drivers for regression

	Sample size	Mean	Std	Min	Q1	Median	Q3	Max
Revenue (CNY bn.)	36,002	8.341	65.137	0.000	0.589	1.410	3.760	2,966
Employment (000)	30,129	6.184	23.997	0.009	0.994	2.114	4.782	863.8
Age (year)	36,002	12.36	6.198	1.000	7.000	11.00	17.00	33.00
Tobin's Q	36,002	2.255	1.890	0.263	1.081	1.681	2.747	19.45
Capex	36,002	0.238	0.281	0.001	0.084	0.168	0.294	2.904
RnD	36,002	0.019	0.034	0.000	0.000	0.000	0.031	0.248
Leverage	36,002	0.611	0.922	0.000	0.061	0.317	0.777	8.699
Cash margin	36,002	0.098	0.142	-0.458	0.023	0.080	0.155	0.758
Asset utilization	36,002	0.635	0.438	0.055	0.351	0.531	0.784	3.037
Shareholder return	36,002	0.047	0.196	-2.772	0.028	0.067	0.111	0.629
Past growth in								
Revenue	36,002	0.136	0.231	-0.682	0.015	0.122	0.241	1.219
Employment	30,129	0.060	0.229	-1.504	-0.036	0.028	0.131	1.454

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Panel C. Correlations between key variables

	Future 3-y growth		*Size*						*Cash*			*Shareholder*	*Past growth*	
	Revenue	Employment	Revenue	Employment	*Age*	*Tobin's Q*	*Capex*	*RnD*	*Leverage*	*margin*	*Efficiency*	*return*	Revenue	Employment
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)		0.481***	-0.110***	-0.035***	-0.128***	0.121***	0.117***	0.021***	-0.085***	0.074***	-0.044***	0.083***	0.078***	0.075***
(2)	0.481***		-0.012**	-0.129***	-0.152***	0.105***	0.137***	-0.001	-0.100***	0.100***	0.044***	0.210***	0.164***	0.159***
(3)	-0.110***	-0.012**		0.752***	0.308***	-0.386***	-0.037***	-0.096***	0.213***	-0.021***	0.475***	0.155***	0.175***	0.123***
(4)	-0.035***	-0.129***	0.752***		0.149***	-0.324***	-0.052***	-0.065***	0.129***	0.044***	0.221***	0.106***	0.080***	0.158***
(5)	-0.128***	-0.152***	0.336***	0.185***		-0.280***	-0.317***	0.017***	0.267***	-0.053***	0.022***	-0.142***	-0.189***	-0.205***
(6)	0.109***	0.073***	-0.386***	-0.324***	-0.170***		0.140***	0.258***	-0.221***	0.066***	-0.085***	0.085***	0.013**	0.006
(7)	0.038***	0.027***	-0.037***	-0.052***	-0.160***	0.140***		0.147***	-0.162***	0.042***	0.041***	0.293***	0.272***	0.310***
(8)	0.027***	-0.006	-0.096***	-0.065***	-0.070***	0.258***	0.147***		-0.173***	0.024***	-0.106***	0.013**	-0.036***	0.050***
(9)	-0.082***	-0.067***	0.213***	0.129***	0.214***	-0.221***	-0.104***	-0.173***		-0.182***	-0.004	-0.188***	-0.000	-0.045***
(10)	0.057***	0.070***	-0.021***	0.060***	-0.053***	0.110***	0.042***	0.028***	-0.182***		-0.229***	0.299***	0.054***	0.065***
(11)	-0.045***	0.044***	0.499***	0.305***	0.022***	-0.100***	0.041***	-0.106***	-0.004	-0.229***		0.261***	0.199***	0.060***
(12)	0.058***	0.104***	0.155***	0.106***	-0.082***	0.085***	0.091***	-0.028***	-0.346***	0.176***	0.112***		0.389***	0.284***
(13)	0.004	0.085***	0.175***	0.082***	-0.134***	0.013**	0.147***	-0.036***	-0.000	0.054***	0.199***	0.389***		0.457***
(14)	0.022***	0.028***	0.137***	0.201***	-0.101***	0.006	0.310***	0.050***	-0.045***	0.065***	0.060***	0.284***	0.457***	

The sample is detailed in Table 1. In Panel A, *Future revenue (employment) growth over 3(5) years* is annualized rate of growth in sales revenue (employee numbers) between *t*+1 and *t*+3 (*t*+5), calculated using the method in Section III. In Panel B, unless noted otherwise, the growth drivers are measured at the end of (over) year *t* (prediction date): *Revenue* is in CNY. billion and *Employment* is in thousand, both at the end of year *t*; *Age* is the number of years from a firm's first registration to year *t*; *Tobin's Q* is a firm's market value divided by total assets at the end of year *t*; *Capex* is capital expenditure divided by net fixed assets; *RnD* is R&D expense divided by sales; *Leverage* is total borrowing divided by common equity; *Cash flow* is operating cash flow, averaged over past three years, divided by sales; *Asset utilization* is sales divided by total assets; and *Shareholder return* is net profit divided by shareholders' equity; *Past revenue (employment) growth* is the annualized rate of growth in sales revenue (employee numbers) between *t*–2 and *t*. All growth drivers are winsorized at 1 and 99 percentiles.

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Panel C shows Pearson (upper-left) and Spearman (lower right) correlations between key variables. *Size* is the natural log of either sales revenue (in CNY million) or employee numbers (in thousand) at the end of year *t*. The sample size for this panel is 30,129 observations.

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Table 3. Predicting Future Growth: Regression Analysis

Panel A. Overall sample

		Future revenue growth		*Future employment growth*	
	Pred.	3 years	5 years	3 years	5 years
Growth drivers	sign	(i)	(ii)	(iii)	(iv)
Intercept		0.526***	0.461***	0.011	0.031**
		(7.78)	(7.37)	(0.78)	(2.35)
Hypothesis 1					
Size	−	-0.083***	-0.079***	-0.040***	-0.045***
		(-5.02)	(-5.20)	(-5.31)	(-7.24)
Size^2	+	0.005***	0.005***	0.008***	0.009***
		(5.22)	(5.09)	(5.10)	(6.73)
Age	−	-0.012***	-0.010***	-0.007***	-0.008***
		(-5.97)	(-5.19)	(-3.65)	(-4.04)
Age^2	+	0.030***	0.026***	0.018***	0.022***
		(4.97)	(4.01)	(2.97)	(3.37)
Hypothesis 2a and b					
Tobin's Q	+	0.008**	0.005*	-0.000	-0.002
		(2.58)	(1.76)	(-0.09)	(-0.97)
Capex	+	0.013	0.021*	0.005	0.010
		(1.26)	(2.05)	(0.69)	(0.99)
RnD	+	0.146	0.179	0.177**	0.160
		(0.92)	(1.51)	(2.20)	(1.68)
Hypothesis 3a and b					
Leverage	−	-0.009**	-0.007**	-0.001	0.001
		(-2.66)	(-2.40)	(-0.52)	(0.32)
Cash margin	+	0.065**	0.071***	0.118***	0.100***
		(2.54)	(3.67)	(6.12)	(6.31)
Hypothesis 4					
Asset utilization	−	-0.006	-0.001	0.038***	0.035***
		(-0.89)	(-0.20)	(7.52)	(7.52)
Shareholder return	+	0.062***	0.019	0.090***	0.089***
		(5.43)	(1.04)	(5.98)	(4.05)
Hypothesis 5	−	-0.003	-0.009	0.031***	0.013
Past growth		(-0.15)	(-0.49)	(3.61)	(1.71)
Adj. R^2		0.070	0.070	0.067	0.105
Fixed effect		Industry, year			
Sample size		36,002	29,029	30,129	23,896

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Panel B. Select industries with heavy R&D activities

	Pred.	Industry					
		Manufacturing		Business equipment		Health care	
	sign	Revenue	Employment	Revenue	Employment	Revenue	Employment
Capex	+	0.022	0.052**	-0.007	0.001	0.030	-0.026
		(0.75)	(2.83)	(-0.47)	(0.11)	(1.21)	(-0.72)
RnD	+	0.267	0.452***	0.234**	0.278***	0.567***	0.130
		(1.25)	(4.11)	(2.17)	(3.53)	(2.93)	(0.90)
The rest drivers		Omitted					
Adj. R^2		0.085	0.063	0.085	0.074	0.082	0.103
Sample size		10,663	8,848	4,434	3,506	2,872	2,434
Mean							
Capex		0.206		0.330		0.223	
RnD		0.020		0.043		0.024	

The table shows the results of regressing future revenue (employment) growth over 3(5) years on the growth drivers that are measured at the end (over) *t*. *Size* is the natural log of sales revenue and employee numbers for columns (i) and (iii), respectively; $Size^2$ is defined similarly. *Past growth* is the annualized rate of growth over past three years in sales revenue and employee numbers, for columns (ii) and (iv), respectively. The rest of the variables are defined in Table 2. *t*-statistics (shown in parentheses) are calculated using standard errors clustered by firm and year. ***, **, * indicates being significant at 1%, 5%, and 10%, respectively, from two-sided tests.

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Table 4. Non-linear Relationship between Firm Size and Future Growth

Panel A. Firm size and growth measured by revenue

Groups based on current revenue	Number of observations	Future 3-year revenue growth		
		Full period	2000s	2010s
1 (smallest firms)	4,936	0.178	0.169	0.181
2	4,924	0.136	0.148	0.132
3	4,922	0.135	0.146	0.129
4	4,927	0.119	0.139	0.107
5	4,926	0.105	0.128	0.097
6	4,921	0.102	0.136	0.089
7	4,927	0.091	0.117	0.080
8	4,922	0.089	0.123	0.074
9	4,923	0.090	0.131	0.075
10 (largest firms)	4,934	0.095	0.157	0.068
Difference				
1 vs. 5/6		0.074***	0.037***	0.088***
5/6 vs. 10		0.009***	-0.026***	0.025***
1 vs. 10		0.083***	0.012*	0.113***

Panel B. Firm size and growth measured by employment

Groups based on current employment	Number of observations	Future 3-year employment growth		
		Full period	2000s	2010s
1 (smallest firms)	3,808	0.054	0.029	0.063
2	3,813	0.045	0.036	0.050
3	3,803	0.031	0.021	0.037
4	3,805	0.025	0.020	0.027
5	3,818	0.020	0.019	0.021
6	3,805	0.015	0.017	0.015
7	3,812	0.014	0.016	0.012
8	3,814	0.007	0.011	0.006
9	3,813	0.009	0.018	0.006
10 (largest firms)	3,808	0.003	0.023	-0.005
Difference				
1 vs. 5/6		0.036***	0.011*	0.045***
5/6 vs. 10		0.015***	-0.005	0.022***
1 vs. 10		0.051***	0.006	0.067***

In each year, the sample firms are sorted into 10 groups, each with the same number of firms, based on sales revenue or employee numbers. In both panels, the top portion reports median future revenue (employment) growth over three years by group. The bottom portion shows the differences in median growths between Group 1 (smallest), Group 10 (largest), and Groups 5 and 6 (mid-sized). The number of observations shown are for the full sample period. ***, **, * indicates the difference is significant at 1%, 5%, and 10%, respectively, from two-sided *t* tests.

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Table 5. Proportions of SOEs among Firms of Different Sizes

	Firm size measured by			
	Revenue		Employment	
Groups based on firm size	Number of observations	Proportions of SOEs	Number of observations	Proportions of SOEs
1 (smallest firms)	4,510	12.4%	3,560	26.4%
2	4,501	15.6%	3,554	28.0%
3	4,500	18.7%	3,544	29.9%
4	4,504	23.4%	3,550	33.2%
5	4,503	27.7%	3,558	37.3%
6	4,498	34.2%	3,538	42.1%
7	4,505	37.8%	3,546	44.3%
8	4,499	41.5%	3,548	50.6%
9	4,501	50.5%	3,548	53.9%
10 (largest firms)	4,508	56.7%	3,556	57.7%

The table shows the proportions of SOEs by groups based on either sales revenue or employee numbers. A firm is considered an SOE if its ultimate controlling shareholder(s) is the State Assets Supervision and Administration Commission (SASAC), a local bureau of SASAC, or a local finance bureau. Due to data constraints, the sample period reduces to between 2003 and 2019 and there is additional sample loss over this period.

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Responses to reviewers' comments by the authors

Referee(s)' and Co-Editor Comments to Author:

Referee: 1

Recommendation: Minor Revision

Comments:
You have presented some compelling arguments regarding the concerns raised. Analysing financial data, particularly focusing on profitability and return, SOEs may exhibit lower return compared to POEs. But this disparity arises from their distinct purposes and roles within the Chinese economy, thus the financial figures could hardly be the conclusive remarks on growth. Growth comes with multiple dimensions. To gain a comprehensive understanding of the SOEs growth patterns and underlying factors, qualitative data would be essential in explaining this complexity. I suggest that the study should add limitations to inform the audience. **A limitations section has been added, recognising the points you make in the comment above.**

Additional Questions:
1. Originality: Does the paper contain new and significant information adequate to justify publication?: Ok.

2. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: Ok.

3. Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: Ok.

4. Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: OK.

5. Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: Ok.

6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc. Does the title of the paper adequately reflect the key concepts/ideas/topics addressed?: Ok.

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Referee: 2

Recommendation: Minor Revision

Comments:
Comments to the Author,

Thank you for your great efforts to improve the manuscript, and I can see such improvements overall. However, there is still room to elaborate further. In particular, I cannot see any new contributions to the literature, even though I think the paper can produce insightful implications based on data that may not be accessible from outside of China. Also, the discussions are poorly developed, so they should be elaborated further. **We respond to the specific points below in order to address these issues.**

Please refer to the more detailed comments below.

In the Abstract, the growth pattern of smaller and younger firms has been discussed in many papers, so this is not quite new, though this paper discusses Chinese businesses. To better identify the contributions of this paper, it would be helpful to elaborate further, discussing why previous studies of Chinese firms have limitations in addressing this issue. This can be added to the discussion section and compared with other literature. **This has been added to the initial part of the Literature Review (Section II). It has helped to be more explicit that even though interactions between the state and the entrepreneur are important considerations in China, explanations of private enterprise growth are due to a much wider range of variables than this factor.**

If you can provide any additional discussion about the trajectory records of SOEs to compare their performance between the early stage and the current maturity of SOEs, your readers may find more meaningful information. This information can be added to the analysis section and the discussion. **A Chinese paper using extensive longitudinal data and an AER model of the Chinese economy considering private and state-owned enterprises are cited to indicate lower productivity and financial returns for SOEs. Their findings align with our results.**

Also, there have been different growth patterns among private companies depending on their age and size. This means you need to strengthen this argument by investigating other relevant papers. **One of the key original papers on firm size and age – Evans (1987) and an empirical study are referenced to confirm overall effects. Please note, however, that there are few papers looking at this in China and those we identified are not in well established journals and do not provide sufficient robut conclusions to deploy in this paper.**

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For the term 'Dual Economy', it is necessary to define what 'dual economy' means in this paper and why the term is defined as such. Normally, many studies use this term to distinguish between two different industrial sectors, not to identify public and private sectors. **Reference to dual economy has been removed in order to remove this ambiguity. As you indicate, there are different definitions of dual economy, so this wording does not help the paper.**

On page 4, the differences in growth patterns by firm size are not quite new; many similar studies have discussed this. However, you can present this as a case of two cohorts in China and mention that there are similar patterns found in previous studies. As noted above, this paper can also compare large and small companies across the two sectors (e.g., smaller/larger in the private sector and smaller/larger in SOEs). **Reference to previous studies is made, and the points about smaller/larger and private/state-owned made.**

On page 6, I am not sure that the expression "the fastest growing" is appropriate. It would be better to use "the fast-growing firms," and it would be helpful to define what companies are categorised as fast-growing in this paper (e.g., by providing a specific growth rate value for the top and bottom groups among ten evenly divided groups). **Agree. We have changed the wording. The growth rates by group are provided in Figure 4 in the paper.**

In Tables 4 and 5, the numbers differ between employment growth and revenue growth. I can see that some companies did not have revenue data in their early business stages, as shown in Table 1, so the difference makes sense. However, the paper should indicate why the sample sizes differ in the Data and Sample section. **Done.**

On page 21, the discussion mainly illustrates the data analysis results rather than developing the discussion in comparison with the literature reviewed in the paper. Where are those discussions? The discussion section should be improved accordingly. **We have changed the title of this section to make it more focused on analysis of results. We have also refined the discussion at the end of this section to make it clear that growth up to 2008 and growth after offer two different patterns, and that there are plausible explanations for both.**

On page 24 (Conclusions), the conclusion should provide clear answers to the research questions rather than simply illustrating what the Chinese economy shows in terms of the growth records of both groups. **The section has been amended to explicitly address the two questions raised in the abstract.**

Also, you should refer to the literature reviewed in the paper so that readers can compare this study with previous research. **References have been added and key articles on the growth and finance literature added to provide this comparison.**

The implications should offer meaningful discussions about what readers can learn from this paper. Although this paper investigates Chinese cases, readers should be able to draw insights for their own research or economies. Please consider providing such implications. Once published, the readers of this paper will not be limited to

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those interested in China. Based on the research findings, we need to know what to avoid and what to enhance for national economic development and future research. This is a very important contribution for a research paper. **The broader importance of the private sector in delivering economic growth has been identified as a key implication arising from this study.**

Additional Questions:
1. Originality: Does the paper contain new and significant information adequate to justify publication?: In terms of data, the paper presents new and significant information. However, it lacks high-quality discussion and does not sufficiently contribute to the literature or the journal.

2. Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: The paper does investigate relevant literature and refers to it when framing the hypotheses.

3. Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?: The research method employs a longitudinal approach to test hypotheses related to the growth trajectories of private and public businesses in China. The research design and hypothesis testing are appropriately addressed.

4. Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?: The results are clearly presented in tables, but it would be more effective to indicate the extent to which each result is supported or not supported by the literature reviewed in the paper.

5. Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: Although theoretical contributions are limited, the paper focuses on an empirical case study of China, which demonstrates its uniqueness compared to other studies. Nonetheless, the discussion and implications should be further developed.

6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc. Does the title of the paper adequately reflect the key concepts/ideas/topics addressed?: Overall, the paper is easy to read.

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