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Who should be Running Ahead? The Roles of Two Types of Entrepreneurship in China's Contemporary Economy

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One of the most important transitions of China from a centrally planned economy to a market-based economy was the emergence of entrepreneurship in two different forms of private enterprise, viz. getihu and siyingqiye. Using a unique database for 31 Chinese regions over the period 1997-2009, we investigate the economic antecedents of regional rates of getihu and siyingqiye, and find that the antecedents of these rates are substantially different. We also investigate the mutual interactions between getihu and siyingqiye at the regional level. Our analysis suggests that both types of entrepreneurship play important but distinct roles in stimulating China's economic development.

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INTRODUCTION

The Chinese economy has gone through major transitions in the last three decades, where a substantial part of economic activity has shifted from state-owned sectors to private sectors. With a population of more than 1.3 billion people and a labor force of more than 800 million[1], the economic potential of China remains huge. Two developments characterize China's economic transition. First, China has transitioned from a tightly centrally-planned economy to a market-orientated economy but still shaped by the government's long-term economic development plan and entrepreneurship focus (cf. Oi 1995; Huang 2010). Policies have helped speeding up China's economic development by making important adjustments in the areas of education, national innovation system, economic openness, market function, infrastructure investment, etc.

[1] Source: World Bank, World Development Indicators.

This transition cycle has run for more than three decades and still plays a critical role in China's economic growth. One important characteristic of this economic and institutional transition is *the attitude transition* in acknowledging entrepreneurship. Second, China has been developing from a factor-driven economy to an efficiency-driven economy in the past 30 years, and is now transitioning to an innovation-driven stage.[2] These developments are not independent from each other with entrepreneurship undoubtedly contributing to China's fascinating economic growth (with more than 60% of China's Gross Domestic Product (GDP) in 2012 being performed by the private sector).[3]

The number of studies on China's economic and institutional transition is booming (e.g., Ahlstrom and Bruton 2002; Anderson et al. 2003; Batjargal and Liu 2004; Begley et al. 2005; Davies and Walters 2004; George and Prabhu 2000; Lau and Busenitz 2001). Two main streams of literature may be distinguished. The first stream treats China as an institutional context and investigates the institutional environment and entrepreneurship in China either separately or in direct relation to each other (Qian, 2000; Yang and Li, 2008, Zhou, 2014), but overlooks the aggregate *indirect* impact of economic institutional transition on entrepreneurship development, i.e., through shaping economic antecedents of entrepreneurship such as economic openness, human capital, institutional market changes, etc. (see also Figure 1 in our theory section).

The second stream statistically investigates the impact of a specific economic factor (such as FDI, the cost of labor, social capital, industrialization, etc.) on China's economic performance, either at the micro or macro level (Chuang and Hsu 2004; Madariaga and Poncet 2007; Buckley et al. 2007; Xing 2010; Li and Atuahene-Gima 2001; Lin & Germain 2003). These studies

[2] Cf., in Global Innovation Index 2013, China was ranked 3rd regarding the dimension of knowledge & technology output and 4th in creative output (Cornell University, INSEAD, and WIPO, 2013). See Porter, Sachs and McArthur (2002), for a description of these different stages of economic development.
[3] Calculated from data from the National Bureau of Statistics of China (NBSC): http://www.stats.gov.cn/
also news from http://english.cntv.cn/program/bizasia/20130206/105751.shtml

investigate a direct link between economic antecedents and economic development, but overlook the intermediate mechanism of entrepreneurship, where not only the number of private firms but also the quality of the private firm sector play their own important roles in China's economic development.

This study aims to address the crucial link between economic antecedents and private firm rates in Chinese regions, in order to offer a better understanding on the nature (in terms of both quality and quantity) of entrepreneurship in China. Our analysis helps to predict to what extent increasing numbers of private firms may contribute to economic development, taking into account that not only the quantity but also the quality of a region's private firm population determines the economic impact of entrepreneurship (Thurik et al., 2013).

In order to shed light on the quality of a region's entrepreneurship population, we investigate the missing link in the economic mechanism of China's entrepreneurship and economic development: the economic antecedents of private firm rates in Chinese regions. Distinguishing between two different types of private firms (getihu versus siyingqiye; to be introduced in the next section), we investigate to what extent regional private firm rates are sourced from 'productive' antecedents, i.e., antecedents which are in accordance with a modern, innovation-driven ('entrepreneurial') type of economy (Audretsch and Thurik, 2000, 2001, 2004; Thurik et al., 2013), where comparative advantage is no longer based on exploitation of scale economies (as in the efficiency-driven economy), but rather on the ability to generate and commercialize new knowledge (Porter et al., 2002; Audretsch and Thurik, 2001). From the perception of the economic consequences of entrepreneurship development, establishing the economic antecedents of private firm rates then enables us to reflect on the extent to which entrepreneurship development in China has been up to speed with transitioning to the innovation-driven stage of economic development. In particular, different antecedents will be associated with

different types of entrepreneurship and different roles played in the economy. In the same spirit, we also investigate to what extent interactions between the numbers of getihu and siyingqiye types of private firms are in line with an 'entrepreneurial' type of economy.

In terms of the title of our paper, by investigating regional antecedents of getihu and siyingqiye and their mutual interactions, we aim at drawing conclusions as to which type of private firm should take the lead ('run ahead') in transitioning China towards the innovation-driven stage of economic development, where knowledge-based entrepreneurial activity is key.

By investigating regional-level determinants of entrepreneurship in China, our study contributes to extant literature in at least three ways. First and as already mentioned, the antecedents of Chinese economic development (e.g. FDI, labor costs, etc.) have often been investigated quantitatively, however the intermediate mechanism of entrepreneurship influencing economic development has been overlooked. This study therefore contributes by investigating the role of economic antecedents in shaping entrepreneurship development (see also Figure 1 in our theory section).

Second, as far as research on entrepreneurship is concerned, we move analysis of entrepreneurship during economic transition in China beyond qualitative evidence (case studies and descriptive statistics) of how entrepreneurs adapt to changing economic circumstances. We apply econometric analysis to quantify the impact of regional conditions on the rates of two types of private firms in regional economies. Regional antecedents of Chinese firm rates have been rarely investigated, let alone the antecedents of the two main different types of private firms (Yang and Li, 2008).

Third, by applying a simulation analysis, we are able to shed light on the size and magnitude of the mutual interaction between getihu firms and siyingqiye firms in Chinese regions. This, in turn, gives us an indication to what extent these types of firms are able to stimulate and challenge each other in the current Chinese economy.

The paper is organized as follows. After reviewing the evolution of China's institutional environment and corresponding private firm development since the 1980s, our theory section addresses the conceptual framework of this study. This section also briefly describes how economic antecedents may be different in the 'managed' versus the 'entrepreneurial' economy (Audretsch and Thurik, 2001). Based on our theory section we then develop our hypotheses. Next, we describe our data, model set-up and methodology. In the final sections we present and discuss our results and conclusions.

HISTORICAL BACKGROUND OF CHINESE ENTREPRENEURSHIP

In a transition context, a successful entrepreneurial economy depends not only on the initial conditions in the transition economy but also on the speed and consistency with which the reform process is applied (Estrin, Meyer, and Bytchkova 2006). In the last three decades, China has attempted an entrepreneurial approach in the economic transition from a central-planning system to a market-based economy. The major characteristics of China's institutional environment, especially formal institutions since the 1950s, comprise the *one party state* and *strong government intervention* (Barkema et al. 2015). Although Chinese government has been relaxing the impact of state control on market and business, policy-driven economic transition still cannot be denied as the major cause of China's entrepreneurship development via the shaping of economic antecedents. These antecedents have been considered as the key factors in promoting efficient social reforms and economic development (World Bank 1993), efficiently bringing Chinese society restrictive covenants (Stiglitz and Yusuf 2001).

Since the late 1970s, Chinese entrepreneurship has experienced three generations of organizational forms: commune and brigade enterprises, Township and Village enterprises (TVE), and finally, getihu and siyingqiye. Commune and brigade enterprises were the first generation, born in the 1980s, designed by the central government to deal with the bad economic consequences caused by China's Cultural Revolution (1966 to 1976), particularly in

nonagricultural industries (Gregory, Tenev, and Wagle 2000). This organizational form did not function in Chinese economy longer than a decade and was then replaced by the second generation, TVEs, characterized by shared ownership of local government and collectives. Similar to the first generation, TVEs faced tremendous questioning on its ownership and the nature as private firms. Though it contributed significantly to China's economy in the late 1980s (20% of China's gross output; Liao and Sohmen 2001), TVEs were terminated by gradually being replaced by the third generation of organizational forms from the late 1980s: getihu and siyingqiye.

Getihu (in Chinese) are private businesses that are registered at the Chinese Industry and Commerce Office in the enterprise category with no more than seven people hired as employees.[4] In June 1988, the Chinese central government issued the tentative stipulations on private enterprise (TSPE), stipulating that a unit with privately owned assets and more than seven employees could be registered as another form of private enterprise named *siyingqiye* (in Chinese).

Besides the difference in the maximum number of employees, there are also some other important differences between getihu and siyingqiye. In particular, getihu are restricted to only use individual or household assets for running their firm but they register with a shorter procedure and wider cognitive acceptance.[5] In contrast, siyingqiye are given much more relaxed conditions in terms of more allowed sources of registered capital (i.e., shareholders can be from outside of the entrepreneur's family), but are compulsory required to hold a fixed amount of registration capital, causing higher start-up costs. For these differences, getihu are usually smaller than siyingqiye in terms of organizational size.

[4] This policy was based on Marx's theory that if a business is allowed more than seven employees, the result could be the exploitation of labor (from "Das Kapital" by Karl Marx, 1867).

[5] In the early stage of China's entrepreneurship development, entrepreneurs who chose to set up getihu were more often from necessity orientation. Getihu form received more legitimate support from government.

Introducing getihu and siyingqiye as new organizational forms of private firms was a landmark for China's economic transition, and very critical in China's entrepreneurship development. Since then, private firms have started coexisting with State-Owned Enterprises (SOEs), though they only played a marginal, stop-gap role in the economy in the early 1990s (Gregory, Tenev, and Wagle 2000). However, given China's policy-driven economic transition, the early stage of governments' discriminative attitude to private sectors hampered Chinese entrepreneurs' contribution due to a lack of acknowledgement, resources, and development space. In 1989 and 1990, China's economic growth rate slowed to 4.4% and 3.9% respectively.

In 1992, Deng Xiaoping's South Touring Talk changed Chinese entrepreneurs' situation. Deng's suggestion of transforming China into an economically strong country through entrepreneurial activities has guided Chinese government to re-set the goal of economic reform to transit China into a socialist market economy (announced at The Chinese Fourteenth Party Congress in September 1992) on the foundations of entrepreneurship. A series of reforms was executed, such as reducing state intervention to state-owned companies, "selling off small ones" (Young 1995) and "grasping the large" (zhuada fangxiao in Chinese, meaning saving the larger SOEs and letting smaller SOEs exit or be acquired).[6] Other new policies included the fields of foreign exchange, taxes, monetary and fiscal system, and streamlining government bureaucracy (Qian 2000). By 1996, these reforms had triggered a second boom in entrepreneurial activities, following 50% to 70% of the SOEs being privatized.

In the late 1990s, China's entrepreneurship development entered a new era. By 1998, getihu and siyingqiye together accounted for one-third of national industrial output and one-fifth of national non-farm employment (Gregory, Tenev, and Wagle 2000). Chinese government started to clarify the importance

[6] Because it was no longer viable to sustain a vast number of small and medium-sized SOEs in the face of market competition (Xu, Lu, and Gu 2014)

of entrepreneurship in China's economy. In 1999, the Second Plenary of the Ninth People's Congress gave the private sector the same legal footing as the public sector, remarked as the central government's formally granting private sectors constitutional recognition (Zhou 2014).

This governmental attitude change is also echoed by Chinese governmental de-centralization reform in the late 1990s, by which regional governments have relatively independent authority to determine the structure of regional expenditure (Qian 2000), issuing business license, coordinating business development, resulting business disputes, and enacting tax policies (Zhou 2014).Therefore, each provincial government had to figure out which regulatory policies were most appropriate for their own region, or imitate successful policies in other regions (Breznitz and Murphree 2011). Partly as a result of differences in regional policies, there is considerable variation in regional rates of getihu and siyingqiye.

To summarize, since the end of the 1990s private firms in the forms of getihu and siyingqiye account for ever increasing shares of China's GDP, and there is considerable variation, both over time and across regions, in the relative prevalence of these two types of private firms. This variation will be exploited in the empirical analysis, where economic antecedents of getihu and siyingqiye rates are investigated.

THEORY

Conceptual framework: The role of entrepreneurship in modern China

Current literature on China's strong economic growth in recent decades has not taken into account the bigger picture of China's entrepreneurship and economic development so that current knowledge about the role of entrepreneurship in China's economic development has been partial in nature. Figure 1 exhibits our view on the bigger picture of the economic mechanism of China's entrepreneurship and economic development. Since 1978, Chinese government has been gradually experimenting various transitional policies, which led to improvement of welfare (the standard of living) for the majority of the

population (direct link between the most left and most right boxes in Figure 1), but also to entrepreneurial activities being promoted in two ways. First, directly, by allowing and acknowledging the important role of private enterprise in the Chinese economy (arrow 1 in Figure 1), which contributed to an increase in the numbers of private firms. Second, by improving the conditions for entrepreneurship, such as the renovation of labor, attracting foreign investment, facilitating urbanization, investing in knowledge stock and human resource development, and upgrading the institutional environment[7], entrepreneurial activities may be boosted as well (see arrow 2 in Figure 1).

[Insert Figure 1 here]

In this study, we address the link between economic antecedents and private firm rates in Chinese regions (arrow 2 in Figure 1). This link is crucial to understand the nature (in terms of quality) of entrepreneurship in China. In particular, while it is clear that the number of private firms has increased considerably over the last two decades, it is not clear to what extent these increased numbers may contribute to economic development (arrow 3 in Figure 1), because higher numbers of private firms do not necessarily spur economic development (Van Praag and Van Stel 2013; Shane 2009). The economic contribution of entrepreneurship has been found to differ across different types of firms (e.g. ambitious vs. non-ambitious, opportunity vs. necessity-based), and hence the economic impact of entrepreneurship will not only be determined by the quantity but also by the quality of a region's private firm population (Thurik, Stam, and Audretsch 2013).

In order to shed light on the quality of a region's entrepreneurship population, we investigate the economic antecedents of (two types of) private firm rates in Chinese regions. In particular, we investigate to what extent regional private firm rates are sourced from 'productive' antecedents like, for instance, a high education level of the regional population. Hence, by studying the crucial link between economic antecedents and private firm rates, we are

[7] See the arrow between China's policy-driven economic institutional transition and economic antecedents in Figure 1.

able to understand the role of China's macro-economic and economic institutional transition in shaping Chinese private firms' development, not only directly in terms of facilitating higher numbers of private firms (arrow 1 in Figure 1), but also in terms of shaping the right antecedents of entrepreneurship, influencing the type (quality) of entrepreneurship, and specifically uncover the economic antecedents of China's two organizational forms of private firms: getihu and siyingqiye.

We will select economic antecedents from the literature on regional determinants of entrepreneurship (e.g. Reynolds, Storey, and Westhead 1994) and empirically test to what extent economic antecedents of regional private firm rates are in line with the theory of the 'entrepreneurial economy' (Audretsch and Thurik 2000, 2001, 2004; Thurik, Stam, and Audretsch 2013). This theory, discussed in more detail later on, describes how entrepreneurship contributes to macro-economic development in the innovation-driven stage of economic development, and which factors (antecedents) determine productive entrepreneurship (Baumol 1990). This theory is particularly relevant for entrepreneurship development in China, which is moving from an efficiency-driven economy towards the innovation-driven stage (Fu 2015; Fu and Mu 2014) with a number of regions taking the lead, such as Beijing, Shanghai, and Shenzhen.[8] If economic antecedents of regional private firm rates in China are in line with those described in the theory of the 'entrepreneurial economy', it may be expected that the economy has the right incentive structure in place to produce high quality entrepreneurship, and hence, that the entrepreneurial sector (private firm population) contributes substantially to economic development.

Rather than attempting to establish a direct link between entrepreneurship development and economic development (arrow 3 in Figure 1), which is hampered by the complexity of incorporating entrepreneurship in

[8] From the speech of Chinese premier Li Keqiang at 2015 World Economic Forum (https://agenda.weforum.org/2015/01/chinese-premier-li-keqiangs-speech-at-davos-2015/).

formal models of economic theory and endogenous growth (Baumol 1968; Carree and Thurik 2010), we take a more indirect approach by studying economic antecedents of entrepreneurship (arrow 2 in Figure 1). As far as we are aware of, this is one of the first (if not, the first) studies on economic antecedents of regional rates of entrepreneurship in China, providing a better understanding of the complex role of entrepreneurship in China's economic development. From the perception of the economic consequences of entrepreneurship development (arrow 3 in Figure 1), this then enables us to reflect on the extent to which entrepreneurship development in China has been up to speed with transitioning to the innovation-driven stage of economic development.

From a managed to an entrepreneurial economy

China's current transition from an efficiency-driven stage to an innovation-driven stage of economic development requires a different way of organizing economic activity. In particular, in the efficiency-driven stage, comparative advantage is realized by an efficient use of physical capital which facilitates exploitation of scale economies. This exploitation typically takes place in an environment where the value of new ideas is relatively certain, so that economies of scale can also be achieved in the research and development sector. The most profitable firms in such an economy are typically large firms which can be relatively easy to maintain high profit levels. These are the characteristics of the so-called 'managed' economy (Audretsch and Thurik 2001). In contrast, in the 'entrepreneurial' economy, small and new firms play an important role, introducing new products and services in highly uncertain economic environments while quickly adapting to rapidly changing consumer preferences. In this type of economy, knowledge is a crucially important factor of production and the prime source of competitive advantage. Economic, and particularly, innovative activity by a heterogeneous population of firms is required for an innovation-driven economy (or 'entrepreneurial' economy) to be competitive. In the entrepreneurial economy, competitive advantage of firms

is based on new knowledge that, as a result of globalization and fast and expanding ICT developments, is highly uncertain in nature. This uncertainty causes the success of introducing new products or services to be less predictable than in the managed economy. A firm may only experience the economic value of his idea once it introduces the idea to the market (passive learning). At the macro-level the market will select the best firms with the economically most valuable new product ideas. These firms will grow whereas the less innovative firms will decline and eventually exit (Jovanovic 1982).

In this environment, where scale economies are relatively less important and flexibility more important, smaller firms are relatively better equipped to compete, and strong firm performance is generally less persistent as competition is stronger. These are the characteristics of the 'entrepreneurial' economy (e.g. Audretsch and Thurik 2001). In such an environment, entrepreneurs with higher human capital levels tend to select into entrepreneurship, as higher skills are required to compete in the market (Van Stel, Millán, and Román 2014). This notion is very much echoed by China's recent national economic development strategy of "Mass Entrepreneurship and Innovation"[9] to encourage and provide a better environment for Chinese people in starting entrepreneurial activities and pursuing innovation at established firms, so as to foster the new engine of economic growth.

DERIVATION OF HYPOTHESES

We will derive hypotheses from the regional determinants of entrepreneurship literature (e.g. Reynolds, Storey, and Westhead 1994; Armington and Acs 2002). In this literature, determinants of entrepreneurship at the regional level are typically classified in three categories (Bosma et al. 2008): (i) demand and supply factors for entrepreneurship, (ii) agglomeration effects, and (iii) cultural or policy environment determinants. Regional demand for entrepreneurship relates to conditions for local consumer demand. For instance, higher average

[9] From the speech of Chinese premier Li Keqiang at 2015 World Economic Forum (https://agenda.weforum.org/2015/01/chinese-premier-li-keqiangs-speech-at-davos-2015/).

incomes in a region imply that consumers have more money to spend, and hence there is more room ('demand') for entrepreneurship. On the other hand, a region with relatively highly educated inhabitants may produce relatively many individuals with the right skills for entrepreneurship ('supply' of entrepreneurship). We include in our study the main demand and supply side variables of regional entrepreneurship, including industrial structure (demand side), the stock of human capital (supply side) and the average wage rate, which has features of both the demand and the supply side.

Furthermore, we also include explicit measures of agglomeration effects and regional policy (such as the institutional environment) as well as two variables which are particularly relevant for regional entrepreneurship in the Chinese context, i.e., inward FDI and investments by state-owned enterprises, both of which may be classified on the demand side of entrepreneurship. But we will start our derivation of hypotheses with the interaction between the numbers of getihu and the number of siyingqiye.

Interaction between getihu and siyingqiye. Our first hypothesis relates to the interaction between getihu and siyingqiye firms. Although getihu has a longer history than siyingqiye and are chosen by entrepreneurs in larger numbers, getihu and siyingqiye may benefit from each other's presence. First, in China's contemporary economy getihu and siyingqiye play different roles in the value chain, where, in certain sectors such as retail, construction, trading service, etc., (larger) siyingqiye firms often act as demanders of specialized, high-quality, intermediate goods and services, while getihu, because of their specialized activity and size, often act as suppliers. Hence, a stronger presence of siyingqiye in a region may create more demand for intermediate goods and services, allowing more room for specialized getihu firms in the market. This suggests a positive effect of the number of siyingqiye on the number of getihu. However, in other sectors, such as manufacturing, the reversed value chain relation occurs as well, i.e., siyingqiye delivering products and services to

getihu (in line with a positive effect of the number of getihu on the number of siyingqiye).

Second, in an 'entrepreneurial' economy, one may expect a continuous battle between small, innovative firms, most of which may be expected to have the lower-cost getihu organizational form (at least until it is clear that the firm will be successful and grow beyond the seven employees limit). The most viable firms with the best product ideas will grow out to larger size, and hence transition to the siyingqiye organizational form. The more (high-quality) getihu there are in an economy, the more competitive this evolutionary process will be, and the larger the chance that the 'winners' from this process will grow bigger to siyingqiye firms. This suggests a positive impact of the number of getihu on the number of siyingqiye.

Importantly, for both processes described above, substantial interaction between getihu and siyingqiye can only take place if the getihu firms are of sufficient quality. Therefore, we interpret the strength of the interaction between getihu and siyingqiye firms, in both directions, as a reflection of the average quality of the getihu firms. We argue that a competitive getihu sector strongly facilitates the emergence of an 'entrepreneurial' economy in China.

We thus hypothesize the interaction between getihu and siyingqiye firms to be positive (in both directions). However, the strength of the mentioned competition process (well-performing getihu challenging and stimulating siyingqiye in a region) depends on the quality and innovative capacity of the getihu firms, as weaker firms will not be able to challenge other firms, which will then also not be stimulated to increase their performance (Fritsch and Mueller 2004). As high-quality small and new firms play a more important role in innovation-driven economies, we expect the effect of getihu on siyingqiye to be especially strong, given the transition of China to an innovation-driven economy (Fu and Mu 2014).

Hypothesis 1: The rate of getihu and the rate of siyingqiye have a positive impact on each other but the impact of getihu on siyingqiye is relatively stronger.

Remuneration of Labor. The remuneration of labor in a region, as proxied by the level of the average regional wage rate, may have positive and negative effects on the rate of private firms. High wage rates imply that labor market participants may earn more income as an employee than as an entrepreneur, lowering the supply of entrepreneurs. Also, for homogeneous labor, high wages imply higher costs of employing personnel, which makes running a business with sustainable profit levels more difficult. Hence, the number of firms may be expected to be lower in high-wage regions (Ashcroft, Love, and Malloy 1991). In contrast, higher wages may imply a higher demand for products and services by consumers, and may therefore be associated with *more* firms in the region. Moreover, in high-tech industries, higher wages may actually be a sign of higher human capital levels of the employees, enabling firms to outperform their rivals through higher productivity of their employees (Okamuro 2008). In more 'entrepreneurial' economies, where producing at the technological frontier is more common, higher wages may thus go together with higher employment (Audretsch and Thurik 2001). Put differently, higher wages may indicate higher regional supply of high human capital workers implying higher productivity levels. Such regional labor markets are attractive environments to operate private firms. This may hold especially for siyingqiye firms which are not restricted in the number of (high-skilled) jobs they can provide at the technological frontier of production.

Hypothesis 2: A region's level of remuneration of labor is positively related to the rate of private firms but stronger related to siyingqiye.

Stock of human capital. Opportunity-based entrepreneurial activities are associated with entrepreneurs' backgrounds and prior experience (Djankov et al. 2006). According to Shane (2000), the factors that impact the discovery of entrepreneurial opportunities are the possession of prior information and the

cognitive ability to value existing opportunities. Kaish et al (1991) state that those who are better at identifying a new opportunity have prior information complementary to the new information embedded in the opportunity, because specialized information is more useful than general information for most activities (Becker and Murphy 1992). Therefore, we argue that people with a higher level of specialized education (or more generally, people with high human capital) are more likely to exploit such opportunities.

As human capital is the main determinant of entrepreneurs' earnings (Van Praag 2005), regions with a higher proportion of college graduates (which indicates higher human capital stock level) may generate higher rates of entrepreneurs and firms (Armington and Acs 2002; Acs and Armington 2004). However, as entrepreneurs with high human capital levels are typically able to obtain such high earnings by running large firms with many employees (Lucas 1978), average firm size in regions with high stocks of human capital may be higher. Indeed, Van Praag and Van Stel (2013) show that in economies with higher educated labor forces, the number of employees per firm (i.e., average firm size) tends to be higher. Consistent with this evidence, (Millán et al. 2014) show that entrepreneurial performance of the average entrepreneur is stronger in countries with higher educated populations, suggesting that labor market participants with the highest entrepreneurial ability rates select into entrepreneurship, as predicted by Lucas (1978).

Thus, it may be expected that in regions with higher rates of college graduates, the number of entrepreneurs running larger (typically siyingqiye) firms is relatively higher. Accordingly, the number of entrepreneurs running smaller (typically getihu) firms will be relatively lower in such regions.

Hypothesis 3: A region's stock of human capital is positively related to the rate of siyingqiye firms but negatively related to the rate of getihu firms.

Institutional environment. China is often claimed to have an underdeveloped institutional framework (Chen, Chen, and Huang 2013). World Bank (2013) reports that China ranks 96th out of 189 countries worldwide

regarding the general ease of doing business. On a positive note, the report also reports that China ranks among the top-15 economies regarding *improvements* made in the ease of doing business between 2005 and 2013 (World Bank 2013). Regarding such improvements, many studies have argued that China's more stable and efficient institutions have helped Chinese entrepreneurial firms take long-term views and grow faster (Batjargal et al. 2013; Hitt et al. 2004). In particular, China's legal protection of property rights has had positive effects on entrepreneurial activities in China (Cull and Xu 2005; Lu and Tao 2010; Zhou 2011).

Notwithstanding these institutional improvements, considerable differences in the institutional environment still exist between Chinese regions (Zhou 2014). These may impact regional differences in private firm rates. In particular, in an institutional environment that is more business-friendly, the relative number of firms is expected to be higher. This effect may be even stronger for siyingqiye firms as they may have to deal with business regulations on a more frequent basis, e.g. labor market regulations (i.e., the costs of hiring and firing of workers). We hypothesize:

Hypothesis 4: A relatively well-developed institutional environment is positively related to the rate of private firms but stronger related to siyingqiye.

Agglomeration effects. Heavily populated areas are attractive locations for firms because of several advantages of agglomeration. First, in dense areas the local demand for products and services is high (Reynolds, Storey, and Westhead 1994). Second, the local supply of highly-educated workers is high, reducing the search costs for qualified labor (Wheeler 2001). Third, the closeness of people and firms provides an environment that is particularly conducive to knowledge spillovers (Audretsch and Feldman 1996). Other advantages include closeness of research institutions, closeness of suppliers, clustering of innovative firms from the same industry, and room for the creation of niche markets related to a high diversity of the population and associated variety in demand for products and services (Bosma et al. 2008).

Despite negative agglomeration effects such as higher input prices and congestion, the literature is dominated by the empirical evidence for positive agglomeration effects on new firm formation (e.g. Reynolds *et al*., 1994; Armington and Acs, 2002).

Particularly firms with growth potential may benefit from agglomeration advantages (e.g. big sales markets, easy access to qualified labor, good conditions for knowledge spillovers). We therefore hypothesize:

Hypothesis 5: A region's agglomeration effect is positively related to the rate of private firms but stronger related to siyingqiye.

Economic openness. Economic openness is considered as one of the most important characteristics of transitional countries. Many latecomer countries have shown that economic openness affects the economic output and eventually the rate of economic growth, either by export or FDI. In this study, we use inward FDI as an indicator of economic openness. For emerging countries, FDI contributes to the local economy development through financial capital and technology transfer. In particular, activities of multinational enterprises (MNEs) in host countries may generate knowledge externalities (technology spillovers) benefiting domestic firms in the local economy (Caves 1996; Blomström, Kokko, and Zejan 2000).

However, the other voice states that there might be no effect or even negative effects (Aitken and Harrison 1999; Haddad and Harrison 1993). Aitken and Harrison (1999) explain such a negative effect as "market stealing" or the crowding-out effect.[10] Caves (1996) and Blomström, Kokko, and Zejan (2000) also argue that the likelihood that MNEs will crowd out local firms is larger in developing than in developed countries. This is due to a higher technology gap between domestic and foreign firms, because FDI often represents a "death sentence" for local firms that usually cannot compete with MNEs that possess technological and financial advantages. The case for no effect refers to

[10] They argue that even though technology spillovers exist, more efficient foreign firms may draw demand from domestic firms, so the negative competitive effect may outweigh positive technology spillovers.

subsidiaries acting as enclaves in a developing country with lack of effective linkages with the local economy (Aitken and Harrison 1999; Feinberg and Majumdar 2001).

Pertaining to this study, we propose that economic openness, reflected by FDI, has a positive impact on entrepreneurship, where complementary effects dominate due to the reduced technological gap between MNEs and local Chinese firms and network linkage effects in between (Rodriguez-Clare 1996; Markusen and Venables 1999)). Yang, Tipton, and Li (2011) stress that by the time China moves to the late stage of market transition, Chinese local firms have benefited from foreign firms' modern technologies through licensing, international joint ventures (IJVs) and alliances. Complementary effects and networking effects in this stage therefore appear stronger than the crowding out effect. This stimulates local entrepreneurship if the necessary stimulating conditions are created (De Backer and Sleuwaegen 2003). As siyingqiye have a larger business scale than getihu and a stronger internal knowledge base to collaborate with MNEs more often, we hypothesize:

Hypothesis 6: A region's economic openness is positively related to the rate of private firms but stronger related to siyingqiye.

METHODS

Data Source and Sample

We use two major data sources in this study. The first is formed by the various *China Statistical Yearbooks* from the National Bureau of Statistics of China (NBSC) database, covering 31 Chinese regions over 13 years (from 1997 to 2009, in total 403 region-year observations). The NBSC statistics, largely accurate and internally consistent (Chow, 1993), include data about population, economy, and society at the national and regional levels over years, quarters, and months for thirty-one Chinese provinces in twenty-three categories (for national accounts, population, finance, industry, agriculture, trade, education, health, welfare, etc.) and have been used extensively in many China related studies (e.g. Buckley, Clegg, and Wang 2007; Chang and Xu 2008; Tian 2007).

The second data source is the database containing the institutional index developed by the Nevin Economic Research Institute (NERI) (Fan, Wang, and Zhu 2010) to reflect the regional institutional environment. This index has integrated the values from five dimensions of China's institutional environment: government and market forces, development of non-state-owned organizations, development of commodity markets, development of factor markets (in which local knowledge and scientist are evaluated), and the development of market intermediaries and the legal environment. This index has been extensively used in finance and economics (Chen, Ding, and Kim 2010), and has recently been introduced to the management literature as well (Gao et al. 2010; Schotter and Beamish 2011; Shi, Sun, and Peng 2012).

Dependent variable: Entrepreneurship

We define Chinese entrepreneurial activities as economic activities conducted by two types of private firms: getihu and siyingqiye. According to NBSC (2009), private enterprises are those having been registered at the departments of industrial and commercial administration for which the business operations are situated at a county town (i.e., a town where the county government is located), or at urban areas with administrative hierarchy higher than a county town. The main difference between getihu and siyingqiye is the number of employees that they can hire. Following the organizational status perspective of entrepreneurship (Audretsch, Kuratko, and Link 2015), we measure entrepreneurship as the rate of private firms (cf. Congregado 2008). We drew the number of getihu and siyingqiye private firms separately from each provincial Statistical Yearbook (from 1997 to 2009). We merged collected data and then divided the number of firms by the corresponding provincial population size to reflect the firm rate (per thousand capita). The variable names (as shown in Table 1) are ***GTHR*** for getihu rate and ***SYQYR*** for siyingqiye rate.

Independent Variables

We use the average (real) wage rate from town and cities to measure remuneration of labor (e.g. Ashcroft, Love, and Malloy 1991; Okamuro 2008).

We abbreviate this variable as ***WAGE.*** Following previous studies (Millán et al. 2014; Acs and Armington 2004), we measure a region's stock of human capital by the share of population holding tertiary education. As tertiary education (rather than primary or secondary education) is most likely to be associated with productivity (Vandenbussche, Aghion, and Meghir 2006), we use the college graduation rate (per thousand capita) as a proxy, including graduates from both junior colleges (*dazhuan)* and senior colleges (*daxue)*.[11] Dividing by population size, we express the number of college graduates per thousand capita. This variable is abbreviated in the regression as ***CGR*** (college graduates rate). To measure the quality of the institutional environment per region, we used the NERI Index developed by the Nevin Economic Research Institute (NERI) (Fan, Wang, and Zhu 2010). The index was drawn from the NERI index dataset and is abbreviated as ***IE***. Agglomeration effects are measured by population density in this study (e.g. Reynolds *et al*., 1994; Armington and Acs, 2002). We divided the total population by the territory size of the corresponding region (abbreviated as ***PD)***. Economic openness is majorly echoed by the permission of foreign direct investment. We divide the total amount of foreign investment by the corresponding regional gross production (RGP) in the same year, and the variable is abbreviated as ***FDI.*** Finally, to estimate mutual interactions, we also included the (lagged) siyingqiye rate as a determinant in the getihu equation, and vice versa.

Control Variables

We incorporate two control variables in our empirical analysis. First, we control for regional industry structure. As firm size is larger in manufacturing compared to, e.g., services (and hence the relative number of firms lower), a regional economy with a higher share of manufacturing is expected to have a lower private firm rate. We calculated manufacturing industry and service industry shares (in terms of GDP) in the total regional economy and abbreviated them as

[11] In China, *dazhuan* education takes three years and focuses more on practical capability training for industry, while *daxue* education takes four years and focuses more on academic training.

MI, SI in the regression tables. Second, we use a proxy for total investments by state-owned units over regional GDP, labeled ***TIGDP.*** High investments from state owned units may indicate high capital intensity where the large state-owned enterprises have a comparative advantage. In such regions, private firms may be crowded out and the rate of firms may be lower. The variable definitions are summarized in Table 1.

[Insert Table 1 here]

Descriptive statistics

Figure 2 shows the evolution over time of the rate of private firms (distinguishing between getihu and siyingqiye) while Figure 3 provides a regional comparison for the most recent year 2009. Although the rate of siyingqiye is far lower than that of getihu, our data show that, compared to getihu firms, siyingqiye firms occur relatively more often in higher developed regions: the correlation between the regional rates of siyingqiye and of economic development (real GDP per capita) is significantly positive at 0.719 at 5% significance level, whereas this correlation is only 0.216 for the rate of getihu. Accordingly, the cross-regional comparison (see Figure 3) presents a sharp gap between the most developed regions such as Shanghai, Bejing, Tianjing, Jiangsu and Zhejiang which rank top on the siyingqiye rate, and some developing regions which in contrast rank higher on the getihu rate. These correlations of the private firm rates with the regional level of economic development (GDP per capita) raise the question of which economic antecedents underlying the regional level of economic development are able to explain the variations in private firm rates? This is the subject of our empirical analysis.

[Insert Figures 2 and 3 here]

Table A1 in the (online) appendix presents descriptive statistics and the correlation matrix for the variables used in our empirical analysis. It shows that on average, the number of getihu has been about seven times higher than the

number of siyingqiye. However, the table conceals large regional differences with regard to the relative number of getihu versus siyingqiye firms.

Estimation methodology

We aim at explaining the regional rates of getihu firms and siyingqiye firms over the period 1997-2009 from the explanatory variables described above. Moreover, we want to take account of the correlation between the two dependent variables, i.e., the getihu and siyingqiye rates. Therefore, we apply seemingly unrelated regression (SUR) estimation (e.g., Bosma *et al.*, 2008, for a similar application) to provide separate sets of coefficients for both equations while acknowledging correlations between the error terms of both equations (Zellner 1962, 1963).

We estimate two different set-ups of our two-equation model. In our first set-up, we include variables for all (31) regions and all (12) years (1998-2009) in our estimation sample and include regional fixed effects in our model.[12] Hereby we focus on explaining the variations *over time* of the regional rates of getihu and siyingqiye (as the structural cross-regional differences in these firm rates are captured by the regional fixed effects, i.e., the terms β_{0i} in the model below). So, we investigate whether changes in our explanatory variables in a region lead to changes in firm rates in that particular region (dynamic approach). Our regression model looks as follows (indicators i and t represent region and year, respectively):

$$GTHR_{it} = \beta_{0i} + \beta_1 * SYQYR_{i,t-1} + \beta_2 * WAGE_{i,t-1} + \beta_3 * CGR_{i,t-1} + \beta_4 * IE_{i,t-1} + \beta_5 * PD_{i,t-1} + \beta_6 * FDI_{i,t-1} + \beta_7 * Controls + \varepsilon_{it}$$

$$SYQYR_{it} = \beta_{0i} + \beta_1 * GTHR_{i,t-1} + \beta_2 * WAGE_{i,t-1} + \beta_3 * CGR_{i,t-1} + \beta_4 * IE_{i,t-1} + \beta_5 * PD_{i,t-1} + \beta_6 * FDI_{i,t-1} + \beta_7 * Controls + \varepsilon_{it}$$

In our second set-up, we include variables for all regions but include only the years 1998, 2003 and 2009. Here we do not include regional fixed effects but instead estimate a pooled (SUR) model.[13] Hereby we focus on

[12] Note that we lose one year of observations because we include a lag in our model.

[13] The pooled model looks the same as the fixed effects model, with one exception: the β_{0i} terms are replaced by β_0.

explaining the variations *across regions* of the regional rates of getihu and siyingqiye, i.e., why do some regions have higher firm rates than other regions (static approach)? We assume that the cross-region samples for 1998, 2003 and 2009 are sufficiently independent to warrant pooling them in one regression (see Wennekers et al. 2007, for a similar set-up). Nevertheless we do include year dummies to account for differences between these three years.

RESULTS

The estimation results of our two SUR model set-ups as described above (regional fixed effects model versus pooled model) are presented in Tables 2 and 3.[14] Regarding the interaction between getihu and siyingqiye in Hypothesis 1, we observe positive effects which are significant at the 1% level, in both tables (models (1) and (2) in Tables 2 and 3). Moreover, the coefficients are in the same order of magnitude across the fixed effects and pooled estimations, rendering the results to be quite robust. Hence, on Hypothesis 1, we conclude that the interaction effects between the rates of getihu and siyingqiye are positive in both directions.

It is now interesting to consider which cross-effect dominates, in terms of strength. Clearly, as the size of the coefficient for the effect of siyingqiye on getihu (model (1)) is much higher, in *absolute* terms this effect dominates over the strength of the vice versa effect (getihu on siyingqiye). However, this is directly related to the much higher getihu rate (21.1 on average, see Table 2) compared to the siyingqiye rate (3.1 on average). It is more interesting to consider the *relative* impact of both cross-effects. To this end we introduce a simulation analysis (see Appendix 1), where, in one exercise, we provide an impulse of 10% to the number of getihu and consider how the number of siyingqiye develops over time, based on our actually estimated parameter estimates of their mutual interactions (holding the other independent variables

[14] Note that in some model variants, the number of observations in Table 2 is slightly smaller than 372 (i.e., 31 regions times 12 years). This is due to some missing observations for some of the independent variables. Similarly, the number of observations in some variants of Table 3 is slightly smaller than 93 (i.e., 31*3).

constant).[15] In a second exercise, we investigate the reverse impact (i.e., the impact on the number of getihu of a shock of 10% to the number of siyingqiye). We find that the elasticity of getihu on siyingqiye is 0.51 (i.e., a 10% increase in the number of getihu leads to a 5.1% increase in the number of siyingqiye) whereas the elasticity of siyingqiye on getihu is only 0.29.

Hence, the effect of the getihu rate on the siyingqiye rate is relatively stronger than the vice versa effect, consistent with the second part of Hypothesis 1. Therefore, ceteris paribus the effect of other independent variables, our empirical analysis predicts that the gap between the number of siyingqiye and getihu will become smaller in the near feature. We refer to Appendix 1 for more details about this simulation exercise.

Regarding a region's level of remuneration of labor, we find a significantly positive impact of the regional average wage rate on the rate of siyingqiye, both in Tables 2 and 3. As explained in our theory section, higher wages may reflect a higher regional supply of high human capital workers with higher productivity levels. As such regional labor markets provide an attractive environment to operate private firms, in particular firms which are not restricted in size (i.e., siyingqiye firms), the relative number of siyingqiye firms is higher. This result is in line with Hypothesis 2 and also in line with the theory of the 'entrepreneurial economy'. Regarding the impact of wages on the rate of getihu, results are mixed. Using the fixed effects model (Table 2), we find a positive impact, whereas using the pooled model (Table 3), we find no significant effect. Hence these results are not robust. Possibly, some of the negative influences of higher wages on entrepreneurship discussed in the theory section, such as the higher opportunity costs of entrepreneurship, may play a role. In other words, it may be that in high-wage regions, labor market participants prefer a high wage in paid employment over owning and running a getihu firm, which necessarily remains small in size, thereby hampering the possibility of earning a high income through owning and running a getihu firm. In contrast, in such regions,

[15] See Burke and Van Stel (2014) for a similar simulation exercise predicting developments of entry and exit rates.

entrepreneurs of siyingqiye firms have more possibilities to earn a high income by expanding their firm with high-quality employees, hence the positive effect of wages on the rate of siyingqiye firms. We conclude that the impact of average wages on the siyingqiye rate is in line with the 'entrepreneurial economy' whereas the impact of wages on the getihu rate is not. Accordingly, Hypothesis 2 is partly supported.

Regarding the impact of the regional stock of human capital, we see that the coefficient of the college graduates rate for siyingqiye is significantly positive in both Tables 2 and 3. Hence, in regions with relatively more higher educated workers, the number of entrepreneurs running larger (siyingqiye) firms is relatively higher, as theorized in the first part of Hypothesis 3. The second part of Hypothesis 3, stating that the number of smaller (getihu) firms is relatively lower in such regions, is only partly confirmed as the coefficient is significantly negative in Table 2 (model 1) but not significant in Table 3.

Regarding the institutional environment, we find that regions with more business-friendly institutions have higher siyingqiye rates, consistent with Hypothesis 4. For getihu we do not find a significant effect. Hypothesis 4 is thus only partly supported. Apparently, a business-friendly institutional environment facilitates siyingqiye firms more than getihu firms.

On agglomeration effects, we find a negative sign of population density for the rate of getihu and a positive sign for the rate of siyingqiye firms. The latter effect is in accordance with our expectations as particularly large firms or firms with growth ambitions will benefit from the advantages of agglomeration (e.g. easy access to qualified labor). The former effect is somewhat surprising, as for getihu firms, the disadvantages of agglomeration (e.g. congestion, high input prices) seem to exceed the advantages. Thus, Hypothesis 5 is partly confirmed.

Regarding the impact of a region's economic openness, as proxied by the rate of inward FDI, we find a non-significant relation between inward FDI and the rate of getihu, possibly reflecting that getihu firms and foreign firms

compete on different markets. The relation of inward FDI with the rate of siyingqiye is found to be negative. Apparently, foreign firms are able to draw demand from siyingqiye, so that the market share of siyingqiye decreases when FDI levels in a region are higher. Hypothesis 6 is not supported.

Finally, results of our control variables are in line with our expectations: firstly, in regions with a higher share of manufacturing, the rate of siyingqiye is lower, probably reflecting a higher average firm size (as manufacturing firms require a considerable scale of operation to compensate for higher fixed costs); secondly, private firms, and particularly siyingqiye firms, seem to find it hard to compete with SOEs (witness the negative sign of TIGDP in Table 2 and 3).

[Insert Tables 2 and 3 here]

CONCLUSION AND DISCUSSION

Arguably the most important change in the transition of China from a centrally planned economy to a market-based economy was the admission and acknowledgement of private enterprises in the 1980s and 1990s in the form of getihu and siyingqiye firms. In this study we investigated the evolution and the economic antecedents of regional rates of siyingqiye and getihu over a decade (from 1997 to 2009), as well as the interactions between the regional rates of these two types of organizational forms.

A big literature exists on various aspects of China's transition to a market economy. However, to our knowledge no attention has been paid to the variations in rates of siyingqiye and getihu, both across regions and over time. This study not only documents these variations but also explains them. By investigating to what extent regional antecedents of getihu and siyingqiye rates are in line with those predicted by the theory of the 'entrepreneurial economy' (e.g. Audretsch and Thurik 2004), we are able to reflect on the extent to which entrepreneurship development in China has been up to speed with transitioning to the innovation-driven stage of economic development.

We find that determinants of the regional rates of siyingqiye and getihu are substantially different. Among others, a region's prevalence of college graduates is positively related to the rate of siyingqiye but not so to the rate of getihu. Our results also suggest that agglomeration advantages accrue to siyingqiye rather than getihu firms. Thus, siyingqiye firms are relatively more often present in regions where economic antecedents are conducive to knowledge production and knowledge spillovers. As knowledge is the main source of competitive advantage in innovation-driven economies, we may therefore say that regional incentive structures for siyingqiye seem to be in line with a modern competitive economy, where knowledge-based entrepreneurship is key.

Although siyingqiye firms thus seem to be conducive to China's innovation-driven economic development, our results also show that the presence of large companies, either in the form of inward FDI or in the form of SOEs, still crowds out domestic siyingqiye firms. This suggests that, although China is transitioning towards an innovation-driven economy, and away from an efficiency-driven economy, economies of scale still play an important role in China's contemporary economy.

Regarding getihu, we notice that antecedents of regional getihu rates are less in line with the 'entrepreneurial economy'. For instance, we do not find evidence for a positive association between the education level of the regional population and the number of getihu firms. This may reflect that part of getihu firms are started out of a necessity-motivation. When labor market participants have no other options for work, they may start their own firm, and the getihu form is then the easiest (and cheapest) organizational form to choose. However, notwithstanding the presence of necessity-motivated entrepreneurs in the getihu sector, nowadays entrepreneurial activity among getihu is increasingly

opportunity-based.[16] In this respect, the getihu form may offer advantages also to ambitious entrepreneurs as the small scale and scope enables them to be flexible and use a low-profile environment to experiment with new ideas.[17]

Our simulation exercise also seems to support this conjecture of an increasing quality of the getihu sector: we find that there is relatively strong interaction between regional rates of getihu and siyingqiye. We interpret the relatively strong interaction between the two types of firms as a sign that the getihu sector in China is of considerable quality.[18] Regarding these interactions we find that the impact of getihu on siyingqiye (estimated elasticity 0.51) is even stronger than vice versa (0.29), predicting that, ceteris paribus, the gap between the number of getihu and siyingqiye will decrease in the near future. As siyingqiye antecedents have been found to be more in line with the 'entrepreneurial' economy, this predicted increase in the share of siyingqiye firms (relative to getihu) suggests that China is slowly but surely transitioning towards an 'entrepreneurial' economy.

On balance, our results suggest that siyingqiye and getihu each play their own role in the modern Chinese economy. Siyingqiye firms have the possibility to grow and are therefore attractive to ambitious, opportunity-oriented entrepreneurs. Our analysis suggests that siyingqiye entrepreneurship in China is indeed to a large extent opportunity-driven as its rates are found to be highest in regions where economic antecedents are conducive to running profitable, competitive firms in the modern knowledge-based economy. Nevertheless, siyingqiye rates are lower in regions with a high large-firm presence, marking China's transitional stage between the efficiency-driven and

[16] For instance, China's national team in the Global Entrepreneurship Monitor reports that the proportion of opportunity-driven entrepreneurship increased from 40% in 2002 to 58% in 2011 (http://www.gemconsortium.org/country-profile/51).

[17] Indeed, in the 2010s, in certain sectors such as the internet industry, many ambitious entrepreneurs choose the getihu form as it enables them to experiment in a small-scaled environment while enjoying a relatively easy registration procedure (http://news.xinhuanet.com/fortune/2015-03/26/c_1114778026.htm)

[18] Regarding the quality of the getihu sector, the contradicting results for the regional wage rate are also insightful. For the static analysis, we find no significant relation, suggesting that positive ('entrepreneurial economy') effects are being offset by negative ('managed economy') effects. Through path-dependency, the static analysis results partly reflect the initial distribution of (necessity-based) getihu firms. In contrast, for the dynamic analysis we find a positive impact, consistent with increasing numbers of opportunity-oriented getihu firms over time.

innovation-driven economy, where economies of scale still play an important role.

In contrast, antecedents of getihu firms are less clearly linked to reaping the fruits of the 'entrepreneurial' economy, possibly indicating that the getihu sector consists of a mixture between necessity-driven and opportunity-driven entrepreneurs. However, our analysis also suggests that the share of high-quality, opportunity-driven entrepreneurs in the getihu sector may be increasing, as getihu firms were found to play an important role by enabling the number of siyingqiye firms to increase.

Future research may focus on analyzing different types of entrepreneurship, even within the getihu and siyingqiye forms. For instance, it would be interesting if the numbers of getihu and siyingqiye could be split by sector of economic activity, start-up motivation, innovation orientation, or other dimensions. At present, as far as we are aware of, such detailed data are only available to a limited extent though. Another interesting avenue for future research is related to the competition of siyingqiye with foreign firms. Our analysis suggested that, although siyingqiye firms seem to be well-equipped to compete in a modern, knowledge-based economy, to some extent they seem to fall victim to crowding-out effects by inward FDI. However, recent evidence also shows that siyingqiye firms have started going abroad via the route of outward FDI in overseas markets (such as Africa, South Asia, and Eastern Europe). Whether inward FDI really has crowding-out effects for Chinese private firms on the domestic market, and to what extent they respond by going abroad (outward FDI) will be an interesting topic for future research.

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FIGURE 1---ECONOMIC MECHANISM OF CHINA'S ENTREPRENEURSHIP AND ECONOMIC DEVELOPMENT

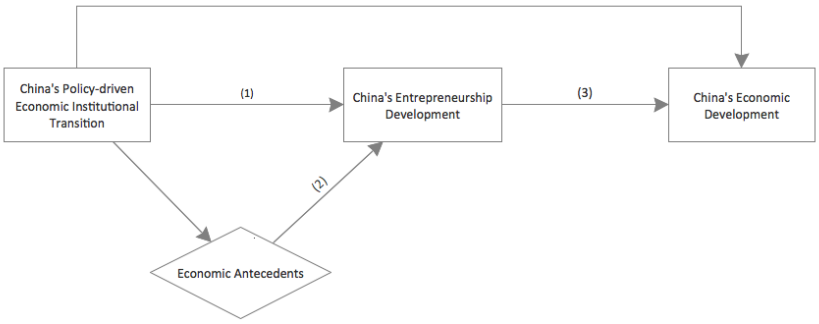

FIGURE 2--DEVELOPMENT OF RATE OF ENTREPRENEURSHIP (1997-2009)

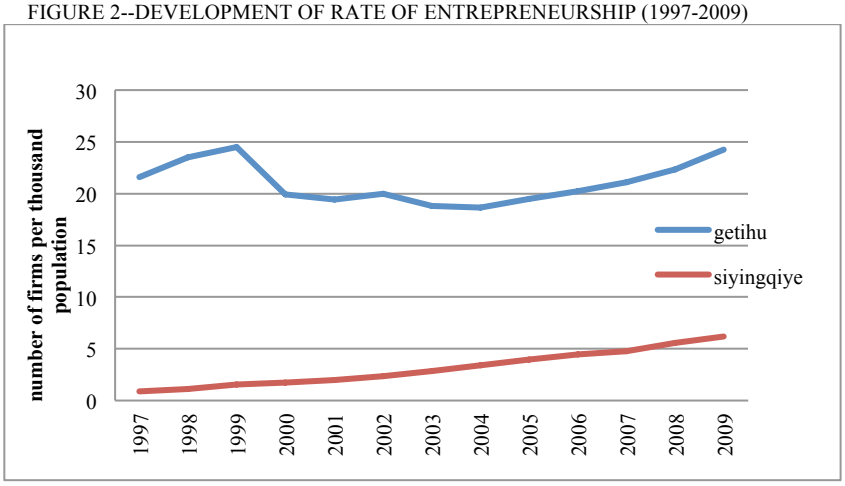

FIGURE 3---RATE OF PRIVATE FIRMS ACROSS REGIONS (2009)

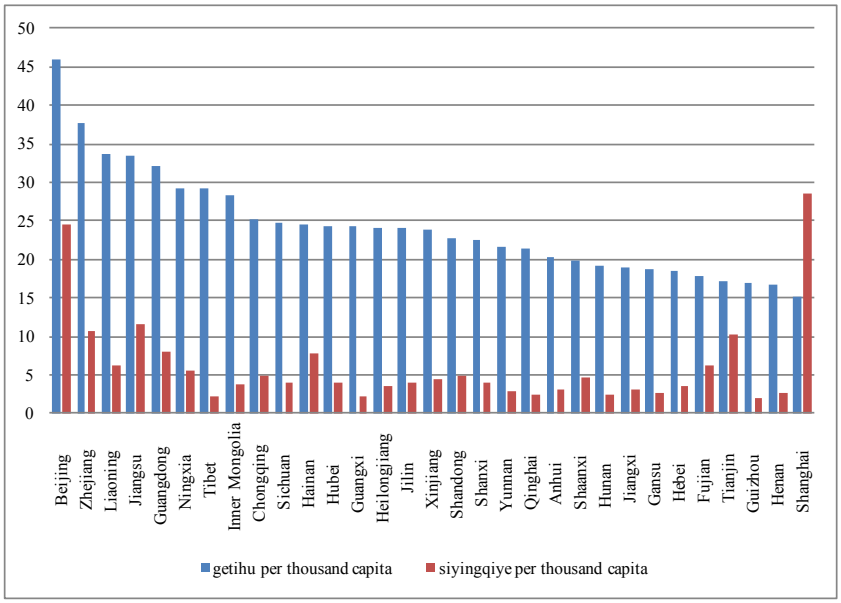

TABLE 1---VARIABLE DEFINITION

Variable	**Definition**
GTHR	Getihu Rate: The number of getihu private firms per thousand capita
SYQYR	Siyingqiye Rate:The number of siyingqiye private firms per thousand capita
WAGE	Average (real) wage in thousands of RMB (Chinese currency)
CGR	College graduates rate: the number of college graduates per thousand capita
IE	Institution Environment Index
PD	Population density expressed in number of people per squared kilometre
FDI	Inward FDI volume as a percentage of GDP
TIGDP	Total investment by SOEs as a percentage of GDP
MI	The GDP share of manufacturing industry in the regional economy (%)
SI	The GDP share of service industry in the regional economy (%)

TABLE 2---SUR ANALYSIS OF ECONOMIC ANTECEDENTS OF ENTREPRENEURSHIP DEVELOPMENT: FIXED EFFECTS MODEL FOR 1998-2009

VARIABLE	GTHR	SYQYR
	(1)	(2)
SYQYR(t-1)	1.7495***	
	(0.254)	
GTHR(t-1)		0.0666***
		(0.008)
WAGE(t-1)	0.7051***	0.2153***
	(0.195)	(0.033)
CGR(t-1)	-1.8526***	0.3558***
	(0.549)	(0.098)
IE(t-1)	0.7363	0.5382***
	(0.519)	(0.091)
PD(t-1)	-0.0376***	0.0119***
	(0.005)	(0.001)
FDI(t-1)	0.0860	-0.0230**
	(0.059)	(0.011)
TIGDP(t-1)	-0.0406	-0.0215***
	(0.038)	(0.007)
MI(t-1)	0.1904	-0.0888***
	(0.162)	(0.029)
SI(t-1)	0.2493	-0.0333
	(0.169)	(0.031)
Constant	9.8999***	0.0471
	(1.518)	(0.279)
Region Fixed Effects	YES	YES
Year Fixed Effects	YES	YES
Mean_DV	21.1	3.1
Observations	369	369
R-squared	0.382	0.899

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Mean_DV: Mean of dependent variable for estimation sample

TABLE 3---SUR ANALYSIS OF ECONOMIC ANTECEDENTS OF ENTREPRENEURSHIP DEVELOPMENT: POOLED MODEL FOR 1998, 2003 AND 2009

VARIABLE	GTHR	SYQYR
	(1)	(2)
SYQYR(t-1)	1.8487***	
	(0.392)	
GTHR(t-1)		0.1019***
		(0.022)
WAGE(t-1)	-0.0373	0.2943***
	(0.259)	(0.061)
CGR(t-1)	-0.3929	0.3934**
	(0.628)	(0.161)
IE(t-1)	0.6748	0.4202***
	(0.531)	(0.132)
PD(t-1)	-0.0142***	0.0038***
	(0.002)	(0.000)
FDI(t-1)	0.0260	-0.0342*
	(0.071)	(0.018)
TIGDP(t-1)	0.0400	-0.0299*
	(0.064)	(0.016)
MI(t-1)	0.2952**	-0.0947***
	(0.116)	(0.031)
SI(t-1)	0.2440	-0.0073
	(0.196)	(0.052)
Constant	-9.062	-1.596
	(9.606)	(2.526)
Region Fixed Effects	NO	NO
Year Fixed Effects	YES	YES
Mean_DV	21.6	3.3
Observations	92	92
R-squared	0.414	0.893

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Mean_DV: Mean of dependent variable for estimation sample

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TABLE A1--- DESCRIPTIVE STATISTICS AND CORRELATIONS

	Obs	Mean	Std.Dev.	Min	Max	GTHR	SYQYR	WAGE	CGR	IE	PD	FDI	TIGDP	MI	SI
GTHR	403	21.1	7.6	9.2	58.0	1									
SYQYR	403	3.1	4.2	0	28.5	0.2020*	1								
WAGE	402	14.3	8.7	0.93	56.6	0.1722*	0.7315*	1							
CGR	402	2.5	1.5	0.77	8.98	0.1770*	0.7254*	0.5997*	1						
IE	399	5.6	2.1	0.29	11.8	0.1490*	0.6406*	0.5687*	0.5512*	1					
PD	403	380	519	2.0	3554	-0.0754	0.7670*	0.3855*	0.5370*	0.4882*	1				
FDI	401	8.3	8.4	0	61.4	0.0253	0.3896*	0.1546*	0.3295*	0.4981*	0.4619*	1			
TIGDP	402	42.5	13.6	17.8	82.5	-0.0443	0.1572*	0.5316*	0.2370*	0.0607	-0.0655	-0.1815*	1		
MI	402	45.2	8.2	17.6	61.5	0.0873*	0.0699	0.0777	0.2065*	0.3790*	0.1774*	0.0600	-0.0219	1	
SI	402	38.3	6.8	24.6	73.2	0.1242*	0.6200*	0.5545*	0.5474*	0.2105*	0.4066*	0.3243*	0.3217*	-0.4140*	1

Pairwise correlation coefficients are reported
* $p<0.05$ (two-tailed)

Appendix 1: Simulation analysis

In this appendix we present the results of a simulation analysis where, first, we provide a shock to the number of getihu and use our actually estimated coefficients to establish how the number of getihu and siyingqiye develop over time as a result of such an impulse. Second, we investigate how these numbers develop when we apply a shock of equal relative magnitude to the number of siyingqiye. Hence, we compute to what extent the number of one type of firms increases as a result of an increase in the number of the other type, i.e., we compute the magnitude of the interaction between the numbers of getihu and siyingqiye in both separate directions. The goal of this exercise is to enable a prediction, based on our estimation results, about the future development of the number of siyingqiye firms relative to the development of the number of getihu firms in Chinese regions. Do our estimation results imply that the proportion of siyingqiye firms in the total number of private firms will increase or decrease in the near future?

Using our actually estimated parameter estimates, we first investigate the impact on the development of the numbers of getihu and siyingqiye of a shock of 10% to the number of getihu in an imaginary region where the initial proportion of siyingqiye versus getihu equals the average from our data base. In other words, we assume this initial proportion of siyingqiye over getihu is (3.1/21.1)=0.147 (see Table 2). For simplicity, we translated this into initial numbers of getihu and siyingqiye of 21100 and 3100, see the first row of Table A2 (period 0 or the starting situation). Hence, we consider what happens if we provide a ceteris paribus shock to the system in period 1 of 10% of getihu firms. Given the initial numbers, this shock translates into an increase of 2110 getihu, see period 1 in Table A2. The numbers of getihu and siyingqiye at the end of period 1 are simply calculated by adding the change in period 1 to the number of firms at the end of period 0.

In period 2, the lagged interaction effect of the shock to the number of getihu is emerging. In particular, the number of siyingqiye changes with 0.0666 times 2110 (see Table 2, model (14), and period 1 in Table A2 below), equaling 141.[1] In contrast, the number of getihu does not change in period 2 because the change in the number of siyingqiye in the previous period (1) was 0. The numbers of getihu and siyingqiye at the end of period 2 are again calculated by adding these changes to the number of firms from the previous period. In period 3 the number of getihu changes with 1.7495*141=246. In the periods that follow, there are still delayed effects on the number of firms of the shock in period 1 but the effects fade away over time. Indeed, as can be seen from Table A2, from period 8 onwards, the change in both the numbers of getihu and siyingqiye is zero and the new equilibrium situation has been reached.

It is now interesting to compare the numbers of getihu and siyingqiye in the new equilibrium and the old equilibrium and consider the relative change in these numbers. We then see in Table A2 that, as a result of the initial shock of 10% to the number of getihu firms, the number of siyingqiye has increased with 5.1%. This corresponds to an elasticity of 0.51, implying a substantial impact of the number of getihu on the number of siyingqiye. Note that in the new equilibrium, the number of getihu has increased with 11%, but 10% out of this 11% change is due to the initial shock.

The second exercise is similar to the first one, but instead of applying a shock of 10% to the number of getihu, we apply a shock of 10% to the number of siyingqiye. Results are in Table A3. Here we see that in the new equilibrium, as a result of the initial shock of 10% to the number of siyingqiye firms, the number of getihu has increased with 2.9%, corresponding to an elasticity of 0.29.

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[1] Note that the fixed effects nature of the estimation model (i.e., the consideration of variations over time) requires us to apply the coefficients to the changes in the number of firms, instead of the levels.

Hence, the relative impact of getihu on siyingqiye (elasticity 0.51) is much bigger than the reverse impact of siyingqiye on getihu (elasticity 0.29), implying that the number of siyingqiye will increase much faster as a result of a given increase in getihu, than the number of getihu will as a result of an increase in siyingqiye of similar magnitude (+10%, in this example). Leaving aside the influences of other independent variables (i.e., ceteris paribus), our empirical analysis therefore predicts that, as a result of the mutual interaction between the two types of firms, the proportion of siyingqiye relative to getihu will increase in the near future, or in other words, our analysis predicts that the number of siyingqiye will grow relatively faster than the number of getihu. This, in turn, implies that the gap between the number of siyingqiye and getihu will decrease in the near future.

TABLE A2---SIMULATING THE EFFECTS OF A 10% INCREASE IN THE NUMBER OF GETIHU

Period	Number of getihu	Number of siyingqiye	Change in number of getihu	Change in number of siyingqiye
0	21100	3100		
1	23210	3100	2110	0
2	23210	3241	0	141
3	23456	3241	246	0
4	23456	3257	0	16
5	23484	3257	29	0
6	23484	3259	0	2
7	23488	3259	3	0
8	23488	3259	0	0
9	23488	3259	0	0
10	23488	3259	0	0
Change between old and new equilibrium (periods 0 and 10)	2388 (+11%)	159 (+5.1%)		

TABLE A3: SIMULATING THE EFFECTS OF A 10% INCREASE IN THE NUMBER OF SIYINGQIYE

Period	Number of getihu	Number of siyingqiye	Change in num-ber of getihu	Change in num-ber of siyingqiye
0	21100	3100		
1	21100	3410	0	310
2	21642	3410	542	0
3	21642	3446	0	36
4	21706	3446	63	0
5	21706	3450	0	4
6	21713	3450	7	0
7	21713	3451	0	0
8	21714	3451	1	0
9	21714	3451	0	0
10	21714	3451	0	0
Change between old and new equilibrium (periods 0 and 10)	614 (+2.9%)	351 (+11%)		