

# Property Rights, Deregulation, and Entrepreneurial Development in a Transition Economy

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**ABSTRACT** This article investigates the relative roles of formal property rights institutions versus deregulated markets in entrepreneurial development, based on China's market transition. Empirically, it is not yet known which set of institutions matters more for entrepreneurship, particularly in the long run, despite the existence of well-established theoretical arguments for each. Using provincial-level panel data from China's transition economy, this study has the following findings: On average, both formal protection of property rights and deregulated markets have positive effects on entrepreneurial development; yet, as market transition progresses, the effect of formal protection of property rights increases, while that of deregulated markets decreases. These results are robust to both multiple model specifications and an endogeneity test using an instrumental variable approach. Overall, therefore, while both sets of institutions indeed play positive roles in entrepreneurial development, property rights institutions may be more fundamental in the long run.

**KEYWORDS** China, deregulated markets, entrepreneurial development, property rights, regionally decentralized system, transition economy

## INTRODUCTION

Institutions are formal or informal constraints that structure human interaction (North, 1990). Formal institutions include formal rules such as laws and regulations, together with their enforcement mechanisms, sanctioned by the state; informal institutions refer to informal constraints such as customs, norms, and cultural beliefs that are imposed on, or internalized by, social actors (North, 1990; Scott, 1995). Among social scientists, there is no longer significant debate concerning whether institutions matter in economic development (Acemoglu & Johnson, 2005). Among scholars in the field of entrepreneurship, since the publication of the classic work of both Baumol (1990) and North (1990), there has been a growing consensus that institutions, particularly formal institutions, are a primary determinant of entrepreneurial activity and performance.

According to both Baumol and North, institutions can affect entrepreneurship development because, as 'rules of the game' in a society, they structure not only

individual opportunities to access market information and resources, but also entrepreneurial incentives to invest and produce (North, 1991). More specifically, North has focused on the fundamental importance of secure private property rights, which refers to individuals' rights, or powers, to consume, obtain income from, and alienate scarce resources (Demsetz, 1967). Based on analysis of the rise of the Western world, North (1990; North & Weingast, 1989; North & Thomas, 1973) has argued that a credible commitment on the part of the state to protect private property rights is necessary for entrepreneurial investment because enterprising individuals will invest only when they expect to be able to keep the fruits of their investment.

Baumol (1990), on the other hand, focuses on broader institutions. He argues that different institutions affect profit opportunities, and, thus, rates of return, for different entrepreneurial investment activities. Based on Baumol, researchers have identified a set of 'good' formal institutions that provide positive opportunities and incentives for productive entrepreneurship (see reviews in Acs & Szerb, 2007; Bruton, Ahlstrom, & Li, 2010; Jennings, Greenwood, Lounsbury, & Suddaby, 2013; Minniti, 2008; Minniti & Levesque, 2008). Among the identified 'good' formal institutions, some protect property rights as North argues (e.g., legal rules for secure property rights, a fair and balanced judicial system, and legal enforcement mechanisms); some support a deregulated market (e.g., a free market system that underpins voluntary exchange, and free entry and competition);<sup>[1]</sup> and others, possibly, support both (e.g., effective constitutional limits on government's ability to transfer wealth through taxation and regulation).

Based on North and Baumol's theories, a vast entrepreneurship literature has emerged to empirically examine the effect on entrepreneurship of either institutions for protecting property rights or those supporting a deregulated market, or some combination of the two. With data from both developed economies and developing and transition ones, researchers have generally found support for the significance of either formal protection of property rights (Aidis, Estrin, & Mickiewicz, 2008; Johnson, McMillan, & Woodruff, 2002; Lu & Tao, 2010; Puffer, McCarthy, & Boisot, 2009; Zhou, 2013, 2014) or deregulated markets (Capelleras, Mole, Greene, & Storey, 2008; Djankov, Porta, Lopez-de-Silanes, & Shleifer, 2002; Gohmann, Hobbs, & McCrickard, 2008; McMullen, Bagby, & Palich, 2008; Zhou, 2011).

However, the existing literature, in general, has studied the effect of formal protection of property rights and that of deregulated markets separately, and thus has rarely attempted to examine the relative roles of each in entrepreneurial development. Empirically, therefore, it is not yet known which matters more, especially in the long run, despite the existence of well-established theoretical arguments emphasizing each set of institutions. North (1990) and, more recently, Acemoglu et al. (Acemoglu & Johnson, 2005; Acemoglu, Johnson, & Robinson, 2005) have argued that formal protection of property rights is more fundamental

because incentives will exist to create and improve markets once individuals have secure property rights. Thus, it follows that, in the long run, formal protection of property rights may play a more significant role in entrepreneurship than deregulated markets.

On the other hand, many other scholars have emphasized the role of deregulated markets. According to Djankov et al. (2002), as well as Acs and Szerb (2007) and De Soto (2000), high levels of regulation in terms of both firm entry and markets inevitably detract from the available pool of wealth among entrepreneurs, leading to fewer businesses being started and slower growth of existing firms. Based on the experience of transition economies, many researchers have further suggested that a deregulated market may be more important for entrepreneurship than formal protection of property rights (see reviews by McMillan & Woodruff, 2002; Whyte, 2009). This may be because, while property rights can often be protected effectively through a variety of informal social arrangements with low costs (Dixit, 2004), there are no cheap and efficient social remedies for a heavily regulated market (Djankov et al., 2002).

Therefore, this paper aims to investigate the relative significance of formal protection of property rights versus deregulated markets in entrepreneurial development, particularly in the long run. To accomplish this goal, I will examine not only the effects of the two sets of formal institutions in the same model, but also how the effect of each set changes over a relatively long period. The empirical setting for this investigation is China's transition economy. This setting is best suited for such an investigation because, since the late 1970s, and particularly since 1992, China has experienced concurrent development in formal protection of property rights, deregulated markets, and entrepreneurship, and there has been substantial variation across regions in institutional development due to the regionally decentralized system (Fan & Wang, 2000, 2001, 2006; Xu, 2011; Zhou, 2011, 2013, 2014).

For hypothesis testing, I used provincial-level panel data, which covers all Chinese provinces in a period of fast institutional and entrepreneurial development (1998–2006). Given that institutions vary greatly both horizontally and vertically (Greenwood, Raynard, Kodeih, Micelotta, & Lounsbury, 2011), a number of entrepreneurship researchers have recently called for comparative research rather than single-region/community designs (Bruton et al., 2010; Jennings et al., 2013) and longitudinal research rather than cross-sectional designs (Djelic, Nooteboom, & Whitley, 2005) to fully capture the institutional effects. Panel data, which have not been used often in the entrepreneurship literature, are most appropriate for testing institutional effects since such data combine both comparative and longitudinal research designs. To verify whether institutional effects are biased due to the endogeneity problem, this study has also adopted an instrumental variable approach to test for endogeneity of key institutional variables.

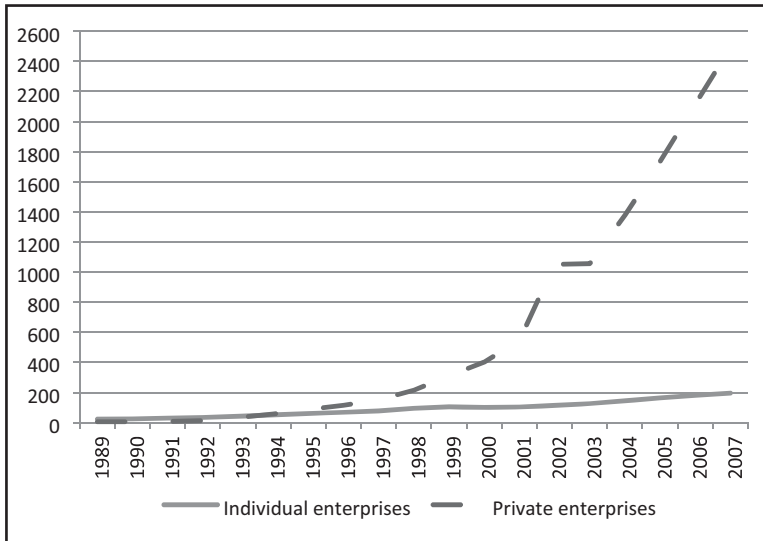


Figure 1. Growth of total registered capital of private firms, 1989–2007

Source: M. Huang (2008). *Notes:* The unit of the Y-axis is one billion Chinese Yuan. Registered capital here is the sum of tangible and intangible assets owned by a firm and is thus roughly equivalent to ownership equity. The numbers on the Y-axis have been adjusted for inflation using the consumer price index (1985 = 100).

## THEORETICAL BACKGROUND AND HYPOTHESES

### Concurrent Development of Institutions and Entrepreneurship in China's Transition Economy

Private entrepreneurship plays a central role in creating wealth, providing jobs, and facilitating economic growth among developed world and transition and developing economies (Jackson, Klich, & Poznanska, 1999; McMillan & Woodruff, 2002). China is not an exception to this general observation. The private entrepreneurial sector, which includes two types of *de jure* privately owned domestic firms (i.e., non-farm private enterprises (*siying qiye*) with at least eight employees, and individual enterprises (*getihu*) with at most seven employees), has developed rapidly since the late 1970s, particularly since 1992. Figure 1 shows growth of private and individual enterprises in terms of total registered capital between 1989, when the data first became available, and 2007, when the Property Law for protecting private property rights was finally passed. This figure indicates that both types of private firms grew steadily from 1989 to 2007, and particularly since the late 1990s. With such a rapid growth rate, by the mid-2000s, this sector already contributed 41 percent of national industrial output and more than 50 percent of the national GDP (Nee & Oppen, 2012; Zhou, 2009).

Such impressive entrepreneurial growth, however, was achieved under a generally less conducive, though incrementally improving, national institutional environment (Gregory, Tenev, & Wagle, 2000; Nee & Oppen, 2012; Zhou, 2014). It

Table 1. Improvement of national institutions on private entrepreneurship in China during the study period

<i>Year</i>	<i>Legal and regulatory improvement</i>	<i>Sources</i>
1997	The Central Committee of the CCP formally removed ideological discrimination against private entrepreneurship by announcing that the private sector would be considered equally important as the state-owned sector in the economy.	Zhou, 2011
1999	The Chinese Constitution was amended to grant formal constitutional recognition to the private sector by elevating its status from marginal one to significant in the national economy.	M. Huang, 2008
2000	Jiang Zemin – then General Secretary of the CCP – officially expressed the Three Represents Theory, through which he welcomed private entrepreneurs to join the CCP, and thus the political legitimacy of the private sector improved greatly.	Dickson, 2003
2001	China was accepted into the World Trade Organization, which required a level playing field between public and private firms. The legal status, as well as political legitimacy, of the private sector improved further.	Zhou, 2009
2003	The Small and Medium Enterprises (SME) Promotion Law was passed. This law required the government to develop support systems that provide SME, most of which were private firms, with resources and input needed to start and grow their ventures.	Zhou, 2011
2004	The Chinese Constitution was amended again to, for the first time since 1949, acknowledge that the Chinese government would protect private property rights.	Zhou, 2014
2005	The central government promulgated a regulation – “Thirty-six Principles of the Non-public Economy” – to seriously tackle problems of government predation and discrimination against private firms.	M. Huang, 2008
2007	The Property Law, which specifies the details for property rights protection, was passed, finally, despite strong opposition from the left faction of the CCP.	Clarke, 2007

is generally accepted that the Chinese state did not have any government programs to deliberately develop its domestic private sector (McMillan & Woodruff, 2002; Naughton, 2007). Although, for pragmatic reasons (e.g., resolving the problem of a high unemployment rate), private entrepreneurial firms were allowed to reemerge after China began its market-oriented reforms in the late 1970s, the state set a number of regulatory restrictions on the private sector (e.g., limiting the maximum size of a private firm to seven employees, and industries that a private firm could enter to those producing consumer goods and services) for ideological reasons in the first decade of the reform (Gregory et al., 2000; Tsang, 1994). Many of these regulatory restrictions were lifted or loosened only after Deng Xiaoping’s Southern Tour in 1992, when the Chinese state pledged to transform China’s planned economic system into a market system (Naughton, 2007). Since 1992, and particularly since the mid-1990s, the overall national institutional environment was improving almost every year, though slowly and incrementally (M. Huang, 2008), as seen in Table 1. Yet, it has been noted that most of the central policies were

on paper only, and seldom implemented seriously throughout the 1990s and early 2000s (Y. Huang, 2008; Lardy, 2014; Nee & Oppen, 2012).

Though incrementally improving, the national institutional environment in China was not homogeneous; rather, there was large variation in formal institutions among Chinese regions (Montinola, Qian, & Weingast, 1995; Xu, 2011). And regional institutions developed much faster and far more boldly than national institutions, primarily because of the regionally decentralized system, pushed forward by the Chinese government since 1979 (see, e.g., Montinola et al., 1995; Xu, 2011; Zhou, 2011, 2014). Under the regionally decentralized system, regional and local bureaucrats enjoyed fairly broad autonomous power to, for example, enact tax policies and promulgate regional laws and regulations (Qian, 2000). This system also changed the incentives of regional and local bureaucrats. While promotion of bureaucrats within the political hierarchy was linked primarily to loyalty to higher level officials before the reform, it was now linked closely to the economic growth rate in a region or locality (Xu, 2011).

Given the new power and incentive structures for regional/local bureaucrats, such a regionally decentralized system had an advantage in facilitating both regional experimentation with development policies and diffusion of those, which were successful (Montinola et al., 1995). The existing literature suggests that a number of successful development models, such as the Southern Jiangsu, Guangdong, and Zhejiang models, have thus been attempted since the early 1980s (Chow, 2002; Walder & Oi, 1999). Some of these (e.g., the Southern Jiangsu model) resembled the developmental state model, which emphasized government ownership. Others (e.g., the Guangdong and Zhejiang models), however, were much closer to the liberal state model, which relies on the private sector as the engine of growth and catalyst for generating wealth (Chen, 1999; Whiting, 1999; Zhou, 2011). These latter models emerged in some Southeastern-Coastal regions where there were no significant industrial bases at the start of the reform and thus regional governments were neither financially prepared nor inclined to challenge the private entrepreneurial sector (Walder & Oi, 1999). In the early reform period, both models were very successful in promoting regional development. Since the mid-1990s, however, the developmental-state-like models faded as a result of the rapidly declining performance of local government-owned enterprises; and government practices of liberal regions began to diffuse across China due to their superior economic effects (Naughton, 2007; Zhou, 2014).

As in other transition or developing economies, the governmental practices of liberal regions in China can be summarized in two categories, i.e., deregulatory policies to accommodate and encourage private entrepreneurship, and formal protection of private property rights (McMillan & Woodruff, 2002; Zhou, 2011, 2014). One important type of deregulatory policy in these regions included providing timely government support, such as easing procedures for obtaining business licenses, official business documents, and transaction services (Chen, 1999; Whiting, 1999). Other important deregulatory policies included facilitating the

development of ‘specialized markets’ – marketplaces for specific goods such as steel, cement, and various types of commodities (Whiting, 1999) – and private-sector institutions, particularly local private financial institutions (Gregory et al., 2000; Zhou, 2009, 2011).

With weak rule of law but a strong government, it is found that liberal regions in China primarily adopted the administrative rather than the legal system to protect property and contractual rights of private firms (Institute of Economic and Resource Management, 2003). For example, the provincial government of Zhejiang has promulgated a number of government ordinances to forbid arbitrary charges, fines, or apportionments (*‘san luan’*) on private firms by government agents and to protect private property from encroachment by government agents or officials since the early 1980s (Yuan, 2007). To ensure that these government ordinances were properly enforced, the provincial government of Zhejiang instituted a regular inspection system, which was executed not by the legal system but by higher level administrative organs (Yuan, 2007). With this system, regional and local governments in Zhejiang rectified a number of cases of property rights violation ranging from wrongful confiscation of private assets of entrepreneurs to extralegal payments charged on private firms/entrepreneurs by government officials during the reform period (Yuan, 2007).

### Formal Institutions and Entrepreneurial Development

As noted above, there exist well-established theoretical arguments emphasizing the significance of either formal protection of property rights or deregulated markets in entrepreneurial development. According to the existing literature, formal protection of property rights affects entrepreneurial development through at least two mechanisms. Firstly, backed by the legitimate coercive power of the state, formal protection of property rights may be the most effective way of mitigating the risks of both governmental expropriation and capture attempts by other citizens (North, 1990). Certainly, property rights can also be partially protected through informal social arrangements (Dixit, 2004). However, it is difficult to mitigate the risk of expropriation by the government and powerful elites through informal social arrangements (Acemoglu & Johnson, 2005). Therefore, it has been noted that potential and existing entrepreneurs feel more confident in engaging in production and long-term investment under the formal protection of property rights (Acemoglu & Johnson, 2005; Johnson et al., 2002).

This point may be well illustrated by the following case. In 1982, the eight largest private entrepreneurs in Wenzhou – a municipal city in Zhejiang – were imprisoned and all of their property confiscated for the crime of economic speculation (*‘tou ji dao ba’*). Under the regular inspection system, however, the municipal government of Wenzhou evaluated the eight legal cases again two years later and did not find evidence for the crime, and thus ordered the local court to dismiss all of these cases. Seeing the rectification of these cases, a great

number of potential entrepreneurs who were previously scared away rushed into entrepreneurship (Yuan, 2007).

Secondly, formal protection of property rights can also affect resource allocation activities of entrepreneurs. Previous research has suggested that, in responding to low levels of formal protection of property rights, entrepreneurs (both potential and existing) often need to spend resources to gain legitimacy and seek private protection (Dixit, 2004; Xin & Pearce, 1996; Zhou, 2009, 2013). With increasing levels of formal protection of property rights, however, both potential and existing entrepreneurs will be less obligated to engage in strategic responses to their less-than-legitimate status (Tsang, 1996). Thus, they can use resources that were formerly spent in implementing such responses for more productive activities, such as finding an appropriate niche, reinvesting in the firm, and competing with other firms. Such more productive uses of firm resources may also be factors conducive to entrepreneurial development. Zhou (2014), for example, reported that entrepreneurs in regions with better formal protection of property rights were significantly more engaged in productive activities than in rent-seeking activities, and thus had higher entrepreneurial performance.

Based on both mechanisms, it follows that formal protection of property rights can both increase the entry of new entrepreneurs and reduce the failure of existing entrepreneurs, thus increasing the net growth rate of entrepreneurship, which is defined as the entry rate deducted by the failure rate. Thus, for Chinese regions during market transition, we expect the following:

*Hypothesis 1: Better formal protection of property rights will be associated with higher net growth rate of private entrepreneurship in a region.*

Deregulation can also affect entrepreneurial development, particularly in highly regulated economies, such as many transition and developing economies, for two reasons (Capelleras et al., 2008; Djankov et al., 2002; De Soto, 2000). Firstly, deregulation can stimulate market development, a key condition for entrepreneurial development. In a transition or developing economy, most private firms have difficulty in obtaining a variety of critical resources, such as bank credit, because many of these resources are controlled by the state, which often favors politically connected firms (e.g., current or former state-owned enterprises) and discriminates against private firms that have no political connections (Aidis et al., 2008; Zhou, 2009). As the government loosens its control over economic resources, and particularly as an increasing number of special markets and private-sector institutions emerge, entrepreneurs can gain access to these critical resources more easily, thus facilitating the entry of new entrepreneurs and reducing the failure of existing entrepreneurs. A case in point is entrepreneurial access to financial credit in China. Throughout China's reform period, private firms were discriminated against by financial institutions, most of which were government-owned, and thus had difficulties in obtaining loans from the latter (Gregory et al., 2000; Zhou, 2009). Since the mid-1990s, however, many provinces have deregulated their



regional financial markets by permitting informal credit markets to emerge and develop, thus channeling household savings to private firms. Such informal credit markets have become a key source of credit for potential and existing entrepreneurs throughout China (Gregory et al., 2000).

Secondly, deregulation can facilitate entrepreneurship by lifting predatory and discriminatory regulatory policies. In many transition and developing economies, entrepreneurs usually need to wait for lengthy periods and make extralegal payments in order to obtain government services and business licenses (Aidis et al., 2008; Fry & Shleifer, 1997; McMillan & Woodruff, 2002). Removal of such regulatory constraints will greatly alleviate the regulatory burdens of both potential and existing entrepreneurs, thus increasing the entry rate and decreasing the failure rate (Capelleras et al., 2008; Djankov et al., 2002). Here, Jiangsu province is a case in point. After the failure of local government-owned enterprises, this province has launched an ambitious deregulation movement since the late 1990s by abolishing regional policies that explicitly discriminated against private firms. This has not only facilitated private venture creation by local people but also attracted thousands of private firms in Zhejiang to relocate to Jiangsu, creating severe concerns among Zhejiang officials about capital outflow (M. Huang, 2008).

Based on the above discussions, it is argued that deregulation may also increase the net growth rate of entrepreneurship. Thus, for Chinese regions during the market transition, we have:

*Hypothesis 2: The greater the extent of deregulation, the higher the net growth rate of private entrepreneurship in a region.*

The effect of formal institutions may not be constant but might vary during the transition to a market economy. It is argued here that the effect of formal protection of property rights may increase during market transition. In the earlier years of the transition, the entire private sector would be less significant economically, and thus less visible, because there may be fewer private firms and the size of most private firms may be smaller. Therefore, although they may face more discrimination because of lower legitimacy (Hannan & Freeman, 1989), the newly emerged private firms may attract fewer capture attempts and less expropriation by government agencies/elites. As a result, informal social arrangements, together with minimal government protection, are sufficient to protect private property rights, in general (Dixit, 2004). Indeed, empirical evidence from China suggests that informal institutions such as political connections (Zhou, 2013, 2014), social norms (Peng, 2004), and social network ties (Tan, Yang, & Veliyath, 2009; Xin & Pearce, 1996) were the primary, as well as most effective, mechanisms for property rights protection in the early years of the market transition.

However, as the transition progresses, the number of private firms and the size of many private firms may increase, and so may the wealth of private entrepreneurs. Thus, although private firms may become more accepted by society, the private sector may attract more capture attempts and more governmental expropriation.

North and Weingast (1989) documented the increasing expropriation of new capitalist elites by kings as the emerging capitalist economy expanded in the seventeenth century in England. Similar things have occurred in contemporary transition economies. The story of Dai Guofang and his private firm – Tie Ben Steel Corporation – in China is one example (*China Economic Weekly*, 2015). A peasant entrepreneur in Jiangsu province with a humble family background, Dai established a small steel-making firm in 1984 after collecting scrap iron and selling it to steel companies for ten years. The firm, which became the Tie Ben Steel Corporation in 1996, developed rapidly and became the largest private steelmaking company in the nation. However, Tie Ben's expansion plan conflicted directly with a stipulation of the central government, which ordered the overproduction of steel in the nation to stop, beginning in 2004. To enforce this stipulation, the central government picked Tie Ben as its primary target, both because of its ambitious plan and because it was a private firm, and sent an inspection team to find evidence against the firm. With no evidence of severe economic crimes found, Dai was finally sentenced to five years in prison for tax evasion, and Tie Ben was taken over by a state-owned steel company.

Given the increasing risk of capture attempts and, particularly, government expropriation, as seen in the story of Tie Ben Corporation, informal institutional arrangements and rudimentary government protection may no longer be sufficient for property rights protection. Instead, stronger formal protection of property rights may become essential for further entrepreneurial development. Therefore, we have:

*Hypothesis 3: The effect of formal protection of property rights on the net growth rate of private entrepreneurship will be stronger as market transition progresses.*

It is argued here that deregulation may have a decreasing effect on entrepreneurial development during the market transition. The effect of deregulation may be highly sensitive to the number of potential and existing entrepreneurs (Capelleras et al., 2008). In the earlier years of the market transition, a deregulatory policy may trigger the entry of a huge quantity of new firms since entrepreneurship would have been suppressed before transition and, thus, most potential entrepreneurs might have entered other occupations (e.g., government employment or work in government-owned enterprises) under heavy regulatory constraints (Wu, 2006). Yet, at this stage, the failure rate of entrepreneurial firms may be low since there are many unfilled niches in the consumer and service markets due to the relatively low number of existing private firms (Hannan & Freeman, 1989). Therefore, the net entrepreneurial growth rate may be high.

As the market transition progresses, *ceteris paribus*, the same 'amount' of deregulation may attract a lower number of new entry firms than previously because most of the suppressed potential entrepreneurs from the pre-transition period would have already entered entrepreneurship. In addition, as the number of existing private firms increases, there would be fewer unfilled niches in the

consumer and service markets, and thus the failure rate of entrepreneurial firms might be higher (Naughton, 2007). As a result, net entrepreneurial growth might be low.

Private firm development in China in the 1990s is a case in point. Although both the central government and regional/local governments introduced increasingly more deregulatory policies on the private sector throughout the 1990s, following Deng Xiaoping's Southern Tour in 1992, the most rapid private firm development occurred from 1993 to 1994, with respect to not only the number of private firms and employment, but also output (Gregory et al., 2000). The number of private firms increased by 70.4 percent in 1993 and 81.7 percent in 1994, but this rate of growth dropped to 51.4 percent in 1995 and below 30 percent thereafter; that of employment by private firms increased by 60.7 percent in 1993 and 74.0 percent in 1994, but dropped to 47.4 percent in 1995 and below 30 percent thereafter; and that of output of private firms increased by 124.2 percent in 1993 and 112.1 percent in 1994, but dropped to 82.2 percent in 1995, 58.4 percent in 1996 and below 30 percent thereafter (for details, see Table 2.1 in Gregory et al., 2000). It should be noted that this drop might not be explained by economic cycles, as the Chinese economy experienced rapid growth every year between 1992 and 1999, or by worsening property rights protection, as property rights protection was improving slightly in those years (Gregory et al., 2000).

Given the reasoning above, it is proposed here that the same 'amount' of market deregulation may have a lower effect on net entrepreneurial growth in the later years of a market transition. Thus, we have:

*Hypothesis 4: The effect of deregulation on the net growth rate of private entrepreneurship will be weaker as the market transition progresses.*

## METHOD

I collected provincial-level panel data covering a nine-year period, from 1998 to 2006. Given that the earliest year available for institutional variables is 1997, my panel data cannot cover years earlier than 1998 (the independent variables are one-year lagged). I cover a research period ending in 2006 because the Property Law was passed in 2007, after which the institutional environment converged quickly across provinces. Though relatively short, this period witnessed both the fastest entrepreneurial growth, as seen in Figure 1, and the most rapid institutional change (particularly, the diffusion of liberal government policies) across Chinese regions (Naughton, 2007; Zhou, 2011).

I assembled the data from two widely used second-hand sources. The first is the *China Statistical Yearbooks* (**China Statistical Bureau**, 1998 to 2007). Although often criticized for problems of accuracy and reliability, the *China Statistical Yearbooks* are the only authoritative source for information concerning numbers and employment for private firms, together with other economic/demographic

information, for each province in each year. Recent studies suggest that statistics from *China Statistical Yearbooks* are not systematically biased, and have high internal consistency (Holz, 2004).

The second source is the annual reports of the *National Economic Research Institute (NERI) Indices of Marketization of China's Provinces* (Fan & Wang, 2000, 2001, 2006). The NERI indices use the methodology of *Economic Freedom of the World* to rank Chinese provinces according to their levels of formal institutional development on five general topics from 0 to 10: (1) relationship between government and the market, (2) the non-state sector, (3) the manufactured goods market, (4) the factor market, and (5) intermediary institutions and legal environment (Gwartney, Lawson, & Gartzke, 2005). Under each topic, there are a number of indices that reflect different aspects of it. The values on each index are comparable across different regions and, within each region, across different years. Given that each reflects one aspect of formal institutional development in a province, the NERI indices allow researchers to recombine them to construct new indices for such variables as deregulation and formal protection of property rights. The indices are available for every year since 1997.

China includes 31 provinces (including autonomous regions and province-level municipal cities). However, most NERI indices for Tibet are available only for 2001 and after. Thus there are missing data on deregulation – one of the two variables constructed from the indices – for this autonomous region for four years (1998–2001). There are no missing data for any other provinces for any of the nine years. Hence, the final cleaned data set is a slightly unbalanced panel and includes 275 province-year observations.

## Dependent Variables

Gartner and Shane (1995) suggested that stock measure – firm entry deducted by firm failure – is more appropriate than firm entry when studying entrepreneurial growth in a region or country because changes in the stock of private firms take into account both firm entry and firm failure. A higher rate of firm entry, in itself, does not guarantee entrepreneurial growth unless the rate is higher than that of firm failure. Using stock measure is also consistent with the theoretical argument of this paper, as the previous section suggests that property rights protection and deregulation increase firm entry and reduce firm failure, thus facilitating net growth of private entrepreneurship.

One stock measure used in this study is the number of private firms per capita in each province for each year; this has been used by previous studies to understand the effect of formal institutions on entrepreneurship (e.g., Campbell & Rogers, 2007; Gohmann et al., 2008; Zhou, 2011). Another stock measure is level of employment in private firms per capita in each province each year. Part of the reason to use this measure as well is that formal institutional development does not simply increase the number of private firms, but may also increase sizes of the

firms, and, thus, the level of employment in a region. Previous studies have also used this measure to examine effects of formal institutions on entrepreneurship (e.g., Gohmann et al., 2008; Zhou, 2011).

Given that there are two types of private firms – individual enterprises and private enterprises, this study uses four stock measures for entrepreneurship: (1) *number of individual enterprises per capita*, (2) *number of private enterprises per capita*, (3) *total employment in individual enterprises per capita*, and (4) *total employment in private enterprises per capita*. These measures are obtained by dividing the number of firms or total employment in each type of firm into the adult population, which is defined as population aged 15 or above in the *China Statistical Yearbooks*. The values of the measures are all positive.

### Independent Variables

I use one of the NERI indices – the extent to which investors' legal rights were protected by regional and local governments – to measure *formal property rights protection* in each province for each year (Fan & Wang, 2006). This index comes from annual firm level national surveys conducted by the Survey System on Chinese Entrepreneurs (SSCE), a survey company, and is based on provincial averages of perceptions of firms concerning how well their legal business activities were protected by regional legal and administrative systems. In the original NERI indices, it was based on SSCE firm level surveys only since 2001. Before 2001, it was measured with the number of cases recorded by government agencies concerning infringement of economic rights divided by total GDP in a province, which was found problematic (Fan & Wang, 2006). To make the index consistent over the years, this study replaces its values for 1998, 1999, 2000 with values for 2001. Tabulations of this index show that, over the period of 2001–2006, the ranking order of the provinces changed little. And given that there were no major legal changes in the entire research period, it should be acceptable, thus, to replace its values for 1998, 1999, 2000 with those for 2001.

Although our index for regional formal property rights protection may be subject to perception bias, it is noted that previous studies using data from less developed economies have also measured it based on perceptions of firms (e.g., Pistor, Raiser, & Gelfer, 2000). In addition, there is evidence suggesting that this index is consistent with anecdotes concerning property rights protection in each province (Fan & Wang, 2004, 2006). In addition, as expected (see, e.g., Clarke, 2003), this index is found to be positively correlated with legal development, which is another NERI index ( $r = 0.60$ ). This index has already been transformed to range roughly from 0 to 10 in the original NERI Indices, with higher values indicating higher levels of formal protection of property rights in a province.

*Deregulation* in each province for each year is a simple average of six of the NERI indices. The existing literature suggests that deregulation consists of two elements: lifting administrative and legislative burdens that take time, energy, and resources

away from fundamental entrepreneurial activities (element 1) and stimulating free markets (element 2) (Djankov et al., 2002; Storey, 1994). Thus, the following six indices were used for constructing this variable: (1) reducing extralegal taxes for firms, (2) reducing government size, (3) reducing government control of economic resources, (4) extent to which prices of commodities were determined by the market, (5) extent to which bank credits were allocated by the market, and (6) extent to which the labor market was fluid. Here indices (1) and (2) may reflect element 1 of deregulation, since they signal a less predatory government (Frye & Shleifer, 1997), while the remaining four indices reflect element 2 (Djankov, McLiesh, & Ramalho, 2006). All of these were already transformed to range roughly between 0 and 10 in the NERI indices, with higher values assigned to those provinces that were more liberal. It is found that these indices are positively correlated with each other. Averaging all six, *deregulation* ranges roughly from 0 to 10, with higher values indicating that the market was more deregulated in a province.

### Control Variables

Based on the existing literature, I controlled for the following variables. *GDP per capita* is a measure of economic development, which has been reported to have a first decreasing and then increasing effect on entrepreneurship (Martinez, 2005; Zhou, 2011). Its logarithmic form is used for its skewed distribution. *GDP growth rate* is an indicator of regional economic health, which may be positively related to entrepreneurial development (Bowen & De Clercq, 2008). *Illiteracy rate* is the percentage of illiteracy or semi-illiteracy in the adult population and is used to control for the stock of human capital in the regional population. *Female rate* is the percentage of female population, and *rural rate* is the percentage of population in the agricultural sector; both have been found to have a negative effect on regional entrepreneurial activities in the literature (see, e.g., Sobel, 2008). *Working age rate* is the percentage of working age (between 15 and 64) population, which is used to control for population age (Sobel, 2008). In a rapidly developing economy like that of China, a higher working age rate suggests a higher demographic dividend and is thus a source of economic growth.

*Guanxi culture* is an index of the level of *guanxi* adoption in businesses in a province. It is constructed by Li and Ye (2015) using the data on national surveys of Chinese private enterprises, which have been conducted every two years since 1993 by the United Front Department of the Central Committee of the CCP and All China Federation of Industry and Commerce. This index is based on the average amount of time, as well as monetary costs, that private entrepreneurs spent in cultivating and maintaining all types of *guanxi* for their businesses in a province. It is available for every two years and, as one might expect, is relatively stable (though declining slightly, as seen in Table 2) throughout the years across all provinces (Li & Ye, 2015). It is argued here that this variable may have a curvilinear relationship with entrepreneurship. That is, as the adoption of *guanxi* practices

Table 2. Descriptive statistics and pairwise correlation matrix

Variable	Mean	S.D.	N	1	2	3	4	5	6	7
1. No. of private enterprises per 1000 people	3.15	3.15	279	1.00						
2. Total employment in private enterprises per 1000 people	40.46	43.47	279	0.95	1.00					
3. No. of individual enterprises per 1000 people	25.90	9.47	279	0.02	0.11	1.00				
4. Total employment in individual enterprises per 1000 people	48.80	20.91	279	-0.14	-0.04	0.90	1.00			
5. Deregulation	6.32	2.05	275	0.37	0.41	-0.02	0.04	1.00		
6. Formal property rights protection	4.14	2.30	279	0.54	0.53	0.23	0.09	0.39	1.00	
7. Illiteracy rate (%)	13.37	9.53	279	-0.28	-0.26	-0.01	-0.02	-0.44	-0.27	1.00
8. GDP per capita (1000 yuan)	10.27	8.31	279	0.92	0.88	-0.03	-0.16	0.48	0.61	-0.35
9. GDP growth rate (%)	10.50	2.17	279	0.29	0.34	-0.07	-0.05	0.42	0.18	-0.04
10. Adult population (in millions)	32.61	21.37	279	-0.17	-0.13	-0.03	0.14	0.52	0.18	-0.21
11. Female rate (%)	48.98	0.83	279	0.24	0.26	0.04	0.00	0.18	0.39	0.24
12. Rural rate (%)	57.92	16.08	279	-0.78	-0.71	-0.10	0.06	-0.37	-0.60	0.45
13. Working age rate (%)	70.02	3.73	279	0.48	0.49	0.12	0.05	0.33	0.40	-0.43
14. Southeastern-coastal province	0.16	0.37	279	0.43	0.42	-0.01	-0.04	0.37	0.44	-0.13
15. Centrally administered city	0.13	0.34	279	0.61	0.51	-0.13	-0.28	0.16	0.32	-0.24
16. Minority region	0.16	0.37	279	-0.14	-0.15	0.14	-0.00	-0.40	-0.07	0.22
17. Year	4	2.59	279	0.27	0.33	-0.35	-0.29	0.36	0.06	-0.17
18. Guanxi culture	8.50	2.53	279	-0.07	-0.05	0.26	0.23	0.15	-0.09	-0.32

Variable	8	9	10	11	12	13	14	15	16	17
8. GDP per capita (1000 yuan)	1.00									
9. GDP growth rate (%)	0.43	1.00								
10. Adult population (in millions)	-0.06	0.15	1.00							
11. Female rate	0.39	0.39	0.08	1.00						
12. Rural rate	-0.86	-0.32	0.22	-0.34	1.00					
13. Working age rate	0.61	0.38	-0.02	0.31	-0.66	1.00				
14. Southeastern-coastal province	0.42	0.10	-0.07	0.00	-0.40	-0.07	1.00			
15. Centrally administered city	0.62	0.12	-0.33	0.22	-0.68	0.38	0.09	1.00		
16. Minority region	-0.17	0.04	-0.33	-0.01	0.18	-0.15	-0.19	-0.16	1.00	
17. Year	0.34	0.55	0.12	0.11	-0.14	0.39	-0.01	-0.01	0.03	1.00
18. Guanxi culture	-0.20	-0.21	0.40	-0.29	0.13	-0.05	-0.17	0.05	-0.47	-0.14

Notes: Correlations with an absolute value exceeding 0.10 are significant at p = 0.05, and correlations exceeding 0.15 are significant at p = 0.01.

increases initially, it can facilitate entrepreneurial development because it greases the wheels of businesses in an unfriendly business environment (Huntington, 1968); as it increases further, however, after a certain point it may inhibit entrepreneurship because it diverts potential and existing entrepreneurs from more productive entrepreneurial activities (Baumol, 1990) and may even seal off entrepreneurs from new market information (Uzzi, 1996). This index ranges roughly from 0 to 16, with higher values indicating a higher level of *guanxi* adoption in businesses in a province.

In addition to the above time-varying controls, I controlled for some time-constant variables. *Southeastern-coastal province* is coded 1 if a province is located in the Southeastern-Coastal region, which includes Guangdong, Hainan, Fujian, Shanghai, and Zhejiang; 0, if it is located in the remaining Inland or Northern regions. China's economic reforms started in the five Southeastern-Coastal provinces, and, thus, these provinces have had not only more developed legal and market institutions, but better infrastructures that can facilitate entrepreneurial development (Naughton, 2007; Qian, 2000; Zhou, 2011). *Centrally administered city* is coded 1 if a provincial region is a centrally administered municipal city – Beijing, Shanghai, Tianjin, and Chongqing; 0, otherwise. These cities are institutionally and economically different from other provincial regions because of their closer relationships with the central government. China's ethnic minorities have been located primarily in five ethnic minority provincial regions. To control for the effect of ethnic minority, *minority region* is created, which is coded 1 if a province belongs to one of the five ethnic minority regions (i.e., Guangxi, Inner Mongolia, Ningxia, Tibet, and Xinjiang); 0, otherwise.

Lastly, to see how entrepreneurial activities change as market transition progresses, and for testing Hypotheses 3 and 4, a linear time trend variable – *year* – is also controlled. This variable equals each year subtracted by 1998, and thus ranges from 0 to 8. It captures the overall progress of market transition each year in the entire nation since 1998. I use the linear time trend variable instead of year dummies for the following reasons. Firstly, using the time trend variable is a common practice in the existing literature, based on panel data (Wooldridge, 2002); and the time trend variable allows for a parsimonious test for Hypotheses 3 and 4. Secondly, additional tests suggest that the four hypotheses are virtually still supported by using a full set of year dummies.

## Model Specification

Following Wooldridge (2002), the basic form of the panel data model for this study can be written as:

$$Y_{it} = X_{i,t-1}\beta + a_i + \lambda t + \mu_{it} \quad (1)$$

for  $i = 1, 2, \dots, 31$  provinces;  $t = 0, 1, 2, \dots, 7, 8$ . In this equation,  $Y_{it}$  is the dependent variable for province  $i$  in year  $t$ ;  $\beta$  is a vector of the effects of the



covariates on the dependent variable, because  $X_{i,t-1}$  is a vector of covariates in year  $t-1$ ;  $a_i$  is a vector of unobserved provincial effects that do not change over time;  $\lambda$  is the coefficient on the time trend  $t$  (i.e., year); and  $\mu_{it}$  is a mean zero error term that varies over both provinces and time, and is assumed to be uncorrelated with  $X_{i,t-1}$ ,  $a_i$ , and  $t$ . Here, I used the values of all time-varying covariates in year  $t-1$  as predictors because most of the covariates have a lagged effect on entrepreneurship.

Given that  $Y_{it}$  (i.e., the number of private firms per capita or level of employment in private firms per capita) is dispersed widely, as seen in Table 2, its logarithmic form is used. Thus, the left-hand side of Equation 1 becomes  $\log(\text{number of private firms}/(\text{adult population}))$  or  $\log(\text{level of employment in private firms}/(\text{adult population}))$ , which equals  $\log(\text{number of private firms}) - \log(\text{adult population})$  and  $\log(\text{level of employment in private firms}) - \log(\text{adult population})$ , respectively. By moving  $\log(\text{adult population})$  to the right-hand side of the equation, the above equation becomes:

$$\log(Y'_{it}) = X_{i,t-1}\beta + \gamma \log(\text{adult population})_{it} + a_i + \lambda t + \mu_{it} \quad (2)$$

where  $Y'_{it}$  is number of private firms or level of employment in private firms.

Both number of private firms and level of private employment are count variables with high means and large standard deviations. Long (1997) suggested that, when the count dependent variables have high means, as in this case, the log-linear model provides virtually similar results to the Negative Binomial model, which is a standard estimation strategy when the dependent variable is an overdispersed count one. In the following, I reported results based on the log-linear model with robust standard errors. The Negative Binomial model is used for robustness tests.

A crucial question for estimating Equation (2) is whether to treat  $a_i$  – provincial effects – as random or fixed effects. Both the random effects model and fixed effects model have advantages and disadvantages. The fixed effects model produces unbiased estimates of  $\beta$ , but these estimates may have high sample-to-sample variance and may thus be less efficient. In addition, this model does not allow for out-of-sample predictions. The random effects model is the opposite: Its estimates are more efficient, but will be biased when  $a_i$  is correlated with  $X_{i,t-1}$ ; in addition, it allows for out-of-sample predictions beyond the sampled units and years (Clark & Linzer, 2015). Therefore, if  $a_i$  is correlated with  $X_{i,t-1}$ , the fixed effects model is usually suggested; otherwise, the random effects model is advised. The Hausman test is designed to detect whether  $a_i$  is correlated with  $X_{i,t-1}$ . A statistically significant result of the Hausman test rejects the random effects model in favor of the fixed effects model, while an insignificant result favors the random effects model over the fixed effects model (Wooldridge, 2002). In this study, the random effects model is adopted, as results from the Hausman test are all statistically insignificant (see the next section for these results).

Specified in this way, a significantly positive coefficient for *formal property rights protection* or *deregulation* implies that an increase in either set of institutions in a province in year  $t-1$  will result in net growth in the number of private firms (or employment in private firms) in year  $t$ , holding other control variables constant.

## RESULTS

Table 2 presents descriptive statistics and pairwise correlations among all variables. Correlations between formal property rights protection or deregulation, on the one hand, and other covariates, on the other, are all below 0.61 and the signs of the correlations are as expected. Formal property rights protection is positively correlated with deregulation ( $r = 0.39$ ). In addition, both formal property rights protection and deregulation increase slowly over time in the research period. For correlations among the control variables, no extremely large correlation coefficients are detected, except for that between GDP per capita and rural rate ( $r = -0.86$ ). Additional tests based on variance inflation factors (VIF) suggest that no significant evidence of multicollinearity is found, as the largest VIF (8.91) is smaller than 10 and the mean of all VIFs (3.50) is not considerably larger than 1 (Chatterjee & Hadi, 2006).

### The Significance of Formal Protection of Property Rights and Deregulation

Table 3 presents coefficients for testing Hypotheses 1 and 2 based on Equation 2. The coefficients of both *formal property rights protection* and *deregulation* are positive and statistically significant in all four equations, suggesting that both better formal property rights protection and deregulation lead to net entrepreneurial growth. Substantively, a one unit increase in formal property rights protection can increase the number of private enterprises by 10.5 percent ( $e^{0.10} - 1$ ), employment in private enterprises by 13.9 percent ( $e^{0.13} - 1$ ), the number of individual enterprises by 6.2 percent ( $e^{0.06} - 1$ ), and employment in individual enterprises by 5.1 percent ( $e^{0.05} - 1$ ). Similarly, a one unit increase in deregulation can increase the number of private enterprises by 5.1 percent ( $e^{0.05} - 1$ ), employment in private enterprises by 9.4 percent ( $e^{0.09} - 1$ ), the number of individual enterprises by 7.3 percent ( $e^{0.07} - 1$ ), and employment in individual enterprises by 8.3 percent ( $e^{0.08} - 1$ ). Thus, both hypotheses are strongly supported. It is noted that, while the effect of deregulation is similar for both private enterprises and individual enterprises, that of property rights protection is larger for private enterprises than for individual enterprises. One possible explanation for the larger effect of property rights protection for private enterprises is that, being larger in size, private enterprises may be more likely to attract government officials' attention and thus more governmental expropriation and capture attempts than individual enterprises, as discussed previously.

Table 3. Formal institutions and entrepreneurship: Baseline models

<i>Variables</i>	<i>Log (No. of private enterprises)</i>	<i>Log (private enterprises employment)</i>	<i>Log (No. of individual enterprises)</i>	<i>Log (individual enterprises employment)</i>
Formal property rights protection	0.10*** (0.02)	0.13*** (0.02)	0.06*** (0.02)	0.05** (0.02)
Deregulation	0.05*** (0.01)	0.09*** (0.02)	0.07*** (0.02)	0.08*** (0.02)
Log (GDP per capita)	-2.32* (1.20)	-4.54*** (1.48)	-1.90** (0.84)	-1.08 (0.88)
Log (GDP per capita) squared	0.14** (0.07)	0.26*** (0.08)	0.11** (0.05)	0.07 (0.05)
GDP growth rate (%)	-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Illiteracy rate (%)	-0.00 (0.01)	-0.00 (0.01)	0.00 (0.00)	-0.00 (0.01)
Log (adult population)	0.58*** (0.07)	0.50*** (0.07)	0.79*** (0.06)	0.80*** (0.08)
Female rate (%)	-0.09 (0.06)	-0.12 (0.08)	-0.08*** (0.03)	-0.08** (0.03)
Rural rate (%)	-0.02*** (0.00)	-0.02** (0.01)	-0.01* (0.01)	-0.01 (0.01)
Working age rate (%)	-0.02** (0.01)	-0.02* (0.01)	-0.02** (0.01)	-0.02* (0.01)
Southeastern-coastal province	0.06 (0.16)	-0.24 (0.24)	-0.56*** (0.13)	-0.56*** (0.15)
Centrally administered city	-0.22 (0.28)	-0.73** (0.29)	-0.78*** (0.16)	-0.95*** (0.21)
Minority region	-0.34** (0.15)	-0.36** (0.15)	0.13 (0.13)	0.01 (0.18)
<i>Guanxi</i> culture	0.25*** (0.06)	0.23*** (0.06)	0.11** (0.05)	0.13** (0.07)
<i>Guanxi</i> culture squared	-0.01*** (0.00)	-0.01*** (0.00)	-0.01** (0.00)	-0.01** (0.00)
Year	0.12*** (0.02)	0.12*** (0.02)	-0.07*** (0.01)	-0.07*** (0.01)
Constant	23.55*** (7.97)	37.47*** (7.86)	23.51*** (4.55)	19.99*** (4.81)
Province-year Observations	275	275	275	275
R <sub>2</sub>	0.88	0.78	0.28	0.22
No. of provinces	31	31	31	31

Notes: Robust standard errors are in parentheses.  
 \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

The effects of other covariates are as follows. Consistent with previous findings (e.g., Martinez, 2005; Zhou, 2011), entrepreneurship initially decreases and later increases as GDP per capita increases. *Female rate* and *rural rate*, as expected, have negative effects on entrepreneurial development in general. Somewhat surprisingly, *working age rate* has significantly negative effects on all four measures of entrepreneurship. This may be because provinces with higher

working age rates were generally poorer, and were origin points of migrant workers rather than centers for entrepreneurship. *Southeastern-coastal region* has significantly negative effects on growth of individual enterprises because many inland or northern provinces started to privatize government-owned firms during the research period and thus many unemployed workers became self-employed (Naughton, 2007). *Centrally administered city* has significantly negative effects in all four equations, except for the first one. These cities had smaller populations but provided a variety of better paid jobs to their citizens and, thus, fewer people started their own businesses. As expected, *minority region* has a significantly negative effect on the growth of private enterprises. In addition, *guanxi culture* indeed has a curvilinear effect on entrepreneurial development in each equation.

### **Increasing Significance of Formal Protection of Property Rights**

Table 4 presents coefficients for testing Hypothesis 3 by adding an interaction between *formal property rights protection* and *year* into each of the equations in Table 3. This Table shows that, while the coefficient of *formal property rights protection* (i.e., the effect of this variable when *year* = 0) is significantly positive in all equations except for that where the dependent variable is total employment in individual enterprises, that of the interaction variable is positive and statistically significant in general. Overall, therefore, the effect of formal property rights protection is significantly positive for each year in the entire research period and is getting stronger over time. These results support Hypothesis 3, and thus formal protection of property rights may have an increasing effect on entrepreneurial development during a market transition.

When deriving Hypothesis 3, it is argued that the effect of formal protection of property rights may increase as the market transition progresses because the private sector may attract more capture attempts from other people and more government expropriation. This mechanism is supported by changing perceptions of private entrepreneurs on the need for formal protection of property rights from national surveys of Chinese private enterprises. The 1995 national survey of Chinese private enterprises suggests that only 4.9 percent of surveyed owners of private enterprises thought that property rights protection was most important among all economic and political/legal problems that affected private businesses. This percentage, however, increased to 60.6 percent in the 2004 national survey of private enterprises.<sup>[2]</sup>

### **Decreasing Significance of Deregulation**

Table 5 presents coefficients for testing Hypothesis 4. As in Table 4, equations in this table regress each of the four measures of entrepreneurship on *deregulation* and the interaction between *deregulation* and *year*, while all other covariates are

Table 4. Formal institutions and entrepreneurship: interaction between formal property rights protection and year

<i>Variables</i>	<i>Log (No. of private enterprises)</i>	<i>Log (private enterprises employment)</i>	<i>Log (No. of individual enterprises)</i>	<i>Log (individual enterprises employment)</i>
Formal property rights protection	0.08*** (0.03)	0.12*** (0.03)	0.04* (0.02)	0.03 (0.02)
Formal property rights protection × year	0.01*** (0.00)	0.00 (0.00)	0.01** (0.00)	0.01** (0.00)
Deregulation	0.05*** (0.01)	0.08*** (0.02)	0.07*** (0.02)	0.07*** (0.02)
Log (GDP per capita)	-0.61 (1.67)	-3.74* (2.17)	-0.86 (1.21)	-0.15 (1.24)
Log (GDP per capita) squared	0.04 (0.09)	0.22* (0.12)	0.05 (0.07)	0.01 (0.07)
GDP growth rate (%)	-0.01 (0.01)	-0.01 (0.01)	0.00 (0.01)	0.00 (0.01)
Illiteracy rate (%)	-0.00 (0.01)	0.00 (0.01)	0.01 (0.00)	0.01 (0.01)
Log (adult population)	0.59*** (0.07)	0.57*** (0.09)	0.85*** (0.06)	0.87*** (0.08)
Female rate (%)	-0.09 (0.06)	-0.13 (0.08)	-0.07*** (0.03)	-0.07** (0.03)
Rural rate (%)	-0.02*** (0.00)	-0.02*** (0.01)	-0.01** (0.01)	-0.01* (0.01)
Working age rate (%)	-0.03** (0.01)	-0.02 (0.01)	-0.02** (0.01)	-0.02* (0.01)
Southeastern-coastal province	0.07 (0.15)	-0.18 (0.26)	-0.52*** (0.13)	-0.51*** (0.16)
Centrally administered city	-0.14 (0.30)	-0.64** (0.31)	-0.68*** (0.16)	-0.84*** (0.20)
Minority region	-0.34** (0.14)	-0.28* (0.16)	0.16 (0.14)	0.03 (0.19)
<i>Guanxi</i> culture	0.22*** (0.06)	0.24*** (0.07)	0.08 (0.06)	0.10 (0.07)
<i>Guanxi</i> culture squared	-0.01*** (0.00)	-0.01*** (0.00)	-0.00 (0.00)	-0.01 (0.00)
Year	0.09*** (0.02)	0.10*** (0.03)	-0.09*** (0.02)	-0.09*** (0.02)
Constant	16.15 (10.03)	33.88*** (10.52)	19.08*** (5.79)	16.26*** (5.98)
Province-year Observations	275	275	275	275
R <sub>2</sub>	0.88	0.79	0.31	0.25
No. of provinces	31	31	31	31

Notes: Robust standard errors are in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

controlled. I did not test the decreasing effect of deregulation by adding the interaction between *deregulation* and *year* into the equations in Table 4 because this interaction variable is highly correlated with the interaction between *formal property rights protection* and *year* ( $r = 0.81$ ). Results in Table 5 suggest that, while

Table 5. Formal institutions and entrepreneurship: interaction between deregulation and year

<i>Variables</i>	<i>Log (No. of private enterprises)</i>	<i>Log (private enterprises employment)</i>	<i>Log (No. of individual enterprises)</i>	<i>Log (individual enterprises employment)</i>
Deregulation	0.07*** (0.02)	0.13*** (0.03)	0.10*** (0.02)	0.11*** (0.02)
Deregulation × year	−0.01* (0.00)	−0.01*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)
Formal property rights protection	0.10*** (0.02)	0.12*** (0.02)	0.05*** (0.02)	0.04* (0.02)
Log (GDP per capita)	−3.07* (1.61)	−6.51*** (1.78)	−3.22*** (0.96)	−2.94*** (0.97)
Log (GDP per capita) squared	0.18** (0.09)	0.37*** (0.09)	0.18*** (0.05)	0.17*** (0.05)
GDP growth rate (%)	−0.01 (0.01)	−0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Illiteracy rate (%)	−0.00 (0.01)	0.00 (0.01)	0.00 (0.00)	0.00 (0.01)
Log (adult population)	0.60*** (0.08)	0.56*** (0.07)	0.83*** (0.06)	0.86*** (0.07)
Female rate (%)	−0.08 (0.05)	−0.11 (0.08)	−0.06** (0.03)	−0.06** (0.03)
Rural rate (%)	−0.02*** (0.00)	−0.02*** (0.01)	−0.01** (0.01)	−0.01 (0.01)
Working age rate (%)	−0.03** (0.01)	−0.02* (0.01)	−0.02** (0.01)	−0.02** (0.01)
Southeastern-coastal province	0.01 (0.15)	−0.24 (0.24)	−0.56*** (0.13)	−0.57*** (0.16)
Centrally administered city	−0.27 (0.28)	−0.81*** (0.31)	−0.83*** (0.17)	−1.01*** (0.22)
Minority region	−0.38*** (0.14)	−0.32** (0.16)	0.16 (0.14)	0.05 (0.19)
<i>Guanxi</i> culture	0.25*** (0.06)	0.30*** (0.06)	0.15*** (0.05)	0.19*** (0.06)
<i>Guanxi</i> culture squared	−0.01*** (0.00)	−0.02*** (0.00)	−0.01*** (0.00)	−0.01*** (0.00)
Year	0.16*** (0.04)	0.20*** (0.04)	−0.01 (0.02)	0.01 (0.03)
Constant	26.33*** (9.36)	45.04*** (8.88)	28.63*** (4.83)	27.28*** (4.97)
Province-year Observations	275	275	275	275
R <sub>2</sub>	0.88	0.79	0.31	0.28
No. of provinces	31	31	31	31

Notes: Robust standard errors are in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

the coefficient of deregulation (i.e., the effect of this variable when  $year = 0$ ) is significantly positive, that of the interaction between deregulation and year is negative and statistically significant in each of the four equations. Overall, therefore, Hypothesis 4 is supported and the effect of deregulation is indeed stronger in earlier years but decreases as the market transition progresses.

## Robustness Tests

Above I have reported results based on the log-linear regression model with  $a_i$  treated as random effects. Results from the Hausman test suggest that the random effects model is appropriate here. For the four equations in Table 3, I ran both the random effects model and the fixed effects model and the  $\chi^2$  results from the Hausman test are as follows: 9.14 ( $p$ -value = 0.61), 12.86 ( $p$ -value = 0.38), 12.66 ( $p$ -value = 0.39), and 16.35 ( $p$ -value = 0.18). The statistically insignificant  $\chi^2$  results suggest that the random effects model may have more advantages than the fixed effects model for this study. In fact, additional tests using log-linear regression model with  $a_i$  treated as fixed effects show that fixed effects estimates are indeed less efficient as they have larger standard errors.

As noted above, the Negative Binomial regression model is a standard estimation strategy when dependent variables are count ones with over dispersion, as in this study. Therefore, I also try the random-effects Negative Binomial model for testing the hypotheses.<sup>3</sup> Results from this alternative estimation strategy still support all of the hypotheses, although with less efficient coefficients, possibly because the Negative Binomial model cannot be estimated with robust standard errors using statistical software such as Stata.

The endogeneity issue is a clear threat to the validity of the research, particularly, in institutional analysis, for three reasons (Acemoglu, Johnson, & Robinson, 2001; Acemoglu & Johnson, 2005). Firstly, institutional variables such as *formal property rights protection* and *deregulation* are unobservable and are usually measured with indices, thus giving rise to the problem of measurement errors. Secondly, some unmeasured but relevant variables may have been omitted from the regression. Thirdly, there may be a simultaneous relationship between the institutional variables and outcome variables. In this paper, one may argue that formal property rights protection and deregulation may be not causes but outcomes of entrepreneurial growth, because private entrepreneurs in regions with high levels of entrepreneurial development may influence policy making procedures by actively lobbying political elites to protect private property rights and deregulate markets.

Does the potential problem of endogeneity affect the results reported above? If so, a common solution is to employ the Instrumental Variable (IV) estimator in an attempt to isolate exogenous variation in the institutional variables to identify their causal effect. Yet, the IV estimator is less efficient than the random-effects estimator in Equation 2 when explanatory variables are exogenous; thus, it is useful to have a test for endogeneity of the explanatory variables to see whether the IV approach is even necessary (Wooldridge, 2013). Therefore, I adopt the Durbin-Wu-Hausman endogeneity test using the algorithm written by Baum, Schaffer, and Stillman (2003). This test compares random-effects and IV estimates and then determines whether the differences are statistically significant. If the differences are

Table 6. Results of the Durbin-Wu-Hausman  $\chi^2$  test

<i>Durbin-Wu-Hausman <math>\chi^2</math> test</i>	<i>Log (No. of private enterprises)</i>	<i>Log (private enterprises employment)</i>	<i>Log (No. of individual enterprises)</i>	<i>Log (individual enterprises employment)</i>
Joint test for both formal property rights protection and deregulation	2.46 (0.29)	2.89 (0.24)	4.80 (0.10)	1.32 (0.52)
Partial test for formal property rights protection	0.09 (0.77)	1.22 (0.27)	0.29 (0.59)	0.61 (0.43)
Partial test for deregulation	0.09 (0.77)	0.24 (0.63)	1.23 (0.27)	1.08 (0.30)

Note: p-values are in parentheses.

statistically significant then the explanatory variables are endogenous and an IV approach is needed for identifying the causal effect; otherwise, they are exogenous and thus the random-effects estimates should be unbiased (Hausman, 1978; see also, Wooldridge, 2013).

Since there are two potentially endogenous institutional variables (i.e., *formal property rights protection* and *deregulation*) in this paper, at least two instrumental variables are needed for the endogeneity test in order to satisfy the order condition of the IV estimator. Following previous studies (e.g., Nee & Opper, 2009), one of the instrumental variables I use is regional area size (logged). While regional area size is usually considered to have no effect on economic development, it is increasingly perceived as a determinant of legal and regulatory institutions, although the relationship between regional area size and formal institutional development is inconclusive in the literature (Alesia & Spolaore, 2005). Another IV is the quadratic form of log (regional area size). In the classic IV framework, the higher order terms (such as the quadratic form) of the IV are considered additional valid instruments (Dieterle & Snell, 2013). It is assumed here that smaller regions may find it easier to implement legal and regulatory policies and thus may have faster institutional development, yet the effect of regional area size may be smaller as area size passes a threshold. Indeed, the data in this paper suggest that the correlation coefficient between log (regional area size) and formal property rights protection is -0.37; that between quadratic form of log (regional area size) and formal property rights protection is -0.35; that between log (regional area size) and deregulation is -0.42; and that between quadratic form of log (regional area size) and deregulation is -0.39.

Using these two instrumental variables, I conduct the endogeneity test for the four equations in Table 3. The results of the endogeneity test are reported in Table 6. Overall, this table suggests that there is no clear evidence for the endogeneity of the two institutional variables because the p-values for both joint tests and partial tests are larger than the commonly adopted significance level of 0.05. The smallest p-value is 0.10 for the joint test of the two institutional variables in column 3 when log (number of individual enterprises) is the dependent variable.



Yet, this column also suggests that no evidence of endogeneity is found for either of the two institutional variables based on the partial tests for either. Overall, therefore, the two institutional variables may be exogenous and the results reported above may be unbiased.

## DISCUSSION

### Theoretical Contributions

This article makes several contributions to the entrepreneurship literature. Firstly, for the general entrepreneurship literature, it helps to understand the relative roles of formal protection of property rights versus deregulated markets in entrepreneurial development. The previous literature has included well established theoretical arguments emphasizing one set of the institutions over the other. One view held by property rights scholars (e.g., North, 1990 and Acemoglu et al., 2005) emphasizes the fundamental significance of formal protection of property rights by arguing that secure property rights can generate incentives to create and improve markets and that formal protection of property rights is more effective in mitigating risks of government expropriation and other citizens' capture attempts. Another view held primarily by deregulation scholars, however, focuses on the importance of deregulated markets by suggesting that, while property rights can be protected through informal social arrangements, there are no cheap social remedies for a heavily regulated market. However, it is not yet known which set of institutions matters more empirically.

Taking advantage of the unique setting of China's transition economy where formal institutions and entrepreneurship have developed concurrently, and examining the effects of formal protection of property rights and deregulated markets in the same model, this study has two major findings. One finding is that, even when both formal protection of property rights and deregulation are added into the same model, both are still found to have a positive effect on entrepreneurial development. Such a finding suggests that both views above are at least partially supported, and is consistent with the results of the previous research, which studies the effect of each set of institutions separately. Another finding shows that the effect of formal protection of property rights increases while that of deregulated markets decreases over time as the market transition progresses. This finding implies that, as conjectured by property rights scholars, formal protection of property rights may be indeed more significant than deregulated markets in the long run.

Secondly, for the literature on Chinese entrepreneurship, the findings of the paper may contribute to understanding the rapid growth of China's private entrepreneurial firms even before the Property Law, which specifies the details for property rights protection, was passed in 2007. The less conducive national institutional environment for private entrepreneurship during the first three decades of the market transition has led many China scholars to argue that

informal social arrangements (in particular, political connections) are key to understanding China's rapid entrepreneurial growth (see, e.g., reviews in Zhou, 2014). Yet, as Baumol (1990) has argued forcefully, entrepreneurship will be restricted and even unproductive if formal institutions are less conducive. Based on the institutional economic theory, this study provides an alternative explanation for China's entrepreneurial success. It suggests that, as a result of the regionally decentralized system, regional market institutions (particularly, formal protection of property rights and deregulated markets) had been increasingly conducive to entrepreneurial activities and, thus, have played a significant role in facilitating entrepreneurial development in China. Moreover, the results suggest that the significance of the two sets of institutions varies at different stages of market transition. While deregulation may have played a more important role in earlier years of transition, formal protection of property rights may have been more significant for entrepreneurship in more recent years.

Although this study's findings are based on data from China, they may hold for other transition and developing economies as well. The existing research has suggested that weak protection of property rights and heavy regulatory constraints are the two common problems among most transition and developing economies (Acemoglu et al., 2005; Djankov et al., 2002; McMillan & Woodruff, 2002). Thus, one may expect that strengthening formal protection of property rights and deregulating the economy can also facilitate entrepreneurial development in such economies. In addition, it has been noted that, as in China, government expropriation, as well as capture attempts, have been a constant and even increasingly more severe problem for entrepreneurs in the past several decades among a number of developing and, particularly, transition economies (Aidis et al., 2008; Johnson et al., 2002). In this sense, formal protection of property rights may also play an increasingly more significant role in entrepreneurial development over time in many other transition and developing economies, as found in this paper.

### **Limitations and Future Research Directions**

This article also has several limitations that may suggest future directions of research. Firstly, this paper has tested only effects—both overall effects and effects contingent on the progress of the market transition—of formal protection of property rights and deregulation. It has not empirically examined the mechanisms that generate these effects, although I discuss these mechanisms when deducing the hypotheses. Thus, this paper indeed has not opened the black box of how a market transition shapes the effects of property rights and deregulation, which may require more data, particularly at firm and individual levels. Future research may acquire such data to explicitly test mechanisms behind the empirical patterns found in this paper.

Secondly, given the problem of data availability for the entry rate of new entrepreneurial firms, which is also a popular measure for entrepreneurial

development, this paper has tested the effect of formal institutions on the net growth rate of entrepreneurial firms but not on the entry rate, although using the net growth rate is also theoretically and empirically justifiable (Gartner & Shane, 1995). Future research may try to obtain data on the entry rate and then test whether the results in this paper still hold by using this alternative measure of entrepreneurial development. Thirdly, given the lack of measurements for the two institutional variables before 1997, this study cannot extend the research period to the earlier transition years. Future research may try to find or construct indices for institutional variables in earlier years to include longer, or possibly the entire, transition period for research.

## CONCLUSION

This article investigates the relative roles of property rights institutions versus deregulated markets in entrepreneurial development based on China's transition economy. Despite the existence of well established theoretical arguments emphasizing one set of institutions over the other, it is not yet known empirically which set of institutions matters more, particularly in the long run, for entrepreneurship. Using provincial level panel data from China, this study provides the following findings. First, when both formal protection of property rights and deregulated markets, which are studied separately in previous research, are added into the same model, both still have positive effects on entrepreneurial development. Second, as the market transition progresses, the effect of formal protection of property rights increases, but that of deregulated markets decreases. These results are robust to both multiple model specifications and an endogeneity test using an instrumental variable approach. Overall, therefore, while both sets of institutions indeed play a positive role in entrepreneurial development, property rights institutions may be more fundamental in the long run.

## NOTES

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- [1] Deregulated markets are a result of deregulation, which means a reduction or substantial elimination of regulatory constraints in the market by the government (Peltzman, 1989). In this paper, I use deregulation and deregulated markets interchangeably.
- [2] The percentages are based on the author's tabulation of a similar variable from the 1995 and 2004 national surveys of Chinese private enterprises. In the 1995 survey, the variable is based on a question which asked 'which one of the following (economic and political/legal) problems affected your firm most'; in the 2004 survey, the question was 'which one of the following problems about the economic and political/legal environment of the private sector concerned you most'.
- [3] The right-hand side of the random-effects Negative Binomial model is specified the same as in Equation 2, while the left-hand side of this model is not  $\log(Y_{it}')$  but  $Y_{it}'$  - the raw numbers of private firms or level of employment of private firms.

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