Institutional Barriers to Growth: Entrepreneurship, Human Capital and Institutional Change

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Prior research often focuses on how many entrepreneurial firms are created, rather than on institutions that encourage specific types of firms or entrepreneurs. This paper identifies institutional changes that reduce barriers to growth as an important factor influencing the propensity of individuals to start a business. The findings suggest that the impact of lower barriers to growth is shaped by the extent of the reduction in barriers to growth and the level of human capital of the individual. Only a large reduction in barriers to growth has a stronger impact in increasing the likelihood of founding at higher levels of human capital. I capitalize on two reforms lowering barriers to growth as natural experiments. One reform, in 1988, only slightly lowered barriers to growth. The second reform, in 1999, more strongly lowered barriers to growth with an amendment to the Chinese constitution reversing regulations that favored firms with foreign investors. This made it easier for domestic entrepreneurs to compete. I collected data through a survey of 2,966 alumni who graduated from a top Chinese university. Results show that reducing the institutional barriers to growth differently affects college-educated individuals with different levels of human capital.

Keywords: entrepreneurship; external environment; institutional theory; barriers to growth
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Introduction

There is a long history of scholarly attention to the effects of institutions on organizations (Dean and Brown 1995, Scott 2008, Suchman 1995, Tucker et al. 1990), including implications for rates of founding (Dobbin and Dowd 1997, Sine et al. 2005). Prior research, however, gives limited attention to how changes in the institutions might influence the founding of high growth entrepreneurial firms. Moreover, the institutional literature on entrepreneurship offers little insight into how to encourage individuals who have high potential to found successful and growing ventures to become entrepreneurs. Yet, as Powell (1996, p. 297) notes, to make theoretical progress, we must address the "more interesting issues of how [institutions] matter, under what circumstances . . . and in what ways."

Entrepreneurship is an intriguing and relevant area in which to examine how institutions matter (Tolbert et al. 2011). Policy makers often encourage entrepreneurship because of its economic and social benefits. Conventional wisdom implicitly equates lower institutional barriers to entry and *more* entrepreneurship with *better* entrepreneurship. In contrast, this study challenges this conventional wisdom in two ways: analyzing the influence of institutional barriers to growth (not barriers to entry) and addressing the quality of ventures (not firm foundings) via a focus on individual entrepreneurs.

The entrepreneurship literature often emphasizes the characteristics of individual entrepreneurs. It focuses on features such as whether entrepreneurs are immigrants, have a high need for achievement (Roberts 1991), or are the children of entrepreneurs (Sørensen 2007), and finds that high human capital entrepreneurs are most likely to be successful (Beckman et al. 2007, Eisenhardt and Schoonhoven 1990, Hallen 2008). Yet, this research typically neglects how the institutional environment might shape the decisions of high human capital individuals to pursue entrepreneurship, and thereby improve the quality of entrepreneurial firms by their participation.

Taken together, the institutional literature on entrepreneurship and the entrepreneurship literature have made helpful strides, but leave open two major issues: identification of mechanisms beyond entry barriers by which institutional changes can lead to increased founding rates and clarity on how institutional changes can differentially influence individuals' decisions to enter entrepreneurship. I tackle these open issues by looking at institutional changes regarding barriers to growth and human capital differences across individuals. Specifically, this paper asks: Does a significant institutional change lowering barriers to growth encourage entrepreneurship by high human capital individuals?

To examine this research question, I take advantage of two institutional reforms in China as natural experiments. The first reform moderately lowered strong barriers to venture growth, while the second reform further and significantly lowered these barriers. In addition, I focus on college-educated individuals and the growth of their ventures, using a unique alumni sample, rather than, for instance, necessity-driven entrepreneurs who

lack higher education and often create subsistence-level small businesses.

There are several findings and contributions. First, this study contributes a new theoretical mechanism (i.e., *barriers to growth*) by which founding rates may increase. Second, this study contributes insights into how barriers to growth differentially influence individuals. *Human capital* is key; that is, individuals with lower human capital are more likely to become entrepreneurs after an institutional change that moderately lowered strong barriers to growth than higher human capital individuals. In contrast, after further and more significant lowering of barriers to growth, individuals are influenced to a greater extent the higher their human capital. Thus, both the direction *and* magnitude of this institutional change distinctively affect the decisions of individuals to start firms. Third, this study contributes a synthesis of the research on who becomes an entrepreneur with work on which entrepreneurs are successful. In particular, higher human capital entrepreneurs are more likely to found *higher growth ventures* than are lower human capital individuals, particularly after the second and stronger reform. A key conclusion is that significantly lowering institutional barriers to growth is important for entrepreneurship policy because it attracts higher human capital individuals (who are then more likely to start higher growth firms) to entrepreneurship; that is, such a policy attracts better, not just more, entrepreneurs.

I organize this paper in three parts. I first summarize related background in the institutional theory and entrepreneurship literatures and develop hypotheses. In doing so, I use several concepts: institutional barriers to growth, institutional barriers to entry, and human capital. A change that lowers institutional *barriers to entry* makes it easier to start a firm (McAfee et al. 2004). A change that lowers institutional *barriers to growth* facilitates the scale-up of a firm after entry. Following prior literature, I define individuals with higher *human capital* as those with greater productivity-enhancing skills and knowledge (Eisenhardt and Schoonhoven 1996, Hallen 2008). Then, I describe the methodology and results. I conclude by discussing the findings and the contributions to the institutional and entrepreneurship literatures.

Background

Institutions can be categorized into regulatory, normative, and cognitive institutions (Scott 2008). Institutional scholars with a focus on entrepreneurship have examined several issues related to the research question. A key argument is that the institutional environment can influence barriers to entry, and so shape founding rates (Dobbin and Dowd 1997, Sine et al. 2005, Sine and David 2010, Suchman 1995).[1] For example, when the U.S. government simplified the legal steps for launching solar ventures and provided financial incentives, the founding rate of these firms increased (Meek

et al. 2010). Institutional changes can also lower barriers to entry by opening markets. For example, when the U.S. government passed the Public Utility Regulatory Policies Act of 1978 (PURPA), independent energy firms became able to sell electricity to the grid. This, in turn, increased the founding of energy firms (Sine et al. 2005). Lowering barriers to entry can also depress founding rates if competition becomes too high. For instance, Dobbin and Dowd (1997) find that public policies that provide capital increase founding by reducing barriers to entry through resource provisioning. In contrast, antitrust policies also reduce barriers to entry but increase competition, leading to a dampening of founding. Changes that streamline the business environment can also lower barriers to entry, and thereby increase founding rates (Hsu et al. 2007).

A second research stream examines the influence of institutions on industries and populations (Kim 2013, Haveman 1993, Haveman and Rao 1997, Romanelli 1989). At the industry level, Strang and Bradburn (2001) show how the U.S. federal government created a new incentive structure and eliminated restrictive practices, helping to shape health maintenance organizations. Similarly, Reger et al. (1992) find that banking deregulation motivated banks to shift their strategies by diversifying their loan portfolios and reducing risk. Haveman et al. (2001) find that deregulation of hospitals eroded sector boundaries, put pressure on pricing, and lowered profits. Likewise, Delmas et al. (2007) find that, after deregulation that forced utilities to buy power from private generators, many utilities adopted new strategies around differentiation or low cost. Rajagopalan and Finkelstein (1992) find that deregulation influences compensation packages.

Yet, while these two streams are useful, the extant literature rarely examines the specific mechanisms for how institutional changes, such as shifting regulations, influence either the founding of high growth firms or higher founding rates by certain individuals. Many of the mechanisms established firms use to mitigate risks from institutional change are not available to entrants (Feinberg and Gupta 2009). Thus, while there has been much work on the effects of institutional change on barriers to entry regarding founding rates and on organizations, there is much less work on how these changes also influence individuals (for exceptions, see the work of microsociologists, such as Colyvas 2007, Suchman 1995) and the emergence of high growth ventures.[2] In particular, we still lack understanding of institutional theory's role in guiding the decisions of individuals who are more likely to succeed as entrepreneurs. This study responds to calls for theory to explain how institutional change encourages different types of individuals to become entrepreneurs (Hoskisson et al. 2000, Tolbert et al. 2011) and creates overall heterogeneity among entrepreneurs and firms (Sine et al. 2005, Stuart and Sorenson 2003, Thornton 1999).

Entrepreneurship Literature

The entrepreneurship literature has explored the individual characteristics that are associated with entrepreneurs. On the one hand, those who are children of entrepreneurs (Sørensen 2007) and have a higher need for achievement (Roberts 1991) are more likely to found firms. In addition, individuals who have larger inheritances, are wealthier, are single males, and have more work experience (Blanchflower and Oswald 1998) are more likely to found firms. Hurst and Lusardi (2004), for example, argue that the correlation between personal wealth and entrepreneurship may be driven by unobservable traits (i.e., ability) associated with wealth. On the other hand, individuals in lower status occupations, immigrants, and the unemployed also have higher rates of entrepreneurship than others have (Hsu et al. 2007, Evans and Leighton 1989). While useful, this research stream has not yet considered how the broader environment such as institutions might influence who becomes an entrepreneur.

A second stream examines the individual characteristics of founders (often differing from those affecting the likelihood of entrepreneurship) that are associated with creating successful ventures (Eisenhardt and Schoonhoven 1990, Beckman 2006, Beckman et al. 2007). A key finding is that individuals with higher human capital are more likely to succeed. For example, individuals with higher education levels started better performing ventures when they spun out from MIT Lincoln Labs (Roberts 1991). Individuals with management experience in prominent firms had higher entrepreneurial success rates (Burton et al. 2002). A next step is to examine the mechanisms by which the most capable individuals become entrepreneurs.

Overall, the institutional and entrepreneurship literatures have developed independently, and collectively offer an incomplete view of the linkage among institutional change, types of individuals, and the rates and success of entrepreneurship. This paper contributes to the nexus of these literatures by showing how institutional changes distinctly shape the decisions of some individuals (more than others) to become entrepreneurs, and the performance of their ventures across time.

Theory and Hypotheses

Decision to Pursue Entrepreneurship

The decision to pursue entrepreneurship can be thought of as the choice between staying in the labor market versus entering entrepreneurship, based on the potential earnings in the labor market and the potential earnings in entrepreneurship. The present value of the potential earnings in the labor market can be the predicted wage. The potential earnings in entrepreneurship can be the present value of the venture's future return minus the

entry cost. If someone decides to enter entrepreneurship, then the following should be satisfied:

$$PV_{wage} < PV_{venture} - C;$$

in other words, potential return in the labor market is less than potential return of the venture minus entry cost.

An individual chooses between staying in the labor market and entering entrepreneurship with the goal of maximizing his/her potential return. When deciding whether to switch to entrepreneurship, the potential return in the labor market is the *opportunity cost* of becoming an entrepreneur. An individual will weigh this opportunity cost against the potential return of the venture minus the entry cost. *Barriers to entry* affect the entry cost, while *barriers to growth* affect the potential return of the venture. For a particular individual, the potential return in the labor market (i.e., opportunity cost) does not change easily. In contrast, holding all else fixed, the potential earnings to entrepreneurship increases as the institutional barriers to growth are lowered. Next, I analyze how changing institutional barriers to growth affects people at different human capital levels in the decision to enter entrepreneurship.

Barriers to Growth and the Founding Rate

A focus of prior literature is that lowering institutional barriers to entry increases rates of entrepreneurship. However, reducing barriers to entry does not make it easier for entrepreneurs to scale up their firms. A second, less examined mechanism is lowering institutional barriers to growth, a mechanism that does affect scaling. Institutional barriers to growth are frequently due to industrial policies that create an uneven playing field by directing resources toward established firms, state-owned firms, and foreign-invested firms (leaving fewer resources for growing ventures). Reducing barriers to growth not only facilitates the postentry growth of ventures, but also stimulates the entry of ventures. On the one hand, by observing other entrepreneurs struggle to scale their ventures, prospective entrepreneurs are discouraged from founding; that is, entering entrepreneurship may be less attractive compared to their other career choices. On the other hand, after institutional barriers to growth decrease and scaling up ventures becomes easier, prospective entrepreneurs become more motivated to found their own firms because the potential return of the venture increases. Thus, lowering barriers to growth increases entrepreneurship.

Hypothesis 1 (H1). *Lowering barriers to growth increases the rate of entrepreneurship.*

Human capital affects an individual's decision to enter entrepreneurship. Following prior work (Li and Walder 2001, Walder 2003), I define high *human capital* individuals as individuals who possess the productivity-enhancing skills, connections, and knowledge (Eisenhardt and

Schoonhoven 1996, Hallen 2008). Lower human capital individuals have lower opportunity costs to entering entrepreneurship (Amit et al. 1995, Gimeno et al. 1997, Buera 2009) relative to higher human capital individuals. When lower human capital individuals choose between staying in the labor market and entering entrepreneurship, the threshold created by the potential return in the labor market (i.e., left side of (1)) is surpassed with a smaller-scale venture as compared with individuals at higher human capital levels. In contrast, individuals with higher human capital tend to have both a higher potential return in the labor market (and thus, higher opportunity cost). Low human capital individuals are likely to have relatively fewer resources for the fixed entry cost of beginning a venture (Buera 2009). This means that the entry cost to entrepreneurship is likely to be less of a constraint for higher human capital individuals relative to lower human capital individuals.

For the future performance of a venture, research indicates that the capability (human capital) of the founder is likely to be a key indicator (Cooper et al. 1994, Hallen 2008, Roberts 1991). The growth of a venture may be constrained by two factors: ability of the founder to scale up the company and institutional barriers to growth. Lower human capital individuals are likely to have less ability than high human capital individuals and empirically have lower performance in entrepreneurship (Eisenhardt and Schoonhoven 1996). Conversely, higher human capital individuals have better ability to make their companies grow and perform better. Thus, for higher human capital individuals, the potential returns of their ventures are more affected by institutional barriers to growth because these barriers pose greater limitations on the upside potential for venture growth. In contrast, limits to the growth of the ventures founded by lower human capital individuals are more affected by the limits of their own ability.

Moderately Lowered Barriers to Growth

Lower human capital individuals are more likely to be more influenced by the initial moderate reduction of strong barriers to growth, as compared with higher human capital individuals. Strong institutional barriers to growth (e.g., ban on firms with more than a small number of employees) deter entrepreneurship even among low human capital individuals. Under strong barriers to growth, entrepreneurs cannot grow their ventures to a scale that provides sufficient returns to justify investing resources toward the venture. However, compared with individuals with higher human capital, even a moderate reduction in barriers to growth can be sufficient for lower human capital individuals to become entrepreneurs.

The first argument is that the lower an individual's human capital, the less his or her ability to gain high potential returns in the labor market, and so the lower opportunity cost to entrepreneurship. This lower opportunity cost, in turn, lowers the scale of the venture necessary for an individual to decide to enter entrepreneurship. Even if their ventures are smaller scale, entering entrepreneurship can still be a better choice for lower human capital individuals than remaining in the labor market.

A second argument is that a moderate lowering of strong barriers to growth can also reduce barriers to entry because more resources (e.g., initial capital, cofounders, and employees) may begin to flow toward entrepreneurs, and ventures that were infeasible on an extremely small scale are now possible with greater scale. Thus, a moderate increase in the scale of ventures that is possible and a correspondingly moderate increase in resources available for the cost of entry may be all that is required to attract lower human capital individuals to entrepreneurship.

Third, moderately lowering strong institutional barriers to growth can also increase the probability of scaling up a venture and consequently be more rewarding. This makes entrepreneurship more attractive, especially for those with a lower potential return in the labor market and, thus, a lower opportunity cost to entrepreneurship. When barriers to growth are strong, investors are likely to be reluctant to commit resources to ventures. In contrast, when barriers to growth fall, more resources become available for these relatively more wealth-constrained entrepreneurs (i.e., those with lower human capital).

Overall, when strong institutional barriers to growth are initially reduced, lower human capital individuals are more likely to become entrepreneurs than higher human capital (i.e., more highly educated and skilled) individuals. Even if the barriers to growth are still significant after their reduction, moderately lower institutional barriers to growth can turn entrepreneurship into an attractive career option for lower human capital individuals as they can more easily gain resources (thus, their entry costs fall) and improve their returns to venture growth, thus surpassing their modest returns in the labor market.

In contrast, moderately lowering strong barriers to growth has less effect on high human capital individuals. First, higher human capital individuals have a larger opportunity cost when deciding whether to pursue entrepreneurship because of their relatively higher returns in the labor market. Since barriers to growth are still relatively high, achieving sufficient venture growth in entrepreneurship to overcome this higher opportunity cost is unlikely. Because of their more lucrative returns in the labor market, high human capital individuals need to give up relatively more when founding a firm than do lower human capital individuals. Relative to low human capital individuals, high human capital individuals need to be able to achieve a greater scale in their entrepreneurial ventures for entrepreneurship to become attractive.

Second, high human capital individuals are more sensitive to the constraints of barriers to growth. Since they have greater ability (which enables them to create larger-scale ventures), they are more constrained by relatively high barriers to growth. Slightly reducing strong barriers to growth does not allow higher human capital individuals to use their greater skills sufficiently to create larger ventures, and consequently achieve returns commensurate with their skills in entrepreneurship. The upside growth potential of their ventures is more limited relative to their skills than that of lower human capital entrepreneurs. Thus, they are less likely to give up high wage opportunities. When significant barriers to growth remain, existing large firms retain institutional advantages such as high wages, and thus high human capital individuals are likely to remain employees inside established firms rather than strike out as entrepreneurs.

Finally, increased competition in entrepreneurship from greater entry by lower human capital individuals may deter entry by high human capital individuals. Since lower human capital individuals do not compete as effectively for wages in the labor market and are less constrained by moderate barriers to growth because of limits to their ability to create large firms, they are more likely to try entrepreneurial opportunities opened up by moderately lowered strong institutional barriers to growth (as argued above). This leads to greater crowding of entrepreneurial opportunities, further reducing the attractiveness of entrepreneurship for high human capital individuals.

HYPOTHESIS 2A (H2A). *A reduction of institutional barriers to growth from strong to moderate, will increase the propensity for entrepreneurship more among individuals with lower levels of human capital compared to individuals with higher levels of human capital.*

Significantly Lowered Barriers to Growth
What type of individual is most affected by such an institutional change that significantly lowers strong barriers to growth? I argue that high human capital individuals will be more likely to start ventures when strong barriers to growth lower significantly than is the case for lower human capital individuals.

First, significantly lowered growth barriers make it possible to found firms that can reach sufficient scale to attract higher human capital individuals to entrepreneurship. Higher human capital individuals have larger opportunity costs when deciding whether to enter entrepreneurship than do lower human capital individuals. Their better returns in the labor market mean that such higher human capital individuals are more constrained by the need to build large firms, and thus by barriers to growth, than lower human capital individuals. Yet, as the institutional barriers to growth are lowered significantly, higher human capital individuals are able to scale

up their ventures commensurate with their own ability. In other words, higher human capital individuals' education and skills provide them with the higher productivity needed to grow their ventures to a larger scale than lower human capital individuals (Becker 1964, Cooper et al. 1994, Eisenhardt and Schoonhoven 1990). These individuals then can realize these larger ventures when they are not blocked by strong or even moderately strong barriers to growth. Colombo and Grilli (2005), for example, show how different forms of human capital contribute to superior growth. Thus, while high human capital individuals are more capable and so more likely to create larger ventures, they are less able to do so when they are constrained by even moderately strong barriers to growth. Consequently, when the institutional barriers to growth are significantly lowered, the potential return of the venture is more likely to surpass the opportunity cost of entrepreneurship for high human capital individuals. Higher human capital individuals are thus better able to scale their ventures, and so overcome the threshold that makes the potential return to entrepreneurship attractive relative to the labor market.

Second, lower human capital individuals are less affected by further lowering of barriers to growth relative to higher human capital individuals. Individuals with lower human capital are less able to afford the fixed entry cost to entrepreneurship compared with individuals with higher human capital. As argued earlier, such individuals have less wealth and access to resources. Therefore, it is unlikely that increasing the return to entrepreneurship by lowering barriers to growth would affect these individuals as much as their higher human capital counterparts. Given their more limited skills, education, and productivity, individuals with lower human capital are also less likely to create high growth firms (Cooper et al. 1994, Eisenhardt and Schoonhoven 1996). Thus, barriers to growth are less binding. Moreover, these individuals are more likely to be attracted to even small venture opportunities because their return in the labor market is lower than for high human capital individuals. So further lowering moderate barriers to growth has relatively less effect on their choices. Indeed, further lowering barriers to growth may even deter some low human capital individuals from founding firms since the expansion of existing firms triggered by a significant drop in barriers to growth may result in improved employment opportunities.

Third, strong barriers to growth create advantages for large, established firms because they reduce competition from smaller-scale competitors. In contrast, substantially lower barriers to growth threaten large, established firms with greater competition. This in turn potentially makes employment in such established firms less attractive for high human capital individuals.

In summary, a significant reduction in barriers to growth makes scaling up a venture more likely, especially for high human capital individuals, and may make

employment at large, established firms less attractive for them. As a result, after substantially lowering the barriers to growth, entrepreneurship increasingly competes with established career paths for high human capital individuals.

HYPOTHESIS 2B (H2B). *A further reduction of institutional barriers to growth will increase the propensity for entrepreneurship more among individuals with higher levels of human capital compared to individuals with lower levels of human capital.*

The gap between the growth potential of ventures with lower human capital founders versus higher human capital founders widens after significantly reducing barriers to growth. This argument differs from the prior work tying venture performance to human capital (e.g., Eisenhardt and Schoonhoven 1990) because it relates to effects of institutional barriers to growth for distinct types of entrepreneurs.

As barriers to growth become significantly lower, a high human capital founder is more likely to reach the full potential of his or her ability in starting a firm. Such founders are relatively more constrained by the strong barriers to growth that existed before the reform. If a reform simply attracted more high human capital entrepreneurs, then one would expect larger firms to result because of their superior ability to create large firms. However, if a reform significantly reduces institutional barriers to growth, the gap in venture size between higher and lower human capital individuals will likely increase. This increased gap is due to the removal of institutional barriers to growth that are more constraining to the scale of ventures with high human capital founders than to the ventures with low human capital founders.

As barriers to growth become significantly lower, high human capital individuals are also better able to take advantage of new types of entrepreneurial opportunities. High human capital individuals have the education and skills that may be necessary to discover and pursue such higher potential growth opportunities. Thus, one part of the effect of significantly lowering barriers to growth is likely to come from high human capital individuals pursuing higher growth potential types of entrepreneurial opportunities. Another part of the effect may come from such individuals being able to grow the same types of entrepreneurial opportunities to a larger size than can lower human capital founders, and so outcompete them. In addition to the founder's own ability to create a venture, investors and other resource providers are likely to favor higher human capital individuals (Hallen 2008). Resource providers may prefer to invest their resources in ventures based (in part) on whether the founder has higher human capital, such as more productive skills to better exploit opportunities (Colombo and Grilli 2005, Eisenhardt and Schoonhoven 1996). Thus, higher human

capital individuals are likely to receive more resource investments.

This facilitation of ties to resource providers may be a key mechanism by which higher founder human capital leads to greater venture growth relative to lower founder human capital. A founder's background provides signals such as career advancement and education that prospective resource providers may use to infer quality and make decisions on whether to invest (Becker 1964, Hsu 2007). Resource providers, early hires, and customers alike may seek high human capital founders, as these attributes signal that their ventures are probably well run and likely to succeed (Hallen and Eisenhardt 2012). When barriers to growth are lowered significantly such that greater scale becomes possible and easier to achieve, resource providers look more favorably on ventures founded by higher human capital individuals. Overall, higher human capital individuals benefit more compared with lower human capital individuals from significantly reduced growth barriers, and so the size gap between ventures founded by high versus low human capital entrepreneurs is likely to widen.

HYPOTHESIS 3 (H3). *The difference in size between firms founded by individuals with lower levels of human capital and individuals with higher levels of human capital will increase after barriers to growth are significantly reduced.*

Methodology

I test these hypotheses within the setting of institutional changes in China. This context along with novel and detailed university alumni survey data allow a clean identification of the impact of reducing institutional barriers to growth. While the hypotheses above are not exclusively about a transition economy, such a setting is a useful context (Kim and Utterback 1983, Giroud and Tucci 2012). Evidence from less developed countries (LDCs), undergoing economic transition, such as China, is useful for three reasons. First, variation in the institutional environment creates relevant opportunities to identify the link between institutional change and behavior. Second, LDCs typically have not yet developed well-organized industry associations to lobby for reforms, reducing concerns of reverse causation. Finally, the majority of the related literature focuses on well-developed, Western economies, and yet most of the world's entrepreneurs live in developing economies (Barkema et al. 2015, Gollin 2002).

I focus on two institutional reforms: one in 1988, which moderated extremely strong barriers to growth, and another in 1999, which significantly lowered barriers to growth even further. According to my interviews, these reforms were the two most significant reforms, with both serving as exogenous shocks in the minds of the alumni entrepreneurs whom I studied in terms

of their effects on increasing entrepreneurship. Entrepreneurship was nearly eliminated when the People's Republic of China was founded in 1949. Barriers to entry into entrepreneurship could not have been much higher. The only form of entrepreneurship permitted in China was individual businesses, employing seven people or fewer. The National People's Congress of China (2007) approved Article 11 of the 1988 amendment to the Constitution, which "permits the private sector of the economy to exist and develop within the limits prescribed by law." Thus, in 1988, the state officially recognized private businesses with eight or more employees. Prior to this time, if a business grew beyond seven employees, it was illegal (Young 1995). Thus, the 1988 reform moderately lowered the previously very strong institutional growth barrier.

Although the 1988 reform moderately reduced the long-standing strong barriers to growth, growth barriers still existed due to the development strategy of the central Chinese government. In the years following the "open door" policy in 1978, the Chinese government set into motion major economic reforms to allow and encourage the entry of foreign invested firms. This emphasis resulted in strong disadvantages and even discrimination against domestic entrepreneurs in favor of foreign-invested and state-owned firms in China (Huang 2003, 2008). A political pecking order of ownership types developed whereby private entrepreneurial firms found it difficult to expand and compete, while foreign-invested and state-owned enterprises were favored in terms of regulatory approvals, expansion funding, and other forms of support. Chinese entrepreneurs were allowed to found firms that could grow beyond seven employees, but the growth of their ventures was, in reality, stifled by banks and other resource providers who would not lend to them and by large companies who would not buy from them. So while it became easier to set up an entrepreneurial firm, the substantial advantages given to foreign and state-owned firms inhibited the growth of new firms (Qian 2000).

These barriers to growth were significantly lowered in 1999, when the government altered its historical discrimination against private sector firms in favor of other ownership types (Huang 2003). In 1999, the National People's Congress approved an amendment to the Constitution that officially put the private sector on the same legal footing as the public sector (Liu 2002, National People's Congress of China 1982). In part, this reform was enacted to address concerns over increasing unemployment. By reversing policies aimed at bolstering foreign-invested and state-owned firms, the amendment did three things that aided the growth of entrepreneurial firms: (1) reduced discriminatory practices against domestic owned private firms, (2) provided assurance that private property would be defended, and (3) signaled

to local governments the importance of supporting entrepreneurial firms (Qian 2000). After the amendment, national, regional, and local governments started to relax restrictions that previously made growth difficult for private enterprises (Peoples Daily 1999). For instance, Zeng Peiyan, minister at the State Development Planning Commission, issued a statement in 2000 saying "[We will] eliminate all restrictive and discriminatory regulations that are not friendly towards private investment and private economic development" (Tian 2007, p. 282).

In this study, I examine the early baseline period (1978–1988, time period 0), a middle period after a moderate reduction of growth barriers (1989–1999, time period 1), and a later period, after further and significantly lowering growth barriers (post-1999, time period 2).

Data

To gather individual-level data in the Chinese context, I sent a unique survey to all alumni of Tsinghua University in Beijing.[3] The survey was sent to all alumni including graduates from 1947 to 2007 with an address on record (a total of 26,700), and could be completed online or via postal mail. Alumni were asked if they had participated in founding a new company or in privatizing a state-owned enterprise. A total of 2,966 surveys were completed (including 718 entrepreneurs). The response rate was 11.2%. The final number of observations is 1,821, the alumni who responded to all variables. I observed these individuals since their graduation year (i.e., varying number of years) for a total observation number of 44,248 person-years. A wide range of industries, including aerospace, biotech, chemicals, consumer products, energy, machinery, materials, medical devices, publishing, and telecom, are represented among the firms, with Internet, electronics, and software firms being the most common (41%). I supplemented these data with semistructured field interviews with 42 informants who were entrepreneurs and investors.

To test whether the respondents to the survey were representative of Tsinghua graduates, I compared the survey responses to the population of Tsinghua University graduates. The school claims 62.5% of the students major in engineering disciplines, 11.9% in sciences, and 12.9% in humanities (architecture, medicine, and law comprise the remainder). My Tsinghua survey sample similarly contains 62.2% engineering, 10.6% sciences, and 13.7% humanities. Traditionally, Tsinghua has been a male-dominated university, and my Tsinghua sample reflects this, with only 12.2% of the responses from women. However, in recent years, Tsinghua has reported that 25%–30% of the students are female. In my survey sample, the percentage of women in recent graduating cohorts similarly ranges from 11% in 2000 to 28% in 2007. Tsinghua has 19.2% of its alumni graduating from doctorate degree programs, while the survey sample has

19.3%. Tsinghua claims that 53.4% of its students are enrolled in graduate (master's or doctorate) programs, while the survey sample similarly shows 53.9%. Overall, these comparisons indicate that there are no statistically significant differences between survey respondents and the general population.

Empirical Strategy

Identifying the effects of institutional change on the likelihood of entrepreneurship across individuals is challenging because it is often difficult to separate institutional influences from unobserved influences, such as cultural labor market changes. To separate the influence of institutional change, I estimated the results using difference-in-differences estimation including a time trend control. By controlling differences due to time before and after reform and differences between high and low human capital individuals, this empirical strategy helps to identify the effects of institutional change net of any differences due to education level, age, and other time trend effects. Because of the nature of the national-level reform, I use a group that is less influenced by the mechanism theorized (i.e., lower human capital group) to form the control group. Thus, the two differences are the difference in entrepreneurship rates between lower and higher human capital individuals and the difference in entrepreneurship rates before and after reform.

Measures

Dependent Variables. To test Hypotheses 1–2B, I use the dichotomous measure *found*, which is equal to 1 if the individual founded a firm in that year and zero otherwise.

To test Hypothesis 3, I measure firm size by *latest employees*, which is measured in the most recent year the firm was still in operation and logged to reduce skew. Failed firms are included, and so there is no survival bias.[4] Since panel data are rarely available for ventures, prior studies often use the most recent year's data (e.g., Eesley et al. 2016, Eesley and Roberts 2012), the pre-money valuation in the latest round (Chatterji 2009), or events occurring in the latest year, such as initial public offering (IPO) or acquisition (Beckman and Burton 2008), or survival (Dencker et al. 2009, Hiatt and Sine 2014, Adams et al. 2015). I also find consistent results using the prior two years of data and the compound annual growth rate. Prior work also uses compound annual growth rates in employees and sales from the beginning to the end point of their study (Baum and Bird 2010). Since it is also interesting to know whether higher profitability ventures were founded, I use profitability (log *profits* and *return on sales*) as the dependent variable and find consistent results.[5] I also use the entrepreneur's reported *income* drawn from the firm in its most recent year of existence and find similar results

(available from the author). I do not explore IPOs and acquisitions because they are both too rare in China and not necessarily indicative of firm size.

Key Independent Variables. To test the impact of moderately lowering barriers to growth, *time period* 1 is defined as a 1 for observation periods after the 1988 reform (1989–1999) and 0 otherwise. *Time period* 2 is defined as a 1 for observation periods after the 1999 reform, which substantially lowered barriers to growth, and 0 otherwise.

Human Capital. Both educational and career-based variables have been used in the prior human capital literature as measures of productivity-enhancing skills (Beckman et al. 2007; Eisenhardt and Schoonhoven 1996, 1990; Hallen 2008; Hitt et al. 2001). Since human capital is a multidimensional construct, I measure human capital by creating an index with multiple measures to capture the ways that individuals could acquire higher productivity skills. This index includes advanced education and building management and leadership experience in extracurricular activities and through work experience, including promotion up the career ladder. I created the index using *education level, promotion*, and *student leader*. *Educational level* (master's and doctorate degrees compared to bachelor's degree only) is an appropriate and often used measure of human capital that has been robustly correlated with entrepreneurial performance (Roberts 1991, Colombo and Grilli 2005). *Promotion* is an indicator variable for whether the individual has been promoted to general manager or technical manager. Prior work has taken the stance that higher human capital individuals are more likely to receive promotions (Becker 1964, Elfenbein et al. 2010). *Student leader* is an indicator variable for whether the individual has leadership experience as a leader in a student government. These variables loaded onto a single factor (varimax with oblique rotation, eigenvalue > 1, Cronbach's alpha > 0.7). The *human capital index* is mean centered at 0. The results are robust to using salary and grade point average, although the sample size is reduced.

Controls. Prior work has found that certain demographic factors predict the likelihood of entrepreneurship. Women are shown to be less likely to become entrepreneurs, so I control for *gender* (male equals 1) (Blanchflower and Oswald 1998). Since having an entrepreneurial parent is often associated with becoming an entrepreneur (Sørensen 2007), I control for *entrepreneurial parent*. Since increased entrepreneurial activity often results in social contagion and positive rate dependence (Dobrev and Barnett 2005, Delacroix and Carroll 1983), I control for the number of colleagues, friends, and classmates who have become entrepreneurs (*entrepreneurship index*) and the number of fellow Tsinghua alumni founding firms in that year (*new firms Tsinghua*).

Second, I control for characteristics of the individual's education and work experience that may be associated with entrepreneurship. I control for *academic job*

and *government job* (including recently held and held in the past). Academic and government jobs are considered attractive job roles in China. I control for whether the individual has gone abroad for education or work experience with the variable *overseas* as an indicator (Huang 2008).

Prior work finds that macroeconomic conditions, such as higher gross domestic product (GDP), increase the entrepreneurship rate (Hsu et al. 2007). I include a control for *GDP per capita* by year in China in the regressions. I include *years since graduation* as the number of years since the bachelor's graduation, as prior literature finds that more years in the workforce may increase the entrepreneurship rate (Carroll and Mosakowski 1987, Sørensen 2007). Since some technical fields (electrical engineering or computer science) or geographic locations may offer more opportunities for entrepreneurship, I include dummy variables for bachelor's major (academic department) and region (province at the time of the survey) effects. Finally, prior work shows Chinese Communist Party members have advantages in career mobility (Walder 1995, 2003). Since the Communist Party began admitting entrepreneurs after 2001, I include a control for *Communist Party member*. Regressions on firm size include controls for *firm age* and founding team size (measured by *cofounder number*). I also include the variable log(*reinvested*) to control for the profits that are reinvested.[6]

Statistical Analysis

The baseline (time period 0) is the 1978 to 1988 period. I begin the analysis in 1978 since China began a major reform to open up the economy in 1978 with the Open Door Policy (Huang 2003). Little entrepreneurship existed prior to this time. The models estimate the effects of the 1988 reform that moderately reduced the initial strong barriers to growth, relative to the baseline. The National People's Congress approved Article 11 of the 1988 amendment to the Constitution, which officially recognized private businesses with eight or more employees (Young 1995). Time period 1 covers the years after the 1988 reform (1989–1999), while time period 2 covers the years 2000 to 2007, after the second institutional reform. In 1999, the Second Plenary of the Ninth National People's Congress approved an amendment to the Constitution that officially stated the private firms should be treated the same by the law as state-owned enterprises and foreign-invested firms (Liu 2002, National People's Congress of China 1982). Table 9 in the online appendix verifies that firm size (as measured by revenues or employees) significantly increased after the 1999 reform.
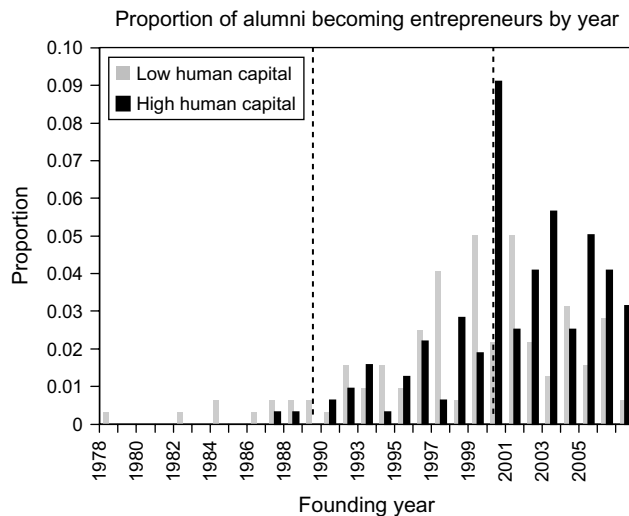
The models include variables for the pre and postreform time periods for each reform. I conducted a pooled

logit regression to test Hypothesis 1, which takes into account the right-side censoring effect (i.e., relative to older graduates, recent graduates had fewer years to found a firm as of the time of the survey). A possible concern is that there are more respondents at risk of becoming an entrepreneur in the later years given that new cohorts of graduates enter each year.[7] I address this issue by the construction of the regression, which predicts the likelihood that an individual will become an entrepreneur and controls for individual demographics, human capital, work experience, and years since graduation. The sample includes graduates from 1947 through 1999. Individuals who graduated after 1999 were dropped from the sample since they were not at risk of founding a firm in the first time period.[8] Although more individuals enter the sample over time, this does not create a "mechanical" increase in the likelihood of an individual founding in more recent years because (as noted above) I conduct the analysis at the individual level and predict an individual's likelihood of becoming an entrepreneur, not number of firm foundings. Showing robustness, negative binomial regression results are consistent with the logit results.[9]

To test Hypotheses 2A and 2B, the key terms are the difference-in-differences estimates from the pooled logit models, which interact the human capital index with the postreform time periods.[10] The sign of the interaction term will indicate whether, in different time periods, the the likelihood of entrepreneurship is higher (or lower) for different levels of human capital. With a continuous variable interacted in my case, the interaction term coefficient is also the correct interpretation of the treatment effect change when the human capital index changes. A short mathematical proof similar to Puhani (2008) is in the online appendix.

To test Hypothesis 3, Heckman regression models are used. If individuals are self-selecting into building up their human capital and choosing entrepreneurship based on some unobservable characteristics, then this might bias estimates upward. The Heckman (1979) model adjusts for this source of bias. Heckman models allow us to control for the first stage of self-selection into entrepreneurship when estimating the impact of the lowering of institutional barriers to growth on the size of ventures started by different types of individuals (high versus low human capital). The first equation is a probit model that predicts whether an individual becomes an entrepreneur. The second equation is a regression model that regresses the dependent variable (firm size) on given explanatory variables (firm age, founding team size, initial capital, founding year and locations, etc.) as well as an additional parameter (lambda) that estimates the impact of self-selection, if any. The self-selection parameter, lambda, is estimated on the basis of the first equation. The variable *entrep_index* is used as an instrument since it is correlated with entry but not with

Figure 1   Proportion of Individuals Becoming Entrepreneurs by Human Capital Level

Proportion of alumni becoming entrepreneurs by year

Notes. Vertical lines indicate the two reform years (1988 and 1999) lowering barriers to growth. High human capital is defined as having a *human capital index* above the median. Low human capital is defined as this measure being below the median.

firm size. The pairwise correlation between entrepreneurship index (*entrep_index*) and number of employees in the last year in operation (*last_employees*) is only −0.003. The initial probit analysis revealed that individuals with more close contacts who had been entrepreneurs (*entrep_index*) have a significantly greater probability ($p < 0.01$) of becoming an entrepreneur. The exclusion restriction (lack of correlation with the error term) is likely to be met since having more friends, colleagues, and family who were entrepreneurs is not likely to be significantly related to whether an individual has a greater (unobserved) ability to create a larger firm.

In this analysis, I drop observations from time period 0 (1978 to 1988) since the hypotheses do not suggest comparing time period 0 to time period 2. I compare time period 1 (1989 to 1999) to the post-1999 reform time period 2 to identify the impact of the significant reduction in barriers to growth 1999 on firm size. This allows a comparison of the time period just before and after the 1999 reform. The results are robust to tobit specifications as well.

Results

Figure 1 shows the increase in entrepreneurship rates among lower human capital individuals after the first reform and the increase among higher human capital individuals after the 1999 reform.[11] Table 1 shows the descriptive statistics and correlation matrix. The data on *latest employees* are skewed, with one major retail firm with many employees increasing the average. (I verified this data point in a phone call with the founder.) I take

the log of this variable to account for the skewed distribution. Such skewed size distributions are not uncommon in entrepreneurship data sets, and the results are robust to removing this observation. *GDP per capita* is correlated with *new firms Tsinghua* and *firm age* due to the strong growth in Chinese GDP over time. Thus, robustness tests substituting *GDP per capita* for *new firms Tsinghua* yields consistent results.

Model 2-1 of Table 2 reports the results for the controls. Models 2-1 and 2-2 provide support for Hypothesis 1, which proposes that lowering barriers to growth increases the likelihood that individuals will become entrepreneurs. In model 2-1, the coefficient on *time period* 1 is positive and significant ($\beta = 2.610$, $p < 0.05$), and the coefficient on *time period* 2 is also positive and significant ($\beta = 2.242$, $p < 0.05$). In model 2-2, the coefficient on *time period* 1 is positive and significant ($\beta = 3.307$, $p < 0.01$), and the coefficient on *time period* 2 is also positive and significant ($\beta = 2.650$, $p < 0.05$). The results of postestimation tests suggest that the second lowering of barriers to growth did not further increase the aggregate likelihood of founding relative to *time period* 1 in either model 2-1 or 2-2 ($Prob > \chi 2 = 0.890$). Since the regression predicts the likelihood of an individual founding a firm, increases over time in the number of alumni "at risk" of founding does not mechanically lead to this result (as discussed in Methodology). Nonetheless, as a robustness test, I examine Hypothesis 1 using the entrepreneurship rate (defined as the proportion of individuals founding firms in a given year as a percentage of alumni up until that year) and find consistent results (Table 3 in the online appendix).[12]

Model 2-3 of Table 2 supports Hypothesis 2A, which proposes that moderately lowering strong barriers to growth will increase the likelihood of entrepreneurship more among lower human capital individuals. I test this hypothesis via difference-in-differences estimates, examining the coefficient on the interaction term between *human capital index* and *time period* 1 to test how the likelihood of founding changes for higher (lower) human capital individuals after the 1988 reform.[13] First, model 2-3 shows that founding rates increased in time period 1 ($\beta = 3.786$, $p < 0.01$). Individuals were significantly more likely to found firms after the 1988 reform, as barriers to growth were initially lowered, but still moderately high.[14] Second, model 2-3 shows the effect is significantly greater for lower human capital individuals. The interaction term between *human capital index* (*moderator*) and *time period* 1 was negative and significant ($\beta = -1.642$, $p < 0.01$), indicating that the main effect of *time period* 1 on the likelihood of founding will decrease as the moderator (*human capital*) increases in value. The results suggest that moderately lowering barriers to growth increased the likelihood of founding,

Table 1   Descriptive Statistics and Pairwise Correlation (Obs. = 1,810)

	Mean	Std. err.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(1) Human capital index	0	0.603	1																
(2) GDP per capita	18,511	2,963	−0.025	1															
(3) Entrep. index	2.014	1.749	−0.034	−0.089	1														
(4) Overseas experiences	0.116	0.320	0.214	0.015	0.024	1													
(5) Gender	0.892	0.311	−0.034	−0.145	0.057	0.079	1												
(6) Communist Party	0.617	0.486	−0.044	0.126	0.064	0.060	0.102	1											
(7) Years since graduation	27.940	17.841	−0.056	−0.260	0.094	0.123	−0.088	−0.062	1										
(8) New firms in Tsinghua	34.286	5.656	0.048	0.727	−0.084	0.012	−0.152	−0.062	−0.233	1									
(9) Ever job in government	0.216	0.412	0.040	0.078	0.144	0.130	−0.038	0.028	0.148	−0.031	1								
(10) Ever job in academia	0.225	0.418	0.019	−0.143	0.032	−0.061	−0.018	−0.053	0.271	−0.112	0.047	1							
(11) Last job in gov.	0.199	0.399	−0.015	0.116	0.105	0.186	0.051	−0.082	0.080	−0.011	0.675	0.032	1						
(12) Last job in academia	0.195	0.396	−0.043	−0.057	−0.039	−0.066	−0.111	0.049	0.223	−0.082	−0.058	0.561	−0.086	1					
(13) Latest employees	628.428	6,424.936	−0.102	−0.316	−0.023	−0.072	0.054	−0.089	0.098	−0.410	−0.103	0.154	−0.064	0.245	1				
(14) Initial employees	54.412	220.470	−0.128	−0.170	0.039	0.057	−0.063	−0.023	0.135	−0.172	−0.037	−0.012	−0.053	0.072	0.538	1			
(15) Reinvested	49.226	36.862	0.106	−0.142	−0.035	−0.057	−0.188	−0.042	−0.045	−0.079	−0.108	0.024	−0.146	0.099	0.101	0.019	1		
(16) Firm age	3.265	3.694	−0.061	−0.899	0.086	−0.058	0.129	−0.150	0.255	−0.852	−0.040	0.149	−0.053	0.117	0.412	0.224	0.188	1	
(17) Cofounder number	1.284	1.071	0.055	−0.043	0.014	0.029	0.087	0.189	−0.081	−0.077	0.045	0.047	0.043	0.158	0.112	−0.114	0.022	−0.016	1

Table 2 Pooled Logit Regressions Testing H1, 2A, and 2B

Variables	Pr(*Found*) (2-1)	Pr(*Found*) (2-2)	Pr(*Found*) (2-3)	Pr(*Found*) (2-4)
Time period 1	2.610**	3.307***	3.786***	3.356***
	(1.021)	(1.067)	(1.045)	(1.070)
Time period 2	2.242**	2.650**		2.604**
	(1.089)	(1.135)		(1.136)
Human capital index		−0.078	1.490***	−0.376**
		(0.105)	(0.194)	(0.188)
Human capital index ∗ Time period 1			−1.642***	
			(0.207)	
Human capital index ∗ Time period 2				0.447**
				(0.225)
Entrepreneurship index	0.072**	0.075**	0.068*	0.078**
	(0.033)	(0.033)	(0.035)	(0.033)
Overseas experiences	−0.477***	−0.441***	−0.388**	−0.442***
	(0.149)	(0.155)	(0.159)	(0.155)
Gender (male = 1)	0.606**	0.607**	0.595**	0.622**
	(0.249)	(0.249)	(0.266)	(0.251)
Communist Party	0.052	0.045	0.029	0.054
	(0.108)	(0.108)	(0.112)	(0.108)
Years since graduation	−0.036***	−0.037***	−0.052***	−0.038***
	(0.006)	(0.006)	(0.007)	(0.006)
New firms in Tsinghua	0.043***	0.051***	0.039***	0.051***
	(0.009)	(0.009)	(0.007)	(0.009)
GDP per capita	−9.12E−05***	−9.12E−05***	−9.12E−05***	−1.10E−4***
	(2.03E−05)	(2.03E−05)	(2.04E−05)	(2.26E−05)
Ever had a job in government	−0.103	−0.088	−0.127	−0.083
	(0.196)	(0.198)	(0.208)	(0.200)
Ever had a job in academia	0.179	0.201	0.180	0.207
	(0.160)	(0.163)	(0.168)	(0.164)
Last job in government	−0.466*	−0.480*	−0.422	−0.496*
	(0.275)	(0.275)	(0.293)	(0.277)
Last job in academia	−0.888***	−0.893***	−0.920***	−0.895***
	(0.258)	(0.258)	(0.282)	(0.257)
Region effects	Yes	Yes	Yes	Yes
Acad. dept. effects	Yes	Yes	Yes	Yes
Log likelihood	−1,350.076	−1,355.987	−1,215.077	−1,354.055
Pseudo-R^2	0.165	0.162	0.170	0.163
Num. obs.	38,412	38,385	36,376	38,385

Notes. The time interval for pooled logistic regression is one year. The excluded time period is time period 0 (1977–1988). *Time period* 0, *time period* 1, and *time period* 2 are dummy variables for years 1978–1988, 1988—1999, and 2000–2008, respectively. Since time period 0 is a baseline for comparison, it is included in the analysis but not shown in the table. In model 2-3, observations in time period 2 (2000–2008) were dropped to compare time period 0 (1978–1988) and time period 1 (1989–1999). Thus, the number of observations is fewer than in models 2-1 and 2-2. The reported standard errors are robust standard errors clustered by individual.

*Statistically significant at the 10% level; **statistically significant at the 5% level; ***statistically significant at the 1% level (two sided).

yet this effect was stronger among lower human capital individuals.

Hypothesis 2B proposes that when institutional barriers to firm growth are substantially reduced, the likelihood of entrepreneurship increases among higher human capital individuals. Model 2-4 shows that the coefficient on the interaction term between *time period* 2 and *human capital* is positive and significant ($\beta = 0.447$, $p < 0.05$), supporting H2B. Thus, after a substantial reduction to barriers to growth, the likelihood of founding increases, and particularly does so for higher human capital individuals. After substantially lowering barriers to growth, the increase in the likelihood of founding is significantly less among lower human capital individuals (Figure 1 offers further support).

The effect sizes of the reforms on entrepreneurial activity were significant. After lowering barriers to growth, the odds of founding were 13.6 times higher ($\exp(2.610) = 13.6$) in time period 1 relative to time period 0. At the pre-1988 founding rate (0.49% of individuals founded firms), this results in a 6.66% entrepreneurship rate during period 1. The coefficients in Table 2 indicate that at the mean level of human capital after the 1999 reform (as compared with before), for each unit increase in human capital, individuals were 56% ($\exp(0.447) = 1.56$) more likely to become founders. Using the 1998 high human capital individual founding rate (Figure 1, 3% of high human capital individuals at risk founded firms) as a baseline, this would result in a 1.7% ($8 * 0.56 = 1.68$) increase in the entrepreneurship

Table 3 Heckman Regressions Testing H3

Variables	Log(*latest employees*) (3-1)	Log(*latest employees*) (3-2)	Log(*2nd latest employees*) (3-3)
Time period 2 (*founding in T2*)	0.192	0.113	0.133
	(0.153)	(0.153)	(0.275)
Human capital index		−0.132	−0.524***
		(0.156)	(0.275)
Human capital index ∗ Time period 2 (*founding in T2*)		0.486**	1.459***
		(0.211)	(0.323)
Log(*initial employees*)	0.621***	0.564***	0.262**
	(0.101)	(0.101)	(0.108)
Log(*initial_capital*)	0.355***	0.362***	0.213***
	(0.048)	(0.047)	(0.064)
Log(*reinvested*)	0.076**	0.074**	0.135***
	(0.029)	(0.029)	(0.035)
Log(*firm age*)	−0.576**	−0.534**	−0.537**
	(0.234)	(0.231)	(0.259)
Overseas experiences	0.047	0.015	−0.233
	(0.170)	(0.171)	(0.268)
Cofounder number	0.076**	0.059	−0.233
	(0.029)	(0.038)	(0.268)
GDP per capita	−1.692E−04**	−1.818E−04**	−4.934E−04***
	(9.75E−05)	(9.50E−05)	(1.02E−04)
Annual performance year fixed effects	Yes	Yes	Yes
Location fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Lambda	0.235	0.107	−0.487
	(0.282)	(0.280)	(0.794)
Constant	1.572	2.032	9.586
	(1.727)	(1.691)	(2.312)
Number of observations	1,810	1,810	1,793

Notes. The dependent variable is the log of number of employees the last year in operation before 2007 (the year of the survey). *Entrep_index* as an instrument meeting the exclusion restriction criteria. The probit model estimated before the regression models described above shows that *entrep_index* was positively and significantly linked ($p < 0.01$) to the probability of entry into entrepreneurship. The correlation between *entrep_index* and Log(*latest employees*) was −0.003. The self-selection parameter lambda is insignificant. Time period 2 is compared against the baseline (time period 1). The reported standard errors are robust standard errors clustered by individual.

**Statistically significant at the 5% level; ***statistically significant at the 1% level (two sided).

rate for higher human capital individuals to 4.7% rather than 3%.

Table 3 tests Hypothesis 3 that the difference in size between firms founded by lower human capital individuals and higher human capital individuals will increase after barriers to growth are significantly reduced. I use the log of the number of employees of the latest year in operation as the dependent variable to avoid selection bias that favors surviving companies when the survey ended.[15] I control for the initial firm size so that the analysis focuses on firm growth. Table 3 includes an interaction term between the human capital index and *time period* 2. Recall that (for this analysis) *time period* 2 is equal to 1 for firms founded after 1999 and is 0 otherwise.

In model 3-2, the interaction between the human capital index and having been founded in *time period* 2 is positive and significant ($\beta = 0.486$, $p < 0.05$). I find support for Hypothesis 3. This means that when barriers to growth are further and substantially reduced (*time period* 2 relative to *time period* 1), the gap in the firm size for ventures founded in *time period* 2 becomes

significantly larger for high versus low human capital, and at the median human capital level, the increase in firm size is 48.6%. Results show that the indicator for the influence of self-selection is insignificant ($\lambda p < 0.10$). Model 3-3 shows that these results are similar when using the number of employees in the second most recent year in operation as well, increasing confidence in the robustness of the results. To address possible concerns that the results are driven by comparing very young and old firms, I reran the analyses, and results (available from the author) are robust to restricting the sample to firms that are three years from founding or older (*human capital index ∗ Time period* 2 coefficient $\beta = 1.105$, $p = 0.055$).[16] The results are also robust to restricting the sample to firms founded five years before and after the reform (*human capital index ∗ Time period* 2 coefficient $\beta = 0.550$, $p < 0.001$). To ensure that the results are not being driven by firms that grew large and then failed, I reran the results coding failed firms as 0 on the dependent variable, and the results continue to support the hypothesis ($\beta = 0.667$, $p = 0.008$). The results are robust to using the compound

annual growth rate and hold for profitability and founder income (results available from the author).[17] Since I find consistent results using different subsamples, different years for performance, and different measures of performance (firm size, salary, profits), this increases confidence in the results.[18]

Discussion and Conclusions

Institutional theory has long focused on how institutional changes in terms of entry barriers affect organizations and aggregate rates of entrepreneurship (Sine et al. 2005, Dobbin and Dowd 1997, Klapper et al. 2006, Tucker et al. 1990, McAfee et al. 2004, Romanelli 1989, Schmalensee 2004). In contrast, the insight here is that barriers to growth are an institutional mechanism that affects individuals (not just organizations) and their personal choices to be entrepreneurs (not just aggregate founding rates). The core insight is that sufficiently lowering barriers to growth can attract *better*, not just more, individuals to entrepreneurship.

Institutional Theory and Entrepreneurship

This study offers several contributions at the nexus of institutional theory and entrepreneurship. First, a key contribution is a *theoretical mechanism* (i.e., barriers to growth) that differentially affects not only founding rates, but also venture growth. Past work emphasizes barriers to entry as a primary theoretical mechanism influencing founding rates (Dobbin and Dowd 1997, Schmalensee 2004, Meek et al. 2010). Lowering barriers to entry eases the path to becoming an entrepreneur (Suchman 1995, Sine and Lee 2009, Hiatt et al. 2009), and so frequently increases entrepreneurship rates. For example, Sine et al. (2005) find that the deregulation of the energy industry via the 1978 PURPA legislation opened the market for independent firms to sell electricity to the grid. This, in turn, prompted the entry of new energy firms. In contrast to this earlier work on barriers to entry and founding rates, I emphasize lowering barriers to growth as an alternative approach, one that acts differentially on different people.

A second contribution is an emphasis on how institutional change can affect specific *individuals*, not just organizations or organizational populations. Here, I focus on how an institutional change (i.e., lowering barriers to growth) affects individuals, and does so in distinctive ways for *different types of individuals*. While lowering barriers to entry mainly appears to influence individuals less likely to succeed in entrepreneurship (Kerr and Nanda 2009), sufficiently lowering barriers to growth can also attract those *more* likely to succeed. In particular, moderately lowering barriers to growth attracts lower human capital individuals to entrepreneurship, while strongly lowering those barriers has a greater influence on higher human capital individuals. Thus,

the findings take a further step by indicating that the *magnitude of institutional change* (not just its direction) is germane; that is, small decreases in growth barriers affect lower human capital individuals, while substantial decreases affect those with higher human capital. Overall, the magnitude and direction of changes in barriers to growth affect different types of individuals.

Third, this study contributes by tying institutional change in terms of barriers to growth to venture growth. Prior institutional work on entrepreneurship rates often emphasizes founding and sometimes survival outcomes, consistent with its emphasis on easing the entrepreneurship path (Sine and Lee 2009, Sine et al. 2005). In contrast, I show how lowering barriers to growth increases entrepreneurship among high human capital individuals and then link these individuals to higher growth ventures; that is, the combination of high human capital individuals and few institutional constraints on scale enhances venture growth. Moreover, this linkage may explain why there is no significant increase in aggregate founding rate in the last time period (after substantial lowered barriers to growth) in Table 2. Some lower human capital individuals may prefer jobs in high growth firms rather than starting their own ventures.

Entrepreneurship Literature

Prior work in entrepreneurship has shown that individual characteristics, such as prior career experience and particular demographic characteristics, are associated with a greater likelihood of becoming an entrepreneur (Sørensen 2007, Blanchflower and Oswald 1998, Hsu et al. 2007, Evans and Leighton 1989). Scholars have also found that higher human capital individuals are more likely to found higher growth firms (Eesley and Roberts 2012, Roberts 1991). Yet, as noted earlier, studies of which individuals are more likely to become entrepreneurs and studies of which individuals are more successful do not often intersect. The contribution here is to bring these two research streams together by showing how institutions (i.e., barriers to growth) can play a role in aligning the characteristics of who is likely to become an entrepreneur with who is likely to succeed. This study indicates that to attract individuals who are more likely to create larger firms to entrepreneurship, barriers to growth must be low. The findings contribute toward bringing an institutions-based view of strategy to entrepreneurship (Ahuja and Yayavaram 2011).

Conclusion

I conclude by noting a counterintuitive dilemma: societies can increase entrepreneurship through lowering barriers to entry, and yet may fail to create high growth ventures (and instead foster many small businesses). Lowering barriers to entry in the presence of high barriers to growth may result in more entrepreneurship but by lower human capital individuals, while growth

remains difficult to achieve. An alternative institutional change, lowering barriers to growth, appears to attract more high human capital entrepreneurs and generates higher growth firms. Overall, this study offers a potentially important public policy implication by challenging the conventional wisdom that equates more entrepreneurship with better entrepreneurship. Rather than "letting a thousand flowers bloom," the institutional environment may be better structured by the latter arrangement that encourages "better gardeners" who nurture healthier plants.

Supplemental Material

Acknowledgments

Endnotes

[1]There is an extensive literature on entry barriers such as deregulation of industries that examines established firms and a variety of outcomes (e.g., Delmas et al. 2007, Djankov et al. 2002, Gruca and Nath 1994). For example, deregulation can shape the diversification strategies of existing firms and their subsequent growth (Haveman 1993). In contrast, I focus the review more narrowly on how lowering entry barriers affects founding rates. I appreciate the advice of a reviewer to be more explicit on the domain of interest.

[2]Note that some work examines the growth of incumbent firms after institutional change based, for example, on their diversification into particular sectors after deregulation (e.g., Haveman 1993). In contrast, my interest is in the growth of new firms (not incumbents) and implications for specific types of founders (not organizations). Thanks to a reviewer for advice to sharpen the focus.

[3]Additional details of the data and survey design are available in the online appendix (available as supplemental material at http://dx.doi.org/10.1287/orsc.2016.1077).

[4]I thank an anonymous reviewer for pointing out the potential concern regarding survival bias and also the importance of the timing of the firm size measure.

[5]I thank an anonymous reviewer for the suggestion to examine return on sales.

[6]I thank an anonymous reviewer for the suggestion to control for reinvested profits.

[7]I thank an anonymous reviewer for pointing out this concern.

[8]Individuals who had started a firm prior to 1978 were also dropped (rare).

[9]The consistent results of negative binomial regression are available from the author.

[10]I thank an anonymous reviewer for suggesting the interaction between the human capital index and time period with, for example, the expectation of a negative coefficient to show that lower human capital individuals were more influenced by the 1988 reform.

[11]A plot of firm foundings by year (Figure 2 in the online appendix) shows a low level of start-up activity before the 1988 reform and sharp increases after the reforms (after 1990 and 1999).

[12]I thank an anonymous reviewer for suggesting this clarification.

[13]The human capital index is mean centered, which eases interpretation of the main effects since the time period coefficient can be thought of as the impact on an individual with average level of human capital.

[14]I thank an anonymous reviewer for suggesting this interaction.

[15]I thank an anonymous reviewer for pointing out the potential concern about survival bias.

[16]It is less feasible to restrict to five-year-old firms, since the postreform firms founded in 2001 would be five years old as of 2006 (the last full year of data that would have been available), restricting us to a small sample of only one to two years of firm foundings after reform and only firms that survived for five years.

[17]Additional robustness checks are available in the online appendix.

[18]I thank an anonymous reviewer for the suggestion to test whether the results are due to differing firm ages.

References

Adams P, Fontana R, Malerba F (2015) User-industry spinouts: Downstream industry knowledge as a source of new firm entry and survival. *Organ. Sci.* 27(1):18–35.

Ahuja G, Yayavaram S (2011) Perspective-explaining influence rents: The case for an institutions-based view of strategy. *Organ. Sci.* 22(6):1631–1652.

Amit R, Muller E, Cockburn I (1995) Opportunity costs and entrepreneurial activity. *J. Bus. Venturing* 10(2):95–106.

Barkema HG, Chen XP, George G, Luo Y, Tsui AS (2015) West meets east: New concepts and theories. *Acad. Management J.* 58(2):460–479.

Baum JR, Bird BJ (2010) The successful intelligence of high-growth entrepreneurs: Links to new venture growth. *Organ. Sci.* 21(2):397–412.

Becker GS (1964) *Human Capital* (Columbia University Press, New York).

Beckman CM (2006) The influence of founding team company affiliations on firm behavior. *Acad. Management J.* 49(4):741–758.

Beckman CM, Burton MD (2008) Founding the future: Path dependence in the evolution of top management teams from founding to IPO. *Organ. Sci.* 19(1):3–24.

Beckman CM, Burton MD, O'Reilly C (2007) Early teams: The impact of entrepreneurial team demography on VC financing and going public. *J. Bus. Venturing* 22:147–173.

Blanchflower DG, Oswald AJ (1998) What makes an entrepreneur? *J. Labor Econom.* 16(1):26–60.

Buera F (2009) A dynamic model of entrepreneurship with borrowing constraints: Theory and evidence. *Ann. Finance* 5(3):443–464.

Burton MD, Sørensen JB, Beckman CM (2002) Coming from good stock: Career histories and new venture formation. Lounsbury M, Ventresca M, eds. *Social Structure and Organizations Revisited*, Research in the Sociology of Organizations, Vol. 19 (JAI Press, Oxford, UK), 229–262.

Carroll GR, Mosakowski E (1987) The career dynamics of self-employment. *Admin. Sci. Quart* 32(4):570–589.

Chatterji AK (2009) Spawned with a silver spoon? Entrepreneurial performance and innovation in the medical device industry. *Strategic Management J.* 30(2):185–206.

Colombo MG, Grilli L (2005) Founders' human capital and the growth of new technology-based firms: A competence-based view. *Res. Policy* 34(6):795–816.

Colyvas JA (2007) From divergent meanings to common practices: The early institutionalization of technology transfer in the life sciences at Stanford University. *Res. Policy* 36(4):456–476.

Cooper AC, Gimeno-Gascon FJ, Woo CY (1994) Initial human and financial capital as predictors of new venture performance. *J. Bus. Venturing* 9(5):371–395.

Dean TJ, Brown RL (1995) Pollution regulation as a barrier to new firm entry: Initial evidence and implications for future research. *Acad. Management J.* 38(1):288–303.

Delacroix J, Carroll GR (1983) Organizational foundings: An ecological study of the newspaper industries of Argentina and Ireland. *Admin. Sci. Quart.* 28(2):274–291.

Delmas M, Russo MV, Montes-Sancho MJ (2007) Deregulation and environmental differentiation in the electric utility industry. *Strategic Management J.* 28(2):189–209.

Dencker JC, Gruber M, Shah SK (2009) Pre-entry knowledge, learning, and the survival of new firms. *Organ. Sci.* 20(3):516–537.

Djankov S, La Porta R, Lopez-de-Silanes F, Shleifer A (2002) The regulation of entry. *Quart. J. Econom.* 17(1):1–37.

Dobbin F, Dowd TJ (1997) How policy shapes competition: Early railroad foundings in Massachusetts. *Admin. Sci. Quart.* 42(3):501–529.

Dobrev SD, Barnett WP (2005) Organizational roles and transition to entrepreneurship. *Acad. Management J.* 48(3):433–449.

Eesley CE, Roberts EB (2012) Are you experienced or are you talented? When does innate talent versus experience explain entrepreneurial performance? *Strategic Entrepreneurship J.* 6(3):207–219.

Eesley CE, Li J, Yang D (2016) Does institutional change in universities influence high-tech entrepreneurship? Evidence from China's project 985. *Organ. Sci.* 27(2):446–461.

Eisenhardt KM, Schoonhoven CB (1990) Organizational growth: Linking founding team, strategy, environment, and growth among U.S. semiconductor ventures 1978–1988. *Admin. Sci. Quart.* 4235(3):504–529.

Eisenhardt KM, Schoonhoven CB (1996) Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms. *Organ. Sci.* 7(2):136–150.

Elfenbein DW, Hamilton BH, Zenger TR (2010) The small firm effect and the entrepreneurial spawning of scientists and engineers. *Management Sci.* 56(4):659–681.

Evans DS, Leighton LS (1989) Some empirical aspects of entrepreneurship. *Amer. Econom. Rev.* 79(3):519–535.

Feinberg SE, Gupta AK (2009) MNC subsidiaries and country risk: Internalization as a safeguard against weak external institutions. *Acad. Management J.* 52(2):381–399.

Gimeno J, Folta TB, Cooper AC, Woo CY (1997) Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Admin. Sci. Quart.* 42(4):750–783.

Giroud A, Tucci CL (2012) Technology, innovation and knowledge: An Asian perspective: Introduction. *Asian Bus. Management* 11(1):5–7.

Gollin D (2002) Getting income shares right. *J. Political Econom.* 110(2):458–474.

Gruca TS, Nath D (1994) Regulatory change, constraints on adaptation, and organizational failure: An empirical analysis of acute care hospitals. *Strategic Management J.* 15(5):345–363.

Hallen B (2008) The causes and consequences of the initial network positions of new organizations: From whom do entrepreneurs receive investments? *Admin. Sci. Quart.* 53(4):685–718.

Hallen BL, Eisenhardt KM (2012) Catalyzing strategies and efficient tie formation: How entrepreneurial firms obtain investment ties. *Acad. Management J.* 55(1):35–70.

Haveman HA (1993) Follow the leader: Mimetic isomorphism and entry into new markets. *Admin. Sci. Quart.* 38(4):593–627.

Haveman HA, Rao H (1997) Structuring a theory of moral sentiments, institutional and organizational coevolution in the early thrift industry. *Amer. J. Sociol.* 102(6):1606–1651.

Haveman HA, Russo MV, Meyer AD (2001) Organizational environments in flux: The impact of regulatory punctuations on organizational domains, CEO succession, and performance. *Organ. Sci.* 12(3):253–273.

Heckman JJ (1979) Sample selection bias as a specification error. *Econometrica* 47(1):53–161.

Hiatt SR, Sine WD (2014) Clear and present danger: Planning and new venture survival amid political and civil violence. *Strategic Management J.* 35(5):773–785.

Hiatt SR, Sine WD, Tolbert PS (2009) From Pabst to Pepsi: The deinstitutionalization of social practices and the creation of entrepreneurial opportunities. *Admin. Sci. Quart.* 54(4):635–667.

Hitt M, Bierman L, Shimizu K, Kochhar R (2001) Direct and moderating effects of human capital on strategy and performance in professional service firms: A resource-based perspective. *Acad. Management J.* 44(1):13–28.

Hoskisson RE, Eden L, Lau CM, Wright M (2000) Strategy in emerging economies. *Acad. Management J.* 43(3):249–267.

Hsu DH (2007) Experienced entrepreneurial founders, organizational capital, and venture capital funding. *Res. Policy* 36(5):722–741.

Hsu DH, Roberts EB, Eesley CE (2007) Entrepreneurs from technology-based universities: Evidence from MIT. *Res. Policy* 36(5):768–788.

Huang Y (2003) *Selling China* (Cambridge University Press, Cambridge, UK).

Huang Y (2008) *Capitalism with Chinese Characteristics: Entrepreneurship and State During the Reform era* (Cambridge University Press, New York).

Hurst E, Lusardi A (2004) Liquidity constraints, household wealth and entrepreneurship. *J. Political Econom.* 112(2):319–47.

Kerr WR, Nanda R (2009) Democratizing entry: Banking deregulations, financing constraints, and entrepreneurship. *J. Financial Econom.* 94(1):124–149.

Kim E (2013) Deregulation and differentiation: Incumbent investment in green technologies. *Strategic Management J.* 34(10):1162–1185.

Kim L, Utterback JM (1983) The evolution of organizational structure and technology in a developing country. *Management Sci.* 29(10):1185–1197.

Klapper L, Laevena L, Rajan R (2006) Entry regulation as a barrier to entrepreneurship. *J. Financial Econom.* 82(3):591–629.

Li B, Walder AG (2001) Career advancement as party patronage: Sponsored mobility into the Chinese administrative elite, 1949–1996. *Amer. J. Sociol.* 106(5):1371–1408.

Liu Y (2002) Development of private entrepreneurship in China: Process, problems and countermeasures. Working paper, Chinese Academy of Social Sciences, Beijing.

McAfee RP, Mialon HM, Williams MA (2004) What is a barrier to entry? *Amer. Econom. Rev.* 94(2):461–465.

Meek WR, Pacheco DF, York JG (2010) The impact of social norms on entrepreneurial action: Evidence from the environmental entrepreneurship context. *J. Bus. Venturing* 25(5):493–509.

National People's Congress of China (1982) Constitution of China, Article 11. Accessed August 10, 2016, http://en.people.cn/constitution/constitution.html.

National People's Congress of China (2007) Amendment to the Constitution of the People's Republic of China. Accessed August 10, 2016, http://www.npc.gov.cn/pc/11_4/2007-12/05/content_1617610.htm.

Powell W (1996) Commentary on the nature of institutional embeddedness. Baum JAC, Dutton JE, eds. *The Embeddedness of Strategy*, Advances in Strategic Management, Vol. 13 (Emerald Group Publishing Ltd., Bingley, UK), 293–300.

Puhani P (2008) The treatment effect, the cross difference, and the interaction term in nonlinear "difference-in-differences" models. *Econom. Lett.* 115(1):85–87.

Qian Y (2000) The process of China's market transition (1978–1998): The evolutionary, historical, and comparative perspectives. *J. Institutional Theoret. Econom.* 156(1):151–171.

Rajagopalan N, Finkelstein S (1992) Effects of strategic orientation and environmental change on senior management reward systems. *Strategic Management J.* 13(S1):127–141.

Reger RK, Duhaime IM, Stimpert JL (1992) Deregulation, strategic choice, risk and financial performance. *Strategic Management J.* 13(3):189–204.

Roberts EB (1991) *Entrepreneurs in High Technology: Lessons from MIT and Beyond* (Oxford University Press, New York).

Romanelli E (1989) Environments and strategies of organization startup: Effects on early survival. *Admin. Sci. Quart.* 34(3):369–387.

Schmalensee R (2004) Sunk costs and antitrust barriers to entry. *Amer. Econom. Rev.* 94(2):471–475.

Scott WR (2008) *Institutions and Organizations* (Sage, Thousand Oaks, CA).

Sine WD, David RJ (2010) Institutions and entrepreneurship. Sine WD, David RJ, eds. *Institutions and Entrepreneurship*, Research in the Sociology of Work, Vol. 21 (Emerald Group Publishing Ltd., Bingley, UK), 1–26.

Sine W, Lee B (2009) Tilting at windmills? The environmental movement and the emergence of the U.S. wind energy sector. *Admin. Sci. Quart.* 54(1):123–155.

Sine WD, Haveman HA, Tolbert PS (2005) Risky business? Entrepreneurship in the new independent-power sector. *Admin. Sci. Quart.* 50(2):200–232.

Sørensen JB (2007) Closure and exposure: Mechanisms in the intergenerational transmission of self-employment. Ruef M, Lounsbury M, eds. *The Sociology of Entrepreneurship*, Research in the Sociology of Organizations, Vol. 25 (JAI Press, Oxford, UK), 83–124.

Strang D, Bradburn EM (2001) Theorizing legitimacy or legitimating theory? Neoliberal discourse and HMO policy. Campbell JL, Pedersen OK, eds. *The Rise of Neoliberalism and Institutional Analysis: Neoliberalism in Perspective* (Princeton University Press, Princeton, NJ), 129–158.

Stuart TE, Sorenson O (2003) Liquidity events and the geographic distribution of entrepreneurial activity. *Admin. Sci. Quart.* 48(2):175–201.

Suchman MC (1995) Managing legitimacy: Strategic and institutional approaches. *Acad. Management J.* 20(3):571–610.

Thornton PH (1999) The sociology of entrepreneurship. *Annual Rev. Sociol.* 25(August):19–46.

Tian X (2007) The prospect of private economy in China. Lin S, Song S, eds. *The Revival of Private Enterprise in China* (Routledge, Abingdon, UK), 271–283.

Tolbert PS, David R, Sine WD (2011) Studying choice and change: The intersection of institutional theory and entrepreneurship research. *Organ. Sci.* 22(5):1332–1344.

Tucker DJ, Singh JV, Meinhard AG (1990) Organizational form, population dynamics, and institutional change: The founding patterns of voluntary organizations. *Acad. Management J.* 33(1):151–178.

Walder AG (1995) Career mobility and the communist political order. *Amer. Sociol. Rev.* 60(3):309–328.

Walder A (2003) Elite opportunity in transitional economies. *Amer. Sociol. Rev.* 68(6):899–916.

Young S (1995) *Private Business and Economic Reform in China* (M.E. Sharpe, New York).

Zhang M (2008) From public to private: The newly enacted Chinese property law and the protection of property rights in China. *Berkeley Bus. Law J.* 5(2):317–363.

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