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One-child policy and family firms in China☆

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A B S T R A C T

Family business plays important roles to fuel economic growth in China. Due to the one-child policy, family firms are increasingly facing human capital constraints for within-family succession. Having only one heir decreases the probability of continuing family management by over 3%, reduces the probability of adult children working in family firms by 14%, and significantly decreases founders' expectations of having young heirs for succession. Having fewer children negatively affects founder's expectation to go public, reduces family firm's reinvestment rate and R&D. Overall, the evidence suggests that the human capital constraints due to the one-child policy impose significant negative impacts on within-family succession. Dynastic management of family firms remains an important challenge for first-generation entrepreneurs in China.

Keywords:
One-child policy
Family firms
Control
Dynastic management
Succession

1. Introduction

Fertility choice and demographic changes are important factors that can foster economic growth (Barro and Becker, 1989; Becker et al., 1990). The one-child policy successfully implemented in China in 1979 has resulted in a significant drop in China's population growth rate during the last three decades, which has been credited for stabilizing China's rapidly growing population and contributing to its tremendous economic growth (Bloom and Canning, 2003; Cai and Wang, 2005). Conversely, the policy has been widely criticized internationally for violating fundamental human rights through forced sterilizations and abortions, as well as for reducing family stability and accelerating aging populations. Regardless of its controversial nature, the one-child policy was extended through a new legislation in 2001 as the nation's demographic strategy for the future and will continue to cast a long-lasting impact on Chinese family planning and populations.

In this paper, instead of holistically examining the policy's overall economic impact, we take family firms as our study context to examine its impact on within-family succession. Within-family succession is important since most family businesses are mainly controlled and managed by their founders or founder's family members. The advantage of studying family firms is that the outcomes associated with the constraints of human capital or lack of talented heirs are easily measurable by firm governance, performance, and corporate decisions. Several theoretical papers show that family firms remain prevalent in economies with weak legal investor protections or under-developed external markets for managers. For example, Burkart et al. (2003) show that family firms by and

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large pass ownership/control and management to family members such as heirs in countries with weak legal environments. Bhattacharya and Ravikumar (2003) show in their model that family firms will face a higher threshold of management professionalization in weak financial markets due to the under-development of external markets for CEOs and managers. China, with its weak institutional environment and poor external managerial market, offers a perfect setting to examine family firm succession from the perspectives of governance and corporate finance. Within-family succession is a crucial issue for Chinese family firms, which are characterized by credit constraints, poorly developed financial markets, and high agency costs of external managers. Dynastic management of within-family succession remains the key issue that first-generation founders have to address as they get older. In most family firms, founders expect to pass their businesses to heirs or within-family members but at the same time want to maintain tight control of such corporations.

Within-family succession includes identifying and developing internal heirs who have the potential to fill leadership and controlling positions in the family owned businesses. Hence, succession management remains the top priority because family businesses that fail to negotiate this transition must often face discontinuity — either being sold for lack of a family member willing or able to take over. Yet because many prior studies treat a founder CEO's family as a monolithic whole with a large pool of heirs who automatically wish to participate in family control of the business, emerging research has yet to identify individual family members' incentives for such dynastic management. Caselli and Gennaioli (2011) argue that if the heir to the family firm has no talent for managerial decision making, dynastic management as a failure of meritocracy will reduce a firm's productivity. Empirically, Bennedson et al. (2007) show that family succession results in value reduction in developed countries due to lack of talented heirs. Bertrand et al. (2008) analyze the allocation of control, management, and ownership to different family members in large family business groups in Thailand and find that such optimal allocation choices explain firm-level performance. Pérez-González (2006) finds that in Mexico family internal succession leads to underperformance. In East Asian nations, Fan et al. (2012) show that the entrepreneurial firm's accounting system is more likely to shift to a less insider-based system after succession when family firms possess more specialized assets. In another study, Fan et al. (2013) find that within-family succession is chosen over outside succession when a firm has been co-managed by multiple family members and when its business depends on relationships with stakeholders such as employees and banks.

In this paper, we focus on family firms' succession as the main research question. In particular, we utilize the constraints on the family firm's human capital pool caused by the one-child policy as a natural experiment. We believe that our study is the first empirical study to understand how succession decisions are affected by a decreasing number of children or potential heirs and how such constraints affect family firms in China. The literature recognizes that human capital is important for family firms and that heirs are often not equally likely to participate in (and thus succeed to) control of the family business. There exist multiple forces underlying within-family succession. First, the management of a family-owned firm is only one of several job options available to an heir. In the Chinese culture, the first-born child is often the default choice for succession. However, if another child would be a better match (both in terms of skills and his/her interests) to run the firm, the chance for the first born heir to succeed will drop. Secondly, there is tournament effect among multiple children for within-family succession. In the tournament, the pressure of competition can make children invest more in developing their skills. As a result, only the most skilled children will be picked to succeed to family businesses.

In China, the one-child policy exogenously imposes constraints[1] on talent/heir availability for family firm's succession. One direct undesired consequence of the one-child policy is that family firms face a lack of multiple heirs for tournament. Chinese family firms hence provide us a close-to-natural experiment to examine the decision of family succession. If there are cross-sectional variations among the number of available children in family firms, succession decisions will differ correspondingly. We hypothesize that the lack of multiple children imposed by the one-child policy will negatively affect family succession decisions. Empirically we can compare the succession decisions in the families with one child to the succession in the families with multiple children. If founders of family firms only consider passing the control of businesses to the first-born child, the number of children will not affect family succession decisions. If founders implicitly consider multiple children for succession, number of children or a dummy of having one child will have significant impact on family management or founders' expectation to pass their businesses to the next generation heirs.

Our research contribution is that we have a clear natural setting where family firms have a constrained talent pool of heirs due to the binding effect of the one-child policy. In contrast, most prior studies assume that there is a large pool of heirs for succession to family firms so that family control can continue with few constraints. In the real world, however, family firms may face the problem of discontinuity when their pool of candidates for succession is limited or restricted. Such limitation will impose a great cost on dynastic management and firms according to Bertrand et al. (2008). Although the succession problem can be partially solved by alternative arrangements, e.g., adopting sons[2] or hiring external managers, internal succession remains the prevalent norm for family business in emerging markets. Unlike the United States (U.S.) or Europe, many emerging countries, tend to have underdeveloped external job markets for talented managers. Bhattacharya and Ravikumar (2003) suggest that family firms face a higher threshold of management professionalization, external succession by hiring outside managers is often considered as the last resort. Extant research also suggests that family control or internal heir succession tends to carry with it the great benefit of private control. Hence Davis, Schoorman, and Donaldson (1997) and Anderson and Reeb (2003) propose that high-performing family businesses

[1] Evans and Jovanovic (1989) show that financial constraints such as the lack of credit are bad for talented but poor entrepreneurs. Chami and IMF Institute (2001) examine family firms in terms of principal–agent relationships between parent/owner and child/employee and finds that in family firms, trust, altruism, and the prospect of succession mitigate the agency problem relative to the parents' hiring of outside employees.

[2] Mehrotra et al. (2011) examine the effect on firm performance of the Japanese practice of adopting male heirs into the family business from outside if the family's own heir is not fit for or interested in succession. Such a practice, however, is not common in China.

are more likely to make working in the family firm more attractive to potential heirs, thereby increasing the likelihood that family control will continue. Fernandez et al. (2007) discussed the topic of gender and family firms and find that the role of women in family firms is important. All these studies suggest that within-family succession is relevant and the impact of the one-child policy is economically significant.

The one-child policy, enacted in late 1979, applies to all families in China. First, this policy applies to couples wanting to have more than one child after 1979 but not those before, providing us a cross-sectional identification for exogenous tests. Second, the enforcement of this policy varies between urban areas and rural areas as well as between the Han race and minority races,[3] both offering us cross-sectional identification tests to examine its exogenous effects. Furthermore, the one-child policy has varying binding effects on populations. For example, government employees and urban residents are more likely to suffer stricter constraints. Such cross-sectional binding effects offer good instruments to study the exogenous effects on family succession decisions. In sum, the one-child policy provides a close-to natural experimental scenario which can be used to examine the impact of within-family succession and the discontinuation of family businesses.

In particular, as a direct consequence of this policy to control the general population, many family firms in China have a lack of appropriate heirs to succeed to the business. In fact, most family-controlled firms have only one heir for internal succession. This policy therefore exogenously imposes constraints on family continuation in terms of the family's control and management of its own firm. We hypothesize that the poor availability of (talented) heirs due to the one child policy imposes discontinuation of dynastic management of family-controlled businesses. The hypothesis allows us to empirically test a negative/positive relationship between one-child dummy/number of children and family succession decisions. Succession can be measured by an expectation of having young heirs or direct family members to succeed to family firms or having adult children to work in their own firms. According to prior research, the fundamental drivers of family control lie in family members' ability to influence firm activities and decisions. The lack of enough talented heirs to work in the firm ultimately affects family control and dynastic management, and thus the founder's corporate decisions. Our second hypothesis is that the poor availability of (talented) heirs due to the one child policy imposes a likelihood of discontinuity of family firms. This hypothesis is empirically tested with a positive relationship between a dummy of having one child and firm's reinvestment rate or R&D expenses.

To examine whether a family member (primarily, the heir) will take control of a family firm and how the availability of (male vs. female) heirs affects founders' succession expectations and the firms' dynastic management, we draw on data from two comprehensive surveys on Chinese small and medium family-run enterprises. These two surveys not only ask the founder CEOs whether they hope that their children will work in the firm in the future, but also request a variety of information about the firm, the founder CEO, and his/her descendants.

We find that not only the number of heirs but also the heirs' opportunity outside the family business has a significant impact on both the family's control and management of the family business and the succession decision. Specifically, the more children that the founder CEO has, the less the restraint there is against passing the family business on to the next generation. Having one child is significantly negatively associated with founder's expectation of having that young child to succeed to his business or adult child to work in the family firm. We also find that having a male child is significantly associated with a founder's expectation of passing his business to heirs.

One concern is that having one child is not exogenous due to the one-child policy in firm's succession decisions, since founders may choose voluntarily to have multiple children despite the threat of civil punishment. We therefore use two-stage regressions to control for this endogeneity issue since enforcement of the one-child policy varies across between villages and cities, between government employees and the self-employed, as well as between members of the Han race and minority races. The two-stage instrumental regressions employ several instrumental variables, including age of entrepreneurs at the year of enactment of the one-child policy (older entrepreneurs are not subject to the policy during their reproductive age), dummy of minority race (not subject to any constraint by the one-child policy), dummy of resident place in town or village (binding of policy not strong), or former employees of government (strictly subject to the one-child policy). The first-stage regression shows the validity of these instruments. After controlling for endogenous effects, we are able to report significantly stronger and robust relationships between the one-child policy and firm succession decisions.

The rest of the paper is organized as follows. Section 2 summarizes the background of the one-child policy and the development of family businesses in China. Section 3 describes the data selection, defines the variables, and outlines the empirical methods. Section 4 discusses the empirical findings and provides endogeneity tests, and Section 5 concludes the paper.

2. Brief history of the one-child policy and Chinese family firms

The one-child policy enacted in China in 1979 officially restricts married couples to only one child, as codified in the Chinese Communist Party Central Committee and the State Council's Resolution Concerning the Strengthening of Birth Control and Strictly Controlling Population Growth (1980):

> The State advocates that one couple has only one child. Except for special cases, with approval for second birth, government officials, workers and urban residents can only have one child for each couple. In rural areas, the State also advocates that each couple has only one child. However, with approval, those who have real difficulties can have their second child, several years after the birth of the first.

[3] People of a minority race are not subject to the one-child policy.

Some exceptions are allowed; for example, couples in which both partners are single children may be allowed two offspring. Some parents are allowed a second child if their first is a girl or if they suffer "hardship" as determined by local officials. Minorities (such as Tibetans or Uighurs) are permitted a second—and sometimes a third—child, whichever the sex of the first-born. Children born in countries overseas are not counted under the policy if they do not take Chinese citizenship, and Chinese citizens returning from abroad are allowed a second child or more children born overseas. In most cases, however, the birth of additional children results in large fines: families violating the policy must pay monetary penalties and could be penalized in various ways ranging from social pressure to job loss. One article in the *Economist*, July 21, 2011 decries this situation: "Before 1997 they usually punished us by tearing down our houses for breaching the one-child policy …. After 2000 they began to confiscate our children." Several unintended consequences of the one-child policy have begun to impact social or economic status in China, as well as family structure and dynamics. Some immediate consequences include the unbalanced sex ratios and urban–rural ratios of newborns, the changing of family and kinship structure and the speeding up of population aging. It remains to be seen what the impact of such policy on family businesses in China will be, a current unknown that this research attempts to address.

Not only are family businesses prevalent worldwide—comprising 70% of businesses across the globe—but family businesses are in fact a more common type of business ownership than public corporations with dispersed ownership (Bertrand and Schoar, 2006; La Porta et al., 1999; Villalonga and Amit, 2009). In the U.S., Villalonga and Amit (2006) find that a large portion of Fortune 500 companies are characterized by the presence of family ownership but that such family ownership creates value only when it is combined with certain forms of family control and management. Claessens et al. (2000, 2002) suggest that family firms are a norm in Asian countries and perform well. In mainland China, although many large businesses are state owned, there is a very rapid growth of family businesses, especially small and medium private enterprises, most of which are managed as family concerns. Indeed, according to one recent study by the Chinese Academy of Social Sciences, the non-public sector went from being worth nothing in 1980s to being worth 19 trillion RMB (approximately USD2.6 trillion) in 2008, contributing 65% of the country's GDP and accounting for 75% of national employment and around half the country's tax revenue.

In most Chinese family-owned small and medium enterprises, there is no separation of ownership rights and management and both are held fast by family members with blood ties and marriage relations. As a result, business decision procedures are often replaced by family management and decision procedures. Unfortunately, however, although some argue that it is unnecessary to separate ownership rights from control rights because so many family businesses perform well, there have been no satisfactory theoretical explanations offered for this phenomenon. What is apparent is that the choice of successor is vital for the healthy development and continuance of a family business and thus has great importance for family business ownership. In fact, to maintain family control over the business, in most cases, the business owner determines the choice of a successor based on inheritance through "blood ties" or "younger family generations." Nonetheless, there are cultural differences: in Japan, succession is seen as a foundation for the children's professionalism rather than as a priority (Mehrotra et al., 2011), whereas in China, it is viewed as a family legacy and a top priority (Wong et al., 1992).

3. Data and variables

3.1. Data

This research draws on data from two surveys carried out by the Chinese Private Enterprises Research Taskforce, a research authority organized by the Chinese central government. The first survey, administered in 2002 and funded jointly by the Chinese Society of Industrialization and the Commerce and Chinese Private Economic Society, encompasses 3258 firms across more than 30 provinces. We also use a supplementary sample, the second survey carried out in 1997 and funded by the Chinese Social Science Society, which covers 1654 small and medium family-owned enterprises across 30 provinces in China. Because these two surveys use different questionnaires, we perform different analyses using both datasets to ensure the inclusion of relevant information. For example, the 1997 survey has more information on the business owners' succession plans (e.g., expectations of whether their children will work in the family firm) but lacks accurate information on the number of children (it only reports up to 2). The 2002 survey, in contrast, has more information on the family firm founders' descendants but does not report their detailed succession plans. We therefore use the comprehensive sample of the 2002 survey in most of the analyses but also draw on the 1997 data for information on succession expectations.

3.2. Variables

The major variables, defined in Appendix Table 1, include information on heirs, succession, and control; founder and family demographics; and firm characteristics. The *One_Child* dummy corresponds to only one child being reported in the survey, *Num_Child* corresponds to the exact number of children reported. To directly measure the firm succession plan, we use a *Family_Management* dummy, which equals one if in the survey a founder expects that the firm will continue to be managed or controlled by family. We also use several other proxies for heir succession; for example, *Adult_Kid_In* is a dummy that equals one if any adult child is already working in the family firm, zero otherwise; and *Kids_Hope_In* is a dummy that equals one if any of the children are expected to work in the family firm in the future, zero otherwise. Because many prior papers use equity control as the main defining criterion for family business, we measure family control of the firm using a similar variable, *Capital_Ownership*.

Because the surveys also provide data on firm financial and management structure, we include an *IPO_Hope* dummy that equals one if the firm owner expects the firm to launch an IPO in the future and zero otherwise, and a *Bond_Hope* dummy that equals one

Table 1
Definition of variables.

Variable	Definition
One_Child (dummy)	One child reported in the survey
Num_Child	The number of children reported in the survey
Family_Management (dummy)	Whether there is an expectation that the firm will continue to be managed/controlled by family
IPO_Hope (dummy)	Whether the firm is expected to launch an IPO in the future
Bond_Hope (dummy)	Whether the firm is expected to issue bond in the future
Owner_Age	Entrepreneur's age
Owner_Gender	Whether the entrepreneur is male
Owner_College	Whether the entrepreneur's education is college level and above
Firm_Village_Town	Whether the firm headquarters is located in a town or village
Family_Size	Number of family members living together
Firm_Age	Years since the firm became registered as a privately-owned enterprise
Firm_Employee	Number of employees
Capital_Ownership	Ownership of capital by the entrepreneur
Capital	Amount of capital (in million yuan)
Sales	Sales (in million yuan)
ROS	Net profit/sales (%)
Kids_Hope_In	Whether any of the children is expected to work in the family firm
Adult_Kid_In	Whether the adult child is working in the firm
Child1_Gender	Whether adult child is male
Child2_Gender	Whether another adult child is

if the business owner is planning to issue bond. The variables for the founder and family's demographic information include *Owner_Age*, *Owner_Gender*, *Owner_College* (a dummy variable that equals one if the owner's education level is college and above), *Child1_Gender* and *Child2_Gender* (both dummy variables, equivalent to one if the child is male). The firm characteristics include *Firm_Village_Town* (a dummy that equals one if a family firm's headquarter is located in a town or village), *Firm_Age*, *Firm_Employee*, *Sales*, and *ROS* (net profits/sales). *Reinvestment rate* is calculated as reinvestment of capital divided by the prior year's sales. *R&D* is the research and development expense divided by the prior year's sales.

Table 2 reports the summary statistics on child information, succession information, founder family demographics, and firm characteristics. As regards the first, the majority or 69% of family business owners have only one descendant, and the average number of children is 1.22. This is consistent with the binding constraints of the one-child policy. On average 38% of founders expect that their family-run firms will continue to be controlled and managed by family. Only 21% of founders expect their firms to go public while 3% want to issue bonds. On average, founders have a mean (median) age of 42 years (44 years) and 89% of them are male. Regarding

Table 2
Summary statistics.

Variable	Mean	Median	SD	Min.	Max.
Panel A: The 2002 survey of privately owned small and medium enterprises (3258 firms)					
One_Child	0.69	1	0.46	0	1
Num_Child	1.22	1	0.65	0	5
Family_Management	0.38	0	0.48	0	1
Adult_Kid_In	0.15	0	0.36	0	1
IPO_Hope	0.21	0	0.41	0	1
Bond_Hope	0.03	0	0.17	0	1
Owner_Age	42.43	44	8.69	31	76
Owner_Gender	0.89	1	0.31	0	1
Owner_College	0.38	0	0.49	0	1
Firm_Village_Town	0.34	0	0.47	0	1
Family_Size	5.19	5	2.12	1	33
Firm_Age	11.27	10	5.97	1	36
Firm_Employee	88.62	32	188.71	3	2.311
Capital_Ownership	0.76	0.90	0.26	0	1
Capital (million RMB)	3.51	1.00	10.07	0.11	460.00
Sales (million RMB)	6.67	6.5	232.27	0.10	350.00
ROS (%)	7.62	4.58	17.62	−300	500
Panel B: The 1997 survey of privately owned small and medium enterprises (1942 firms)					
One_Child	0.56	1	0.49	0	1
Family_Management	0.37	0	0.48	0	1
Kids_Hope_In	0.43	0	0.49	0	1
Adult_Kid_In	0.20	0	0.38	0	1
Child1_Gender (male)	0.68	1	0.47	0	1
Child2_Gender (male)	0.41	0	0.49	0	1

This table summarizes the key variables about demographic information of family firms and the variables related to family dynastic management. Panel A reports the summary statistics with the 2002 survey data and Panel B reports the summary with the 1997 survey data.

education, 38% have at least a college education. In terms of family firm characteristics, as measured at the end of 2001, 34% of family firms have their headquarters in towns or villages, a family firm has a mean (median) age of 11 years (10 years) and employs a mean (median) 88 (32) full-time workers. On average, founders hold 76% of the capital ownership of their firms. Family firms have 3.51 million RMB in capital and deliver a mean of 6.67 million RMB in sales. Additionally, according to the 1997 survey data, 43% of the family firm founders expect that their descendants will work in their family-run firms, and the founder's adult children are already working in about 18% of all family firms.

4. Main results

4.1. The impact on the family succession

In Table 3, we divide the sample according to whether the family firm founder has one child or more than one child and report their sample average and t-test of the mean difference. As shown in the table, there are noticeable differences between the two groups for both surveys' data. For example, family firms with fewer children are apparently less likely to show the expectation by founders to continue family management. For example, only 36% of firms report to want to continue family management when founders have one or no child, compared to 44% when founders have more than one child. Similarly, the former group reports that only 7% has an adult child working in family firms while the latter group reports 41%. There are no differences between the two groups in terms of owner's age or gender. However, there is a selection issue. For those founders with fewer children, they are more likely to be located in cities and have higher education.

One issue with the Univariate test is that the firms with less than one child also include cases when founders have no child. We therefore use the 1997 survey data and compare firms with heirs only and report the analysis in Panel B. Similarly, family firms with one child are less likely to have family continuing management or an adult child working in their own firms.

Overall, Table 3 shows that family firms with fewer heirs have significantly lower within-family succession including both lower expectations of expecting family to manage their businesses in the future or already involving adult children to work in family firms.

In Table 4, we use Probit regressions to identify the factors that drive a family's within-family succession, which is measured by the *Family_Management* dummy (equals one if the founder expects family heirs to control and manage the family business and zero

Table 3
Comparison of family firms conditional on with at least one child.

Panel A: 2002 survey data

Variable	Split-sample summary				
	Number of children = 1 (obs. = 2243)		Number of children > 1 (obs. = 787)		Difference
	Mean	Median	Mean	Median	P-value
Family_Management	0.36	0	0.44	0	0.00
Adult_Kid_In	0.07	0	0.41	0	0.00
IPO_Hope	0.21	0	0.20	0	0.62
Bond_Hope	0.03	0	0.04	0	0.00
Owner_Age	41.66	40	48.54	48	0.45
Owner_Gender (male)	0.87	1	0.92	1	0.17
Owner_College	0.43	0	0.25	0	0.00
Firm_Village_Town	0.31	0	0.46	0	0.00
Family_Size	4.91	5	6.05	6	0.00
Firm_Age	10.58	9	13.44	13	0.00
Capital_Ownership	0.75	0.8	0.77	0.9	0.55
Capital (millions RMB)	12.58	3	9.26	3	0.00
Sales (millions RMB)	27.67	6.5	36.4	6.2	0.00
ROS (%)	7.34	4.44	7.42	4.84	0.82

Panel B: 1997 survey data

Variable	Split-sample summary				
	Number of children = 1 (obs. = 371)		Number of children > 1 (obs. = 286)		Difference
	Mean	Median	Mean	Median	P-value
Family_Management	0.35	0	0.43	0	0.03
Kids_Hope_In	0.39	0	0.55	1	0.00
Adult_Kid_In	0.31	0	0.46	1	0.00
Child1_Gender (male)	0.64	1	0.72	1	0.02
Child2_Gender (male)	None	None	0.39	0	

The table reports the comparison of family firm's or founder's characteristics as well as firm's dynastic management between those with one heir only and those with more than one heir. Panel A reports the mean and median with the sample of the 2002 survey that includes family firms with child number greater than one. Panel B reports the mean and median with the sample of the 1997 survey that includes family firms with child number greater than one.

Table 4
Probit analysis of the determinants of family management.

Explanatory variable	Dependent variable			
	Family_Management			
	(i) Probit	(ii) Probit	(iii) Probit	(iv) Probit
One_Child	−3.97**	−2.45*		
	(2.28)	(1.87)		
Num_Child			18.13***	8.81***
			(21.42)	(11.92)
Owner_Age		0.48***		1.17***
		(3.51)		(16.56)
Owner_College		−7.73***		−7.79***
		(3.37)		(3.33)
Firm_Village_Town		7.92***		7.98***
		(2.53)		(3.54)
Firm_Age		0.43		0.42
		(1.45)		(1.67)
Capital_Ownership		31.23***		31.29***
		(7.72)		(7.76)
Log(*Sales*)		−4.62***		−4.61***
		(6.73)		(6.72)
Sales_Growth		−2.41		−2.42
		(1.41)		(1.15)
ROS		9.20		9.16
		(1.53)		(1.52)
Industry dummies	Yes	Yes	Yes	Yes
Observations	3258	3258	3258	3258
Pseudo R^2	0.03	0.07	0.02	0.06

Notes: The table reports marginal probability coefficients.
This table reports the determinants of family firm's dynastic management with the 2002 survey data on Chinese small and medium enterprises. The sample includes 3030 observations and we only exclude firms having founder's children already working in family firms. The analysis employs Probit regressions and report marginal probability for the coefficients. The dependent variable is *Family_Management* (dummy equals 1 if the founder has expectation that the firm will continue to be managed/controlled by family). The regressions winsorize the sample at 1% based on firm sales. The robust t-stat is reported in parentheses.
* Represents 10% statistical significance.
** Represents 5% statistical significance.
*** Represents 1% statistical significance.

otherwise). This variable captures founder's expectation of keeping control and management within the family (using the survey data on the founder CEO's expectations for the family's role in the family business). We include two explanatory variables of interest: the one-child dummy and the number of children that founders have. Other controls include owner's age, owner's education level, firm location, firm's vintage year, logarithm of sales, and ROS. Industry fixed effects are included and heteroscedasticity-robust t-statistics are reported in parentheses below the coefficient estimates for the marginal probability.

The one-child dummy has negative coefficients in Probit regressions. Having only one child reduces within-family succession by at least 2.5%, and its effect is statistically significant at the 10% level. If we use the number of children instead of this one child dummy, there is a significant negative relationship between number of children and within-family succession. The evidence suggests that an insufficient number of children results in low incentives for entrepreneurs to keep the control and management of their businesses within family.

Other coefficient estimates are consistent with common sense. For example, older entrepreneurs or entrepreneurs from towns/villages tend to continue within-family succession for their businesses. Well-educated entrepreneurs are less likely to expect within-family succession. Firms with more concentrated ownership by family or smaller firms are more likely to keep management or control within the family.

We measure within-family succession with *Family_Management* in this subsection. In Table 5 we use an alternative measure of within-family succession — an indicator for adult children working in family firms. We run Probit regressions to identify the factors that drive this within-family succession decision.

The one-child dummy has negative and significant coefficients in Probit regressions. Economically, having one child reduces the likelihood of adult children working in their own firms by 14%. Although this can be driven partially by a mechanic reason, since young founders may not have a child or an adult child. We therefore use the number of children instead of the one child dummy to exclude those founders without children, and we continue to report a significant positive relationship between number of children and the likelihood of having adult children working in their own firms. The evidence suggests that an insufficient number of children results in low likelihood of entrepreneurs arranging children to work in their own firms, a critical procedure for within-family succession. Similar to prior results, other coefficient estimates are consistently intuitive. For example, older entrepreneurs or entrepreneurs from towns/villages tend to arrange for their adult children to work for their own firms. Well-educated entrepreneurs are less likely to maintain their own children within-family firms.

The one-child policy in theory should apply uniformly to every entrepreneur in our sample. In reality entrepreneurs may not choose to strictly comply with this restriction. There can be potential endogeneity issues, either because firm founders intentionally

Table 5
Probit analysis of the determinants of expecting child to work in the family firm.

Explanatory variable	Dependent variable			
	Adult_Kid_In			
	(i) Probit	(ii) Probit	(iii) Probit	(iv) Probit
One_Child	−24.29***	−14.01***		
	(17.31)	(9.83)		
Num_Child			18.31***	9.96***
			(19.44)	(11.70)
Owner_Age		1.39***		1.25***
		(11.14)		(12.88)
Owner_College		−5.13***		−4.61***
		(3.93)		(3.70)
Firm_Village_Town		3.15**		2.84**
		(2.56)		(2.39)
Firm_Age		0.04		0.01
		(0.32)		(0.10)
Capital_Ownership (%)		0.02		0.02
		(1.16)		(0.90)
Log(*Sales*)		−0.06		0.51
		(0.10)		(1.44)
ROS		−0.46		0.26
		(0.21)		(0.12)
Industry dummies	Yes	Yes	Yes	Yes
Observations	3258	3258	3258	3258
Pseudo R^2	0.11	0.35	0.19	0.37

Notes: The table reports marginal probability coefficients.
This table reports the determinants of family firm's dynastic management with the 2002 survey data on Chinese small and medium enterprises. The sample includes 3030 observations and we only exclude firms having founder's children already working in family firms. The analysis employs Probit regressions and report marginal probability for the coefficients. The dependent variable is *Adult_Kid_In* (dummy equals 1 if adult children are working in family firms). The regressions winsorize the sample at 1%. The robust t-stat is reported in parentheses.
** Represents 5% statistical significance.
*** Represents 1% statistical significance.

choose to violate the one-child policy so that they have more children for within-family succession, or because entrepreneurs voluntarily choose to have one child when they can have more children. We therefore need to address this endogeneity bias.

We utilize two-stage regressions to address this problem. The instruments chosen in the first-step regression will only be related with the effectiveness of the one-child policy but should have nothing to do with within-family succession decisions. The cross-sectional variations in the binding effects of the one-child policy offer the use several perfect instruments. First, because the one-child policy does not apply to minority races but only to members of the Han race in China, whether the founder belongs to a minority race is a good candidate. Since minority races are not subject to the one-child policy, we expect that this dummy negatively predicts one child for founders. Second, the one-child policy was enacted in 1980 and therefore does not apply to people older than 35 (another cutting point is 40) in 1980 with children. Founders older than 35 who choose to have more than one child should not suffer the binding effects of the one-child policy. We empirically expect that their age at the year of 1980 should be negatively related to the dummy of having one child. Third, we include a dummy to indicate entrepreneurs who have worked as civil employees as the one-child policy often has strong binding effects on civil employees. Lastly, we include a dummy for a firm located in a town or village, since the one-child policy is often easily circumvented in non-urban areas.

In the first stage, we run a Probit regression with these four instruments and then generate a predicted probability for a given founder having one child only due to the varying binding effects of the one-child policy. The first-stage regression produces results consistent with our predictions. For example, founders of a minority race, older than 35 or 40 at the year of 1980, or located in town or village are less likely to have one child, while founders who worked in government sectors as civil employees are more likely to have one child. The Wald test accepts the specification of instrument variables in the first stage regression.

We calculate the predicted probability from the first stage and use it as the independent variable of interest in the second stage. In the second stage, we run Probit regressions similar to the results reported in Tables 4 and 5. The dependent variables include either *Family_Management* or *Adult_Kid_In*. We find strong and negative coefficients for the one-child dummy. For example, having one child only reduces the likelihood of within-family succession (expectation of continued family control) by 17% and of adult children working in their own firms by 60%. Consistent with prior results, entrepreneur's education is negatively related to within-family succession. These results confirm the prior analysis that having one child due to the one-child policy does negatively affect within-family succession of family firms in China.

One concern with the analysis in Tables 4 and 5 is that the regressions include all family firms even when founders have no child or the child is too young for succession consideration. We therefore utilize the 1997 survey to analyze this within-family succession conditional on the children being adult and ready for succession, since the 1997 survey reports this information. We thus study

Table 6
Two-stage regression on the determinants of within-family succession.

Explanatory variable	Dependent variable		
	One_Child First stage	*Family_Management* (i) Probit	*Adult_Kid_In* (ii) Probit
Founder's age at year 1980	−3.66***		
	(12.76)		
Dummy (Minority race)	−2.80		
	(0.23)		
Prior working in government	19.57***		
	(3.94)		
Firm_Village_Town	−13.02**	5.29**	0.0.14
	(2.57)	(2.83)	(0.19)
Predicted (*One_Child*)		−17.26*	−60.11***
		(1.89)	(3.44)
Firm_Age		0.40*	0.15
		(1.70)	(1.36)
Owner_Age		0.77	0.78***
		(0.74)	(3.78)
Owner_College		−7.78***	−5.06***
		(3.52)	(3.86)
Capital_Ownership (%)		0.80***	2.15
		(7.98)	(1.47)
Log(*Sales*)		−4.86***	0.52
		(7.80)	(1.56)
ROS		12.20	0.67
		(0.79)	(0.28)
Industry dummies		Yes	Yes
Observations	3258	3258	3258
Adj R^2	0.05	0.08	0.32
Wald exogeneity test (p-value)	0.00		

Notes: In the probit regression, the instrumental variable is the dummy for minority race, dummy of owner age greater than 35 at year of the one-child policy enactment, family size, and rural dummy. If family firm founders are of minority race or have a child before 1980, they and their families will not be subject to the one-child policy. This table reports the impact of the one child policy on firm's dynastic management with the 1997 survey data on Chinese small and medium enterprises. In the first stage regression, the dependent variable is dummy variable equalling one for having one child. The instrument is a dummy variable if founder's age is above 35 in 1980, minority race dummy if founder is not of the Han race. In the second stage regression, the analysis employs Probit regressions. In the second stage regression, the dependent variables include *Family_Management* (dummy equaling 1 if firm is expected to continue under family management) and *Adult_Kid_In* (dummy equals 1 if adult children are working in family firms). The variable of interest is an expected variable of having 1 child due to the one child policy from the first stage Probit regression. The robust t-stat is reported in parentheses.

* Represents 10% statistical significance.
** Represents 5% statistical significance.
*** Represents 1% statistical significance.

whether the gender of adult children matters in within-family succession. In Table 7, we report the Probit regressions of whether an adult child is working in the family firm, a close measure of adult children's within-family succession. (See Table 6.)

The one-child dummy has an insignificant but negative coefficient, suggesting that having only one child reduces the likelihood for him to work in family firms in general. However, having a first-born male child significantly increases his likelihood of working in their own firms by 14% to 17%, and also increases the likelihood of having the second child working in family firms by 21%. Moreover, having a second-born male child significantly increases the likelihood for him to work in the family firm by 25%. On the other hand, having a second-born male child does not affect the likelihood of having the first-born child working in their own firms. This evidence suggests a constraint effect of having fewer children on within-family succession. Although the first-born male child is often by default more likely to be chosen for within-family succession, having more children will increase the likelihood of within-family succession often via tournament, through which founders seem to select their best heirs. We however cannot rule out a possibility that founders choose to have a second-born male child when the first born child is female, who is less expected to succeed to family businesses.

4.2. The corporate effects

The previous section shows that the availability of heirs affects family firm succession decisions. In this section, we further investigate the corporate effects, that is, whether the availability of children affects corporate capital raising decisions. We use the survey data to construct two variables: the tendency to issue equity via IPO and raise money via bond issuance. The two measures capture external capital raising activities of family firms. The Probit regression results are reported in Table 8. The explanatory variables of interest include either one-child dummy or number of children. Other controls include owner's age, owner's education level, firm location, firm vintage year, logarithm of sales, and ROS.

We find that having one child reduces the likelihood of expecting an IPO by 5% while having more children increases IPO expectation significantly. Younger or well-educated founders are more likely to show IPO tendency, similarly, larger firms or firms

Table 7
Analysis of the determinants of dynastic management in the family firm.

Explanatory variable	Dependent variable			
	Dummy (1st adult child works in the family firm)		Dummy (2nd adult child works in the family firm)	
	(i) Probit	(ii) Probit	(iii) Probit	(iv) Probit
One_Child	−0.343**			
	[−14%]			
	(2.13)			
Child1_Gender (male)	0.353**	0.534**	0.297**	0.237**
	[14%]	[17%]	[22%]	[21%]
	(2.06)	(2.13)	2.25	2.27
Child2_Gender (male)		0.116	0.663***	0.707**
		[4%]	[29%]	[25%]
		(0.50)	(2.79)	(2.67)
Owner_Age	−0.001	0.006	0.028	−0.009
	(0.10)	(0.40)	(1.88)	(0.073)
Family_Size	0.099**	0.075*	0.049	0.202
	(2.59)	(1.66)	(1.15)	(0.193)
Capital_Ownership (%)	0.145	0.263		1.815
	(0.46)	(0.62)		(1.318)
(Log)*Sales*	0.206***	0.237***	−0.326***	−0.306***
	(3.80)	(3.39)	(3.84)	(7.22)
Board	−0.661**	−0.479	−1.318**	−0.843***
	(2.17)	(1.57)	(2.66)	(3.16)
Industry dummies	Yes	Yes	Yes	Yes
Constant	−3.492***	−4.773***	−1.315**	−2.547
	(3.96)	(4.53)	(0.294)	(4.250)
Observations	350	134	226	63
Pseudo R^2	0.12	0.10	0.13	0.11

Notes: The table reports regression coefficients: the marginal probability is given only for the first three independent variables in brackets.
This table reports the determinants of family firm's dynastic management with the 1997 survey data on Chinese small and medium enterprises. The analysis employs Probit regressions. In (i) and (ii), the dependent variable is a dummy equaling 1 if the 1st adult child works in the family firms; in (iii) and (iv), the dependent variable is a dummy equaling 1 if the 2nd adult child works in family firms. The robust t-stat is reported in parentheses.
* Represents 10% statistical significance.
** Represents 5% statistical significance.
*** Represents 1% statistical significance.

with more vintage years are also likely to have more IPOs. Regarding the bond issue, having more children increases the expectation of issuing bonds while the one child dummy has a negative but insignificant impact.

The findings reported in Table 8 suggest that the availability of children plays an important role in shaping the founder's expectation of raising external financing. One explanation is that when family firms have a limited pool of heirs for within-family succession, they are less likely to have long-run planning and thus invest less into their future growth. This is consistent with the findings reported in the previous section that family firms plan less into their future succession or family management due to lack of heirs.

If founders feel that constraints due to lack of enough talent will jeopardize within-family succession, we should expect that they make corporate decisions corresponding to such planning horizons. The availability of children will therefore affect firms' long-run corporate investment. We examine such effect with reinvestment rate and R&D and relate them to either the one-child dummy or number of children. The regression results are reported in Table 9. The dependent variables in the Tobit regressions include reinvestment/sales and R&D expenses/sales. Tobit regressions are used because the dependent variable is bounded below by zero. Technically Tobit regressions are best applied for dependent variables that are left censored, although often Tobit is applied in contexts with bounded below by zero. While there are some differences between Tobit and OLS in terms of economic significance, the main findings are not affected either way with the use of Tobit versus OLS.

The results show that having one child negatively affects both reinvestment rate and R&D, both effects statistically significant at the 10% level. For example the one child dummy reduces reinvestment rate by 14% and R&D by 8% marginally, respectively, both are economically significant. Similarly, the number of children increases firm's reinvestment rate and R&D, with the effects both economically and statistically significant at the 5% level. Well-educated founders are also more likely to increase R&D for their family firms.

Overall, the findings in this section suggest that family firms invest less into future growth either through current reinvestment, R&D investment or external financing raising activities. There are two explanations for causing such corporate effects. On one hand, family firms which do not expect to pass the control might be seeking less external capital themselves due to demand side explanation. Alternatively, it could be that since the providers of external finance (stock and debt markets) do not expect the firm to survive in the long term they are not willing to provide enough funding for the firm's investment. We cannot differentiate these two explanations, while future research should aim to answer which explanation is more pertinent.

Table 8
Probit analysis of the determinants of expectation of having IPOs and having board.

Explanatory variable	Dependent variable			
	IPO_Hope		*Bond_Hope*	
	(i) Probit	(ii) Probit	(iii) Probit	(iv) Probit
One_Child	−5.69***		−0.98	
	(2.97)		(1.58)	
Num_Child		3.62**		0.82*
		(2.50)		(1.94)
Owner_Age	−0.27**	−0.31**	−0.05	−0.07
	(2.39)	(2.58)	(1.25)	(0.94)
Owner_College	10.76***	10.94***	1.15*	1.21*
	(5.77)	(5.87)	(1.72)	(1.84)
Firm_Village_Town	−2.15	−2.47	−0.32	−0.38
	(1.18)	(1.36)	(0.97)	(0.42)
Firm_Age	0.36*	0.37*	0.07	0.07
	(1.78)	(1.81)	(0.27)	(0.17)
Capital_Ownership	−0.02	−0.02	0.00	0.00
	(0.66)	(0.76)	(0.12)	(0.11)
Log(*Sales*)	7.82***	7.82***	1.05***	1.04***
	(12.54)	(12.54)	(5.74)	(5.78)
ROS	4.44	4.93	2.35**	2.59**
	(0.56)	(0.56)	(2.41)	(2.75)
Industry dummies	Yes	Yes	Yes	Yes
Observations	3258	3258	3258	3258
Pseudo R^2	0.15	0.15	0.09	0.10

Notes: The table reports marginal probability coefficients.
This table reports the determinants of family firm's financial management with the 2002 survey data on Chinese small and medium enterprises. The sample includes 1865 observations with sales greater than 10,000 RMB. The analysis employs Probit regressions. In (i) and (ii), the dependent variable is *IPO_Hope* (dummy equals 1 if the founder has expectation that the firm will go public); in (iii) and (iv), the dependent variable is *Bond_Hope* (dummy equals 1 if the founder has expectation of issue bond). The robust t-stat is reported in parentheses.
* Represents 10% statistical significance.
** Represents 5% statistical significance.
*** Represents 1% statistical significance.

5. Conclusions

Using two comprehensive surveys on small and medium family firms in China, we systematically examine how the one-child policy affects family firm dynastic management and within-family succession decisions. Our research is the first to examine the economic implications of human capital constraints especially due to the one-child policy on the succession or dynastic management of family firms.

We empirically measure the binding constraints of the one-child policy with either the dummy of having one child or number of children for a given founder. Our findings show that human capital constraints such as having only one child impose significant constraints on family firms' dynastic management. For example, the availability of one child reduces a founder's succession expectations that his family will continue management and control of the family business. Having one child also results in less within-family succession by decreasing the likelihood of adult children working in family firms. Instead of using the dummy of having one child, we use the number of children available for within-family succession. The findings show that the number of children affects within-family succession significantly consistent with the prediction that fewer children result in constraints on within-family succession.

We furthermore investigate whether this relationship is driven by the tournament theory. We use a subsample of firms with more than one child. The results show that having a first-born male child is important for within-family succession while having a second son will also increase his likelihood of working in the family firm but not affect the first son's likelihood. This evidence supports the tournament theory in the sense that having more children especially sons increases the likelihood for both to work in family firms.

The one-child policy should have corporate effects if it imposes constraints on family succession decisions. We indeed report findings that having one child can cause firms to invest less into future growth. For example, family firms with one heir are less likely to have an IPO plan and less likely to raise funds via bonds, both important channels for raising external financing. Similarly, we show that family firms with only one heir show lower reinvestment rate or R&D, both directly capturing firm's current investment for future growth.

Our analysis is subject to endogeneity concerns, since the human capital constraints may be imposed by the one child policy or voluntarily determined by entrepreneurs. We address such endogeneity concerns with two-stage regressions. In the first stage regression, we use instruments that are not related to within-family succession. The instruments include age of founder at the year of enactment of the one-child policy, dummy of minority race for founders, dummy of location in rural areas and dummy of founder's prior job in government sectors. Since the one child policy applies to people with different binding effects, we use the predicted probability of having one child as an independent variable in the second stage regression and investigate its effect on family succession.

Table 9
Impact of dynastic management on family firms' reinvestment rate and R&D.

Explanatory variable	Dependent variable			
	Reinvestment/prior sales		R&D/prior sales	
	(i) Tobit	(ii) Tobit	(iii) Tobit	(iii) Tobit
One_Child	−14.92*		−8.63*	
	(1.83)		(1.79)	
Num_Child		17.19**		10.76**
		(2.44)		(2.36)
Owner_Age	−0.66	−1.02**	0.07	−0.23
	(1.53)	(2.03)	(0.31)	(1.28)
Owner_College	4.86	6.26	11.21**	11.30**
	(0.53)	(0.69)	(2.23)	(2.61)
Firm_Village_Town	1.35	0.12	8.70**	−1.65
	(0.23)	(0.15)	(2.54)	(1.53)
Firm_Age	−0.93	−1.03	0.08	−0.14
	(1.23)	(1.13)	(0.19)	(0.60)
Capital_Ownership (%)	0.23**	0.22**	−0.01	0.00
	(2.11)	(2.04)	(0.19)	(0.03)
Log(*Sales*)	−9.06**	−9.20**	2.64**	1.02
	(2.05)	(2.05)	(2.13)	(0.81)
ROS	−41.19	−40.92	49.60	54.21
	(0.32)	(0.25)	(1.40)	(1.49)
Industry dummies	Yes	Yes	Yes	Yes
Observations	3258	3258	3258	3258
Pseudo R^2	0.02	0.03	0.06	0.07

Notes: The table reports regression coefficients.
This table reports the impact of succession expectation on family firm's financial and business policies with the 2002 survey data on Chinese small and medium enterprises. The analysis employs Tobit regressions in which the dependent variables are reinvestment/prior sales and R&D expense/prior sales. In (iii) and (iv), the analysis employs Probit regressions in which the dependent variable is a dummy equaling 1 if the founder expects firm to shift to a different industry for short-term profit and dummy equaling 1 if firm has a diversified industry. The variable of interest is a dummy variable equaling 1 if the heir is expected to work in the family firm. The robust t-stat is reported in parentheses.
* Represents 10% statistical significance.
** Represents 5% statistical significance.

Confirming with previous analysis, the one-child policy negatively affects family succession. The effects become stronger both economically and statistically than those reported in the one-stage regressions.

Overall, this research suggests that the one-child policy has imposed significant economic constraints on family firms' succession and dynastic management. Specifically, such a policy exogenously reduces the availability of talented heirs, which in turn greatly lowers within-family successions and results in discontinuity of family firms since most family firms rely on within-family succession. Such human capital constraints imposed by the one-child policy have economic costs to society: it substantially reduces entrepreneurs' long-term incentives to invest in future growth, which may reduce the prevalence of family businesses in China.

This research has several important policy implications. First, as the Chinese government is gradually phasing out the one-child policy, we think that this policy may benefit family firms especially those suffering from a lack of enough heirs for family successions. Secondly, our findings on corporate effects suggest that family firms may invest less into future growth due to the external constraint imposed by the one-child policy. The gradual phasing out this policy will positively contribute to the future development of the economy since family firms are important constituents of the economy.

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