The Emergence of Corporate Pyramids in China

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May 2005

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Abstract

We examine the pyramidal ownership structure of a large sample of newly listed Chinese companies controlled by local governments or private entrepreneurs. Both types of the owners use layers of intermediate companies to control their firms. However, their pyramiding behaviors are likely affected by different property rights constraints. Local governments are constrained by the Chinese laws prohibiting free transfer of state ownership. Pyramiding allows them to credibly decentralize their firm decision rights to firm management without selling off their ownership. Private entrepreneurs are constrained by their lack of access to external funds. Pyramiding creates internal capital markets that help relieving their external financing constraints. Our empirical results support these conjectures. Local governments build more extensive corporate pyramids when they are less burdened with fiscal or unemployment problems, when they have more long-term goals, and when their firm decisions are more subject to market and legal disciplines. The more extensive pyramids are also associated with smaller "underpricing" when the firms go public. Entrepreneur owners construct more complex corporate pyramids when they do not have a very deep pocket – as indicated by their personal wealth.

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1. Introduction

Many firms around the world are controlled by pyramidal like ownership structures (La Porta, Lopez-de-Silanes, Shleifer, 1999; Claessens, Djankov, Lang, 2000). On the apex of a pyramid sits a controlling owner who exercises his/her authority on a firm rather indirectly through layers of intermediate companies. Why the owner builds the pyramid is unclear to academicians.[1]

This paper investigates the formation of corporate pyramids in China – the largest transition economy in the world. It tracks the pyramidal ownership and control structures of a comprehensive sample of state since their initial public offerings (IPOs) and private firms since the entrepreneurs get the control of listed firms, through takeover, in addition to IPO. It then examines a few determinants for the extensiveness of the pyramids controlling the firms. The paper also examines how public stock investors perceive corporate pyramidal layers, as reflected in the level of first-day stock price returns after the IPOs.

Focusing on the emergence of Chinese corporate pyramids provides a few advantages. First, China's young market economy allows us to investigate corporate pyramids close to their inception. Second, China's diverse markets and geographic regions provide sufficient variations in institutional settings that potentially affect the emergence of corporate pyramids. Third, the co-existence of state and private owners in China allows a comparison of their incentives of building corporate pyramids.

[1]There have been only a few theories. First, a pyramid creates separation of control from ownership that helps a controlling owner to enjoy private benefits that may include expropriating wealth from minority shareholders (Bebchuk, 1999; Bebchuk, Kraakman, and Triantis, 2000; Wolfenzon, 1999). Second, a pyramidal structure facilitates the control of multiple corporations and the cross-subsidization of funds among affiliated firms (Almeida and Wolfenzon, 2004).

Our sample includes 742 newly IPO firms majority-owned by Chinese local governments and 130 firms controlled by entrepreneurs through IPO or takeover in the private sector.[2] Because little prior research exists, our approach is to identify basic institutional constraints that potentially regulate the pyramiding behavior of the firm owners. First, under China's socialist regime government-owned assets and equity stakes are prohibited from being freely sold, whereas entrepreneur-owned assets and shares are not subject to this restriction. Second, under China's highly regulated financial systems, private sector entrepreneurs and their firms do not have the same level of playing field in obtaining external funds, compared with government-owned firms. The different property rights constraints imposed on the firms generate different incentive and behavioral implications.

For a local government that does not have the rights to sell, it is unable to use outright sales as a means to transfer its decision rights in the firm to a third party. When conditions arise making such decentralization desirable, the local government will consider other methods that can credibly decentralize the decision rights short of actual transfer of ownership. Simply telling the firm managers that they have the rights to make decisions does not work, because the managers believe that there is a non-trivial probability that the government will take their power back. We conjecture that the local government can create pyramidal layers between itself and the firm to credibly decentralize. Pyramiding is a more credible means of decentralizing than is the policy order, because the government has to incur bureaucratic costs should it ex post intervenes the firm management through the layers of corporate pyramids. Consistent with this

[2] We exclude firms that are controlled by the central government because in our later analyses, we want to take advantage of the variations of institutional settings where the local government-controlled firms operate.

conjecture, our sample shows that Chinese government often inserts between itself and the firm pyramidal layers such as a state asset management company (that operates more like a commercial rather than government unit) or a large corporate group with multiple layers of companies.

By contrast, entrepreneurs are not subject to the no-right-to-sell rule. They can freely relinquish their decision rights of firms by selling off part or all of their shares or assets. It can be expected that the decentralization motive of pyramiding is weaker for entrepreneur-owned firms. Rather, China's private entrepreneurs' pyramiding behavior is more likely due to their external financing constraints. Building pyramids allows an entrepreneur to create an internal capital market (Williamson, 1985; Stein, 1997) that facilitates cross-subsidization of funds. On the other hand, firms controlled by local governments are expected to be subject to a much lower degree of financial constraints, because the governments can use their policy tools or political ties to free up the firms' access to funds.

Our empirical results show that both governments and entrepreneurs set up their firms into pyramids. However, their pyramiding decisions are affected by different factors. Local governments build more extensive pyramids on top of their listed companies when they are less burdened with unemployment or fiscal problems, and when their spending in long-term objectives (education, research and development, etc.) is higher. This suggests that local government's weaker incentives to impose policy burden on the firm and stronger desire for long-term economic achievements result in more decentralization. We also find that local-government-affiliated firms belong to more extensive pyramids when the degrees of market and legal disciplines provided to the

firms' regions are stronger. The market and legal disciplines not only align the government's interest toward value maximization they also serve as monitoring devices against agency problems, both of which encourage more decentralization.

We do not find the decentralization consideration significantly related to the pyramiding of entrepreneur-controlled firms. Instead, we find that entrepreneurs use more extensive pyramids to control their firms when they do not have a very deep pocket. Specifically, we find that an entrepreneur creates more pyramidal layers when he/she has less personal wealth. As expected, we do not find that pyramids of government-owned firms are significantly related to financial constraints.

We perform an analysis of the pricing effects of the corporate pyramids upon the IPOs of the Chinese firms. Our goal is to examine whether China's equity markets detect and capitalize on any beneficial or harmful effects of the corporate pyramids. We find a significantly smaller first-day stock return of a government-controlled IPO firm, when it is controlled by a pyramid with more extensive layers, all else equal. The smaller initial return, or smaller "underpricing", of the IPO stock may have suggested an overall beneficial effect of corporate pyramids associated with government ownership. We also find that the initial return is negatively related to the degree of market discipline and legal protection provided to the geographic region in which the firm is located, suggesting that investors take into account the degree of market and legal protection in their IPO pricing decisions. However, we do not find the effect of pyramids or the market and legal factors relevant in explaining the initial returns of the IPOs of entrepreneur-controlled firms.

This paper provides a few contributions to the literature. First is the decentralization effect of pyramidal ownership structure. We conjecture that this effect is

not specific to China or government-owned firms, but can apply to situations when arms' length transfer of ownership is undesirable. The non-transferability of ownership can arise from not just state prohibition but also from high transaction costs of firm specific assets. For example, the prestige or reputation of an entrepreneur and his/her firm cannot be easily sold to an outsider. Rather, it is best kept within the family. When agency problem is not too large, the entrepreneur may allow managers some autonomy by indirectly owning the firm through a pyramid.[3] Second, the paper provides evidence that corporate pyramids are more extensively used when agency problems are more contained by market and legal disciplines. This result complements a few prior studies that emphasize the agency cost effect of pyramids and groups (Bebchuk, 1999; Wolfenzon, 1999; Bebchuk, Kraakman, and Triantis, 2000; Bertrand and Mullainathan, 2002; Claessens, Fan, and Lang, 2002). Third, the paper provides additional evidence that internal market consideration motivates corporate pyramiding and group formation (Khanna and Palepu, 1997; Khanna, 2000; Almeida and Wolfenzon, 2004). Fourth, the paper's evidence of IPO valuation effects is consistent with prior research reporting that business group structure sometimes matter to firm performance (Keister, 1999; Khanna and Palepu, 2000).

The remainder of the paper proceeds as follows. Section 2 develops the hypotheses of the emergence of corporate pyramids in China. The empirical results of the determinants of corporate pyramids are reported in Section 3, and the evidence of IPO pricing effects of corporate pyramids is presented in Section 4. Section 5 concludes the paper.

[3] Due to the small number of entrepreneur owned firms in our sample, we are unable to examine this possibility closely.

2. Development of Hypotheses

In this section we describe the emergence and the organization of China's modern enterprises and discuss institutional factors that influence controlling owners' (governments' or private entrepreneurs') incentives of organizing their enterprises into pyramids.

2.1. The Chinese Pyramids

China's enterprise reforms since the 1980s feature the decentralization of control rights of its state owned enterprises (SOEs) from the central government to local governments. Since the creation of the stock markets in Shanghai and Shenzhen in the 1990s, local governments have carved out from their SOEs productive assets, organized them into corporations, and then partially privatized the corporations through IPO of minority portions of the corporate shares. Over 1000 companies have gone public this way by year 2001, most of which remain majority owned by local governments.

A local government can choose between two different ways in organizing its ownership and control structure of a publicly traded company. One way is to hold the shares of the newly listed company directly through a state asset management *agency*. In that case the ownership structure of the company is simple: the local government directly owns a controlling stake while minority equity investors collectively own the rest. Alternatively, the local government can indirectly own the listed company through a pyramid consisting of one to several intermediate companies. If there is one additional intermediate company, it is usually a parent SOE or a state asset management *company*, which specializes in managing the assets, while the state asset management agency in the apex of the pyramid continues to serve the government administrative and regulatory

functions. However, if there are multiple intermediate layers, it usually suggests that the local government has transferred the control rights of the listed firm to a large enterprise group with multiple layers of companies. In either case, these intermediate pyramidal layers are non-publicly traded SOEs solely owned by the local government or jointly owned by local government and other government agencies. Non-government equity participation of the intermediate SOEs is uncommon, due to state regulations prohibiting free dilution of state ownership. The chain of intermediate companies is typically formed over a period prior to the IPO, through a series of restructuring of SOE assets. Two examples are illustrated in Figures 1 and 2, showing how a listed firm is directly controlled by a state asset management agency and indirectly through a corporate pyramid, respectively.[4]

Along with the state asset management reforms we observe the emergence of private firms. These entrepreneur-owned firms have become increasingly important as China's market economy develops. Since the setting up of the capital markets, a small but increasing number of entrepreneurs bring their businesses public by selling shares in the two stock markets or taking over originally listed firms. Like many government owners of SOEs, the entrepreneurs often control their publicly listed companies through

[4] The reform of the state asset management system in Shenzhen and Shanghai can shed light on our understanding of the emergence of these intermediate pyramidal layers. Back in 1992, the Shenzhen government gave the administrative and regulatory functions of the SOEs to a newly established state asset management agency called the State Asset Management Committee (SAMC), after the abolition of all industry bureaus which used to administer and regulate the SOEs. Five years prior to this, the Shenzhen government set up its first asset management company called Shenzhen Investment and Management Company, serving the management function like a holding company, rather than a government administrative bureau. This and two other companies, Development and Investment Holding Company and Trading and Investment Holding Company, subsequently established are the intermediate pyramidal layer of listed firms in Shenzhen. Similarly, starting in 1993, the Shanghai government set up its SAMC and 19 large enterprise groups and holding companies, like the three holding companies in Shenzhen, to manage all SOEs under Shanghai government's jurisdiction. Qian (1996) argue that by the setting up the SAMC, and the management and holding companies, both governments hoped to separate the administrative and regulatory functions and the management functions, minimizing the political influence of the government over the SOEs.

pyramids. However, unlike governments who typically have full ownership of the intermediate companies along the pyramids, entrepreneurs sometimes introduce outside equity participation of their intermediate companies, resulting in a divergence between the ownership and control of the listed company. Figure 3 provides an example of an entrepreneur setting up corporate pyramid to control a listed firm.

In the following, we provide two potential explanations for why pyramidal ownership is widely adopted by China's government and private owners. The first explanation is based on local governments' incentive to decentralize decision making rights to firm management. The second explanation is based on controlling owners' incentive of creating internal capital markets to cross subsidize their firms.

2.2. The incentive to decentralize

We pay attention to the possibility that a corporate pyramid serves as a device for a local government to decentralize control rights to firm managers. Due to regulations that prohibit the dilution of state ownership, the government cannot relinquish control by freely selling off its firm ownership stake.[5] Creating the corporate pyramid serves as an alternative means of decentralization.

The decentralization decision is made when the local government decides whether to have a state asset management agency control the listed firm either directly or indirectly through a chain of companies such as a state asset management company or a large corporate group of SOEs. By choosing the latter option, the government can allow a credible transfer of decision rights, because the additional intermediate layers are

[5] Alchian (1965) and Karpoff and Rice (1988) provide analyses on the effects of non-transferable property rights on organization and incentive.

associated with higher bureaucratic costs[6] should the government intervene the firm's decision making.

What, then, affect the local government's incentive of relinquishing control of the firm? The key consideration is the degree of conflicts between government and firm objectives. The larger is the degree of the conflicts, the larger is the benefit of the government's control. Conversely, the local government's control benefit is smaller when its objectives are more consistent with those of the firm.

Specifically, a local government burdened with poor fiscal conditions or unemployment wants a firm to subsidize public expenditure or support employment, both are against the interest of a value maximizing firm. However, strong market discipline and legal enforcement work to align the interest of the government and firm management toward firm value maximization.[7] Therefore it would be in the government's interest to decentralize its firm decision rights to the management. By giving decision rights to firm managers who possess professional skills and local knowledge, the decentralization enhances efficiency in firm decision making (Jensen and Meckling, 1992) that is important in the more competitive market environment.

We therefore expect that the degree of decentralization is affected by the extent to which the local government focuses on firm efficiency and the degrees of market and legal disciplines that strengthen the focus. That is to say, the degree of decentralization

[6] Organizing business activities within the firm (instead of the market) involves bureaucratic costs. These costs arise from the propensity to manage, to forgive mistakes, and logrolling (Williamson, 1985). Shirley and Walsh (2001) discuss the potential effect of setting up a corporation in reducing government intervention: "*if an enterprise is run as a department of a ministry, with its managers directly appointed by a minister of chief executive, then political interventions will be easy and common. Alternatively, if the government acts as the dominant shareholder of a largely independent firm, acting through a board of directors, political intervention may be possible but is more costly and more transparent.*"

[7] Conflicts of interest can also arise because the firm managers' objectives deviate from firm profit maximization. The alignment-of-interest effect of the strong market and legal discipline work the same under the double agency setting.

depends on the set of objectives adopted by the local government and the set of institutional factors that collectively affect market and legal disciplines. The complexity of corporate pyramidal layers that control a public traded company, a proxy for decentralization, should vary systematically with these government objectives and institutional factors. Two sets of testable hypotheses follow.

- *The more the local government focuses on firm profit maximization, the more extensive is the firm's pyramidal ownership structure.*
- *The stronger the market and legal institutions in which the firm operates, the more extensive is the pyramid that controls it.*

It can also be expected that compared with those of the entrepreneur-controlled firms, the pyramidal structures of government-owned firms are more sensitive to the above effects.[8] This is possible for two reasons. First, multiple objectives (resulting from policy burdens) and bureaucratic costs are more applicable to government-owned firms than to entrepreneur-owned firms. Second, unlike government leaders who may not have specialized skills for running businesses, entrepreneurs typically have better business knowledge and skills. Private owners also more fully bear the consequences of firm profitability than do government owners. Therefore the private owners' benefits of co-locating knowledge and decision rights through decentralization are lower than those of local government owners.

[8] However, entrepreneurs may build pyramids to conceal assets or information subject to predation by governments or competitors. This can be relevant when the entrepreneurs operate in institutional environments that offer weak property rights protection.

2.3. The incentive to create internal capital markets

Another possible explanation for corporate pyramids is relieving financial constraints. Affiliated firms connected by a pyramid can use internal funds to cross-subsidize each other, so as to reduce their reliance on external financing. Such internal capital markets can be beneficial if the external financial markets are subject to severe distortions (Williamson, 1985; Stein, 1997). Almeida and Wolfenzon (2004) show that corporate pyramids will more likely be used when internal funds are important in financing investment projects, because pyramids allow entrepreneurs to utilize the entire stock of retained earnings of the firm it controls. They further show that pyramids will be more popular in countries with poorer investor protection, because in those environments the internal financing advantage of pyramids is greater.

However, creating internal capital markets can induce organizational costs that lead to misallocation of capital (Scharfstein, 1997; Shin and Stulz, 1998; Rajan, Servaes, and Zingales, 2000; Scharfstein and Stein, 2000). As shown by Claessens, Djankov, Fan and Lang (2002) and La Porta, Lopez de Silanes, Shleifer and Vishny (2002), the complex ownership structures that accompany internal markets can result in managerial entrenchment, the effects of which are reflected in investors' pricing decisions.[9]

The internal market view predicts that corporate pyramids will be used when the controlling owner does not have a deep pocket and when market and legal environments are weak. However, considering that internal organizational costs are also greater in

[9] Consistent with the existence of benefits and costs of internal markets, Claessens, Fan, and Lang (2002) find that financially burdened East Asian firms benefit from group affiliation; mature and slow-growing firms with ownership structures more likely to create agency problems gain more from group affiliation, while young and high-growth firms more likely lose.

regions with weak institutions and market disciplines, it becomes unclear as to whether and when it pays to build pyramids in those environments.

In the context of China, we expect that the incentive to build internal financial markets through pyramiding is stronger for entrepreneur-owned firms than for government owned firms. Private entrepreneurs and their businesses have been disadvantaged in their access to external funds under China's socialist regime (Brandt and Li, 2003). By contrast, local governments and their firms have better access to external funds, because they control policy tools and connections to influence the investment decisions of the finance sector.

3. Empirical results – determinants of corporate pyramids

3.1. The sample

Starting in 2001, publicly traded companies in China are required to report in annual reports detailed ownership information, including the structures of pyramidal ownership chains, of their controlling shareholders. Based on the ownership information disclosed in 2001 annual reports, we trace back the ownership information to the IPO year for each existing company traded on the Shanghai and Shenzhen Stock Exchanges. If there is no change in the controlling owner, we determine that the ownership chain to remain the same since the IPO.[10] If there is any change in controlling shareholder, we identify the controlling shareholder and the ownership structure on the IPO year from the IPO prospectus, media reports, and the websites of the company and its affiliated

[10] If the controlling owner reorganized ownership structure without changing his/her controlling owner status, it would introduce noise to our sample that biases against our hypotheses. As diagnostic checks, we rerun several key regression analyses using that year 2001 data instead of the IPO-year data (see footnotes 11 and 12).

companies. Most listed state firms are restructured and spun off from parent SOEs prior to their IPOs. The restructuring process is disclosed in the IPO prospectus, which also provides us information about the identities of ultimate shareholder. Company websites and media reports are particularly useful for tracing ownership information of private firms. Specifically, the *New Fortune* Magazine's reports of the top-100 family firms allow us to trace the controlling owners of listed private firms.

In addition to the ownership data, we gather financial data from the China Stock Market and Accounting Research (CSMAR) database. We also put together regional macroeconomic data from sources described in Appendix 1.

We start with the complete list of IPO firms in China during 1993 through 2001. We exclude firms that are controlled by the central government (12% of total population), collectives (4%), other owner types (5%) including the military, public universities, public research institutes, financial intermediaries, and work unions, and firms whose ultimate owners cannot be identified (3%). We also exclude firms whose financial data are unavailable (1%). Our final sample, as described in Table 1, consists of 742 local government-controlled firms and 52 firms controlled by private owners, together represents 70 percent of all IPO firms in China during 1993 through 2001. Due to the small sample size of entrepreneur-controlled firms' IPO, we also include 78 firms, for which the private owners get the control through takeover, in our final sample in addition to the IPO firms, and thus expand our sample size of entrepreneur-controlled firms to 130. As in Table 1, the year-by-year coverage of the sample is also quite representative, covering the majority of IPOs in each year. It is clear that most of the IPOs involve government-controlled firms. However, the IPOs of entrepreneur-controlled firms

increase over time. It's also proved that takeover is more widely adopted as access to stock market by the entrepreneurs than IPOs in recent years.

3.2. Measuring the extents of corporate pyramids

From the disclosed structure of pyramidal ownership chains of each company, we identify the chain(s) connecting the largest ultimate owner and the company in question. We choose the longest pyramidal chain (if there are multiple chains) and then count the number of corporate layers between the ultimate owner and the company in question. We use the number of layers of the longest pyramidal chain as a proxy for the extent of corporate pyramid controlling the company.

Figure 3 provides an example of the pyramidal chains that control Xiamen Prosolar Technology Development Co., Ltd. The company is ultimately owned by four large shareholders, three individuals and a local government. From their ownership positions on the weakest links of the control chains between these owners and the company, we identify that Ren Mei has the largest voting rights 32.41%. We therefore identify her as the largest ultimate owner. Ren Mei controls the company through two pyramidal chains, each goes through two intermediate companies before reaching the company in question. We therefore determine that the company is controlled by Ren Mei through 3-layer pyramids. We also calculate that Ren Mei has only 8.77% cash flow rights of the company, by multiplying the ownership percentages along each of the two pyramidal control chains and then summing up the two numbers. This method of identifying largest owners, and determining voting and cash flow rights is consistent with La Porta, Lopez-de-Silanes, and Shleifer (1999).

Using this method, we measure corporate pyramidal layers for all the sample firms. Table 2 Panel A reports the basic statistics. Among the 742 government-controlled firms, 200 (27%) is directly controlled by local governments, as they are associated with only one corporate layer. Among the 742 firms, 452 (61%) are controlled by two-layer pyramids, 82 (11%) are controlled by three-layer pyramids, and 8 (1%) are controlled by pyramids that are more than four layers. Among the 130 entrepreneur-controlled firms, only one is directly controlled by the largest owner; 78 (60%) are controlled by two-layer pyramids, 39 (30%) are controlled by three-layer pyramids, and 12 (9%) controlled by pyramids of more than four layers. From these statistics, it is clear that pyramidal corporate structure is prevalent in China. In particular, two-layer pyramids, where the listed enterprise is controlled by a government agency through a state asset management company or another SOE, are most popular.

Table 2 Panel B reports the summary statistics of the ratio of the largest ultimate owner's cash flow to voting rights. It shows that government-controlled firms are associated with almost no separation between voting and cash flow rights. This is not surprising because state regulations prohibit local governments from freely selling shares of companies that they directly or indirectly control. By contrast, there is a significant separation between ownership and control of entrepreneur-owned firms. The mean (median) ratio of cash flow to voting rights of the largest owner is 54% (51%). Like the rest of the world, China's entrepreneurs build corporate pyramids that result in divergence of their voting rights from cash flow rights.

3.3. Measuring the determinants of corporate pyramids

In this subsection we discuss the empirical measures that capture (1) local government short- and long-term incentives, (2) market and legal institutions, (3) financial constraints, and (4) management capacity. We also discuss their predicted relations with the extent of corporate pyramid. Appendix 1 provides the definitions and the sources of the macro and institutional variables. Table 3 provides the summary statistics of these variables.

3.3.1. Local government incentives

We employ a few regional macro variables as proxies for local governments' short- and long-term incentives. The first is the unemployment rate of the local government's jurisdiction. The second is a dummy variable equal to one if the local government's fiscal balance (income minus expenditure) is within the top quartile of the sample, and otherwise zero. The third variable is a proxy for the local government's long-term incentive. It is the total research and development (R&D) expenditure of the local government's region scaled by regional gross domestic product (GDP). To be consistent with the decentralization hypothesis, a controlling owner's incentive of building pyramids is expected to be negatively related to the regional unemployment rate, while positively related to the local government's fiscal condition and R&D expenditure.

3.3.2. Market and legal institutions

We use four regional macro variables to proxy for the degree of development of China's regional markets and legal environments. The first variable is a marketization index capturing the overall market development, including the degrees of market competition and government intervention, and the strength of legal environment. The second variable is an index of the quality of legal environment. The third is an index of

property right protection, measuring the number of legal cases and the court's efficiency in resolving these conflicts. These regional indexes, compiled by Fan and Wang (2001), are regarded as reasonable measures of the market and legal conditions of China's diverse regions. In addition, we also use an index of deregulation constructed by Demruger et al. (2002). The index captures the amount of preferential policies granted to the region by the central government. It can be expected that the higher the deregulation index, the more developed is the region's markets. These market and legal discipline variables proxy for the government's degree of incentive alignment towards profit maximization. According to our hypotheses, market and legal discipline is positively associated with the complexity of pyramidal layers of the listed enterprise.

3.3.3. Financial constraints

Empirically measuring the degree of financial constraint of a firm or a business group is difficult. We attempt to do so for the ultimate owner, the entrepreneur himself/herself. *New Fortune*, a business magazine in China, publishes a list of top-400 richest people in China in year 2002. From this list, we collect the absolute wealth of the controlling entrepreneurs of firms in our sample. For the ultimate owner, who does not appear in this list, we set his wealth to be one hundred million, which is the middle value between lowest boundary of the list and zero. We expect that a firm's financial constraint is more severe if its controlling owner has less wealth.

We expect that government-controlled firms are less subject to the financial constraint issue. Nevertheless, we are interested in a few of the above regional macro variables that may reflect a local government's ability to subsidize its firms financially. It can be expect that a government owner is more financially constrained if it faces more

severe unemployment or budget deficit problems. To be consistent with the internal market view, the extents of pyramids of government owned firms should be positively related to the regional unemployment rate while negatively related to regional fiscal health. It is interesting to note that these predicted effects are opposite to those offered by the decentralization incentive.

3.3.4. Management capacity

In addition to the macro variables, we include a few firm-level control variables: firm size, growth, and financial leverage. Firm size is measured as the natural logarithm of total assets. Growth is measured by the market-to-book equity ratio defined as market value of common equity divided by book value of equity, with the market price measured at the end of the first year on which the firm went public. Financial leverage is measured as total debt divided by total sales.

Larger firms are more complex to manage. Firms with higher market-to-book ratios have higher growth opportunities relative to their assets in place. Highly leveraged firms have higher financial burdens. These firms are more likely to be decentralized by controlling owners, providing they are lack of the needed knowledge or management skills relative to local management.

Since governments are more likely to be subject to the management capacity problem than entrepreneurs, we expect that the effects of firm size, market-to-book ratio, and leverage are stronger on government-controlled firms than on firms controlled by entrepreneurs.

3.4. Regression results

We perform regression analysis separately on the sample of government-controlled and entrepreneur-controlled firms. The dependent variable is the number of corporate pyramidal layers, ranging from 1 to 5. Therefore we employ the ordered probit model in the regression analysis. Because a few of the regional macro variables are highly correlated, our strategy is to include these macro variables one at a time in separate regressions. In addition to the regional macro variables and the firm-level variables, we include a regulatory industry dummy, and a set of year dummy variables.[11] The regulatory industry dummy equals one if the firm primary operate in the natural resources, public utilities, finance, or the transportation industry, and otherwise zero. There are totally eight year dummy variables each representing a year during 1994 through 2001. A year dummy variable equals one if the firm went public during that year, and otherwise zero.

3.4.1. Government-controlled firms

Table 4 reports the regression results of the government-owned firms sample. Column (1) reports the results of the basic model including only the firm-level variables. Consistent with the view that local government decentralizes in part due to limited management capacity, corporate pyramid is positively related to the firm size, growth, and financial leverage measures, and is statistically significant for the firm size. Columns (2) through (4) include the government objective variables one by one, in addition to the firm variables and other control variables. The regression results clearly show that

[11] To control for any effects of regional wealth and growth, we include regional GDP and GDP growth as additional independent variables, but fail to find their effects significant. We therefore exclude these variables from the regression analysis.

corporate pyramid is negatively related to the unemployment rate, while positively related to the fiscal health and R&D expenditures of local governments. Column (5) reports the results of the regressions that include all the three regional macro variables, and shows that the effects of unemployment and fiscal condition remain statistically significant. This evidence is consistent with the view that local governments' objectives affect their incentive of decentralizing control of their firms through building pyramids. By contrast, the government owned-firms' pyramidal structures are less likely to be affected by the incentive to relieve financial constraints, as the effects of regional unemployment and fiscal health go against its predictions.

Across the columns, the effects of the firm-level variables are consistent. Whether the firm belongs to a regulatory industry does not matter to its pyramidal structure.

Table 5 reports the results of the regressions that include the market and legal variables, in addition to the firm-level and the government objective variables. The results show that the extent of the pyramids of a government-controlled firm is significantly positively related to the degree of marketization, legal environment development, property rights protection, and deregulation of the region in which the firm operates. After including these variables, the effects of the three government objective variables become weakened. However, the positive effect of government fiscal health remains significant in the model with marketization. The results associated with the remaining firm variables remain similar.[12]

[12] As a diagnostic check, we repeat regressions in Table 4 and 5 using data, not from the IPO year, but from year 2001 during which the data for pyramidal layers are most accurately determined. The results remain qualitatively similar.

Overall, the results in Tables 4 and 5 support the hypothesis that local governments use corporate pyramids to decentralize their control rights of firms to the management.

3.4.2. Entrepreneur-controlled firms

Table 6 reports the regression results of the 130 entrepreneur-controlled firms. Column (1) reports the results of regressions with only firm-level variables. The results show that the pyramid of an entrepreneur-controlled firm is less extensive when the entrepreneur has a deeper pocket (being wealthier). Columns (2) through (8) report the results including the regional macro variables. As the results show, pyramids show little relations with these macro variables. The effects of entrepreneurs' wealth, a proxy for deep pocket, are robust to the inclusion of the macro variables. We also find that pyramid is positively related to firm growth and financial leverage but are insignificantly related to firm size. Whether a firm belongs to a regulatory industry has little effect on pyramid.

We report earlier that, different from those of the government-controlled firms, the pyramids of the entrepreneur-controlled firms are associated with substantial separation between ownership and control. We use the ratio of the controlling owner's cash flow rights to voting rights to capture the separation. In Column (9), we report the results of an ordinary least square regression using the cash flow-voting rights ratio as the dependent variable. The regression results are similar to those in Column (1) when the number of pyramidal layers is used as the dependent variable. We find that the entrepreneurs' wealth has positive effects on the degree of divergence between voting and cash flow rights created by the pyramid, while leverage has a negatively significant

result. As none of the regional macro variables matter to the voting-cash flow rights measure, we do not report these results in the table.[13]

Overall, the evidence in Table 6 suggests that the extent of pyramid of an entrepreneur-controlled firm is related to the entrepreneur's wealth constraint. This lends support to the internal market hypothesis. By contrast, the entrepreneur firm's pyramidal structure is unrelated to the government, market, and legal environment factors that have been shown relevant to the pyramidal structures of the government-controlled firms.

4. Corporate pyramids and IPO initial returns

In this section, we examine the first-day stock returns of the newly listed companies in China. It is well known that the initial returns of IPO stocks are positive relative to the market returns, suggesting that the stocks are "underpriced" immediately prior to their IPOs.[14] The positive initial return, or underpricing, has been attributed to theories related to information asymmetry (Rock, 1986; Allen and Faulhaber, 1989; Welch, 1989 and 1992; Chemmanur, 1993).

We are interested in finding out whether China's capital markets capitalize on the effects of decentralization and internal market creation associated with the pyramidal structures controlling the firms upon their IPOs. If the overall effect of pyramiding is beneficial and the capital markets effectively capitalize on the effect, the return required

[13] We again replicate Table 6 using all year 2001 data and all the coefficients of Rich100 remain significant at the 1% to 5% levels.

[14] Welch and Ritter (2002) provide a comprehensive literature review of underpricing in the US, while Loughran, Ritter, and Rydqvist (1996) document empirical evidence of underpricing across 25 countries. Mok and Hui (1998), Su and Fleischer (1999), and Chan, Wang, and Wei (2003) find evidence of large underpricing in China.

by the investors of the IPO stocks should be lower on the margin to reflect the beneficial effect, all else equal.

4.1. Basic statistics

Table 7 reports the summary statistics of the initial return of the IPO firms by control type and the number of corporate pyramidal layers. The sample size for the government-controlled firms is 706, and that of the entrepreneur-controlled firms is 51. Smaller sample size of government-controlled firms is due to our focus on IPOs after year 1993 with consideration of problems in the stock return and financial data prior to 1993. To mitigate the effects of outliers, we winsorize the top- and bottom-one percent extreme values.[15] However, there are still extremely large initial returns even after the wisorization: the maximum return for both the government and entrepreneur-controlled sample is over 2200%! The overall average (median) IPO initial return is 2.545% (134%) for the government-controlled firms, and 252% (146%) for entrepreneur-controlled firms.

Breaking down by the number of pyramidal layers, we report that, for government-controlled firms, the average initial return is 377% for one-layer firms, 209% for two-layer firms, 225% for three-layer firms, and 150% for firms with four or more layers. The median statistics show a similar pattern: 176% for one-layer firms, 123% for two-layer firms, 112% for three-layer firms, and 138% for four-layer firms. Excluding the eight firms with four or more layers, there appears to be a negative association between the initial return and the number of corporate pyramidal layers. For entrepreneur-controlled firms, there are no clear patterns on the relation between their

[15] We have also tried winsorizing the top- and bottom-five percent extreme values and the regression results in Table 8 and 9 remain unchanged.

initial returns and pyramidal layers, perhaps due to the small number of observations and the existence of extreme returns.

4.2. Regression analysis

We now perform regression analysis to determine if there exist any pricing effects of corporate pyramids upon IPOs. The dependent variable is the initial return. The independent variables include the number of corporate pyramidal layers, firm size measured by log of sales, leverage measured by total debt divided by sales, the initial return of the stock market, and the total proceeds of the IPO. Beatty and Ritter (1986) show that the expected initial return is an increasing function of the uncertainty about the market clearing price of an IPO. We use log of sales and the total proceeds of the IPO to proxy for the uncertainty due to information asymmetry. It is expected that they are negatively related to the IPO underpricing. Similarly, leverage is used in the model to control for the information uncertainty of the IPO quality, because high leverage firms are exposed to more financial distress risks. We expect that the higher leverage, the larger the underpricing. The initial return of the stock market is included to adjust for the market return. The regulatory industry and year dummies are also included to adjust for fixed effects of industry and IPO years.

The initial return can reflect investors' perception on the degree of protection provided by the local government policies, the market disciplines, or legal enforcement. If so, we expect that the stronger are these protections, the lower are the initial returns. To control for the possibility that the pyramid variable simply pick up the effects of government incentives or market and legal disciplines, we alternatively include the

regional market, legal, and government incentive variables as additional explanatory variables in the regression model.

4.2.1. Government-controlled firms

Table 8 reports the ordinary least squares regression results of the government-controlled firm sample. The effects of the firm-level control variables are as expected. Initial return is negatively related to firm size and IPO proceeds. The effects of financial leverage are negative and statistically significant.[16]

The effects of corporate pyramid on initial return are significantly negative across all model specifications, suggesting that the magnitude of underpricing is on average smaller for IPO firms controlled by more extensively pyramidal structures. Interestingly, the effect of the four market and legal discipline variables are all negative and three of them statistically significant, suggesting that investors demand smaller returns when they invest in IPO markets that provide better protection. By contrast, the initial return is related to none of the three variables of government incentives (R&D expenditures, the unemployment rate, and the fiscal heath).

The overall evidence from the table suggests that corporate pyramids are perceived to be beneficial by the investors of the IPO stocks of the government-controlled firms. The benefit, as supported by our findings in the previous section, can be derived from the credible reduction in government intervention due to the high bureaucratic cost associated with the intermediate corporate layers along the pyramid. Moreover, we find that the abnormal returns required by IPO investors of government-controlled firms are

[16] This result is puzzling because it suggests that financial leverage is viewed as a signaling device, the higher the leverage, the better is the IPO quality. However, when total assets or total equity is used as deflator for leverage, the coefficient is positive and statistically significant while our key results remain unchanged.

importantly affected by the degree of investor protection provided through market and legal disciplines. This is a result that has not been documented in the previous literature.

4.2.2. Entrepreneur-controlled firms

Table 9 reports the regression results of the entrepreneur-controlled firm sample. Here we do not find a significant relation between initial return and corporate pyramid. The effects of the market and legal variables are insignificant. None of the government incentive variables show significant effects on initial return. Consistent with the literature, initial return is negatively related to firm size and IPO proceeds. The effects of financial leverage and industry are insignificant. The overall weaker results are perhaps due to the small sample size. However, the insignificant effect of pyramid could mean that there are organizational costs associated with pyramiding, which cancel out any beneficial effects of internal markets.

5. Conclusion

Pyramid is a popular control structure of corporations around the world. We do not know well enough why owners adopt pyramidal structures to control their firms. In this paper, we have reported the first evidence of pyramidal ownership structures of China's newly IPO firms. Similar to many firms around the world, most of the Chinese firms, government- or entrepreneur-owned, are controlled by pyramids. The fast emergence of corporate pyramids is rather surprising, knowing China's short history of modern capitalism.

We have investigated the causes of the formation of corporate pyramids, and have found that the reasons are different between the firms controlled by local governments and the others controlled by private entrepreneurs.

Local governments' incentives of building corporate pyramids are closely related to the inability of freely selling off their shares of SOEs, due to the law prohibiting transfer of state ownership. However, when the pressure for decentralizing their decision rights of SOEs becomes large, the local governments can use the pyramidal structure to decentralize their decision rights of SOEs to firm management. The decentralization is credible because the high bureaucratic costs associated with the pyramids deter ex post intervention by the governments. Consistent with this hypothesis, we find that government-owned firms are associated with more extensive pyramids when local government officers are less burdened with unemployment or fiscal problems, or have stronger long-term incentives as reflected in their R&D expenditures in their jurisdictions. Also consistent with the hypothesis, local governments use more extensive pyramids when their market and legal infrastructures provide strong disciplines that mitigate conflicts of interest between the governments and the firms.

By contrast, the incentives for pyramiding by entrepreneurs in China's growing private sector are insignificantly related to the decentralization factors but are significantly related to financial constraints. China's socialist regime has been unequally treating private sector entrepreneurs and their firms, including less favorable conditions for their external financing. China's emerging financial sectors may also hesitate to provide the needed financing to entrepreneurs, for they are new comers and hence are lack of reputation that is important for obtaining external funds. The entrepreneurs'

alternative is to create internal financial markets that allow cross-subsidization among affiliated firms. Consistent with this internal market view, we find that pyramiding of the entrepreneur owned firms is related to the personal wealth constraints of the entrepreneurs.

We have investigated the pricing effects of corporate pyramids upon the IPO of the firms. Consistent with the beneficial effects of decentralization, we find that government-controlled firms' IPO initial required returns are smaller when these firms are controlled by more extensive pyramids. We have also reported that initial returns are smaller when the IPO firms operate in regions with strong market and legal disciplines to protect investors' interests. However, we do not find the initial returns of the entrepreneur-owned firms related to corporate pyramids, market, or legal environments.

It is interesting to find that in case of Chinese government-owned firms, pyramids and their bureaucratic costs can actually be an advantage, for they facilitate credible decentralization that cannot otherwise be achieved by privatization due to state prohibition. However, bureaucratic costs and decentralization can be important considerations for organizational and ownership design in general, not just for Chinese firms. In particular, when a firm possesses firm specific assets that are subject to high transaction costs, concentrated ownership can be desirable because it helps capitalize the specialized assets. However, the majority owner of the firm may want to provide managers some autonomy so as to improve decision making efficiency. Since dilution of the ownership is undesirable, the owner can alternatively use a pyramidal structure to credibly transfer his/her decision rights to the managers.

Future research could more fully explore the effects of bureaucratic costs and more broadly internal organization costs on the ownership and control structures of firms. More research is also needed to understand the causes and effects of corporate pyramids under similar or different institutional settings.

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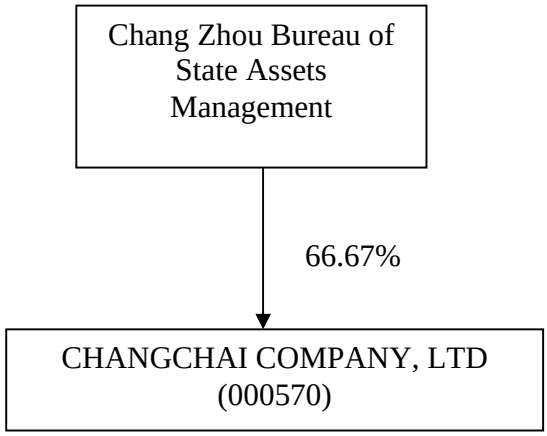
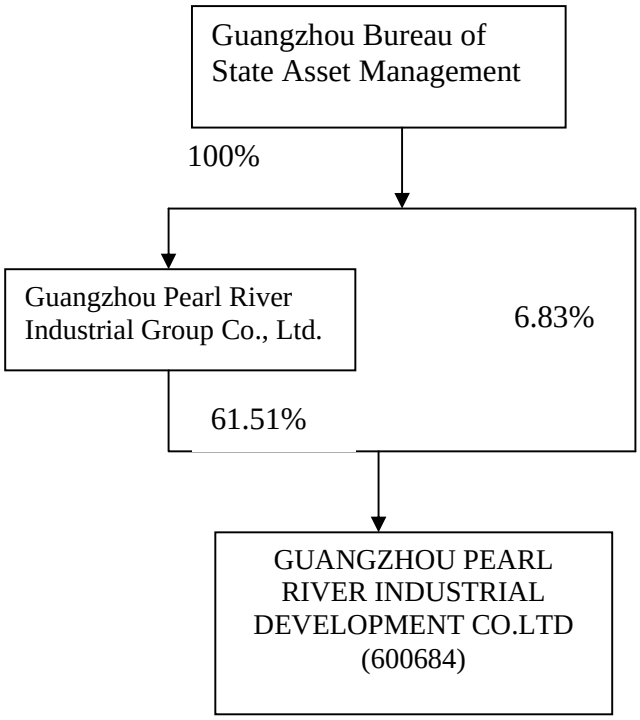
Figure 1
A Listed Company Directly Controlled by A Local Government



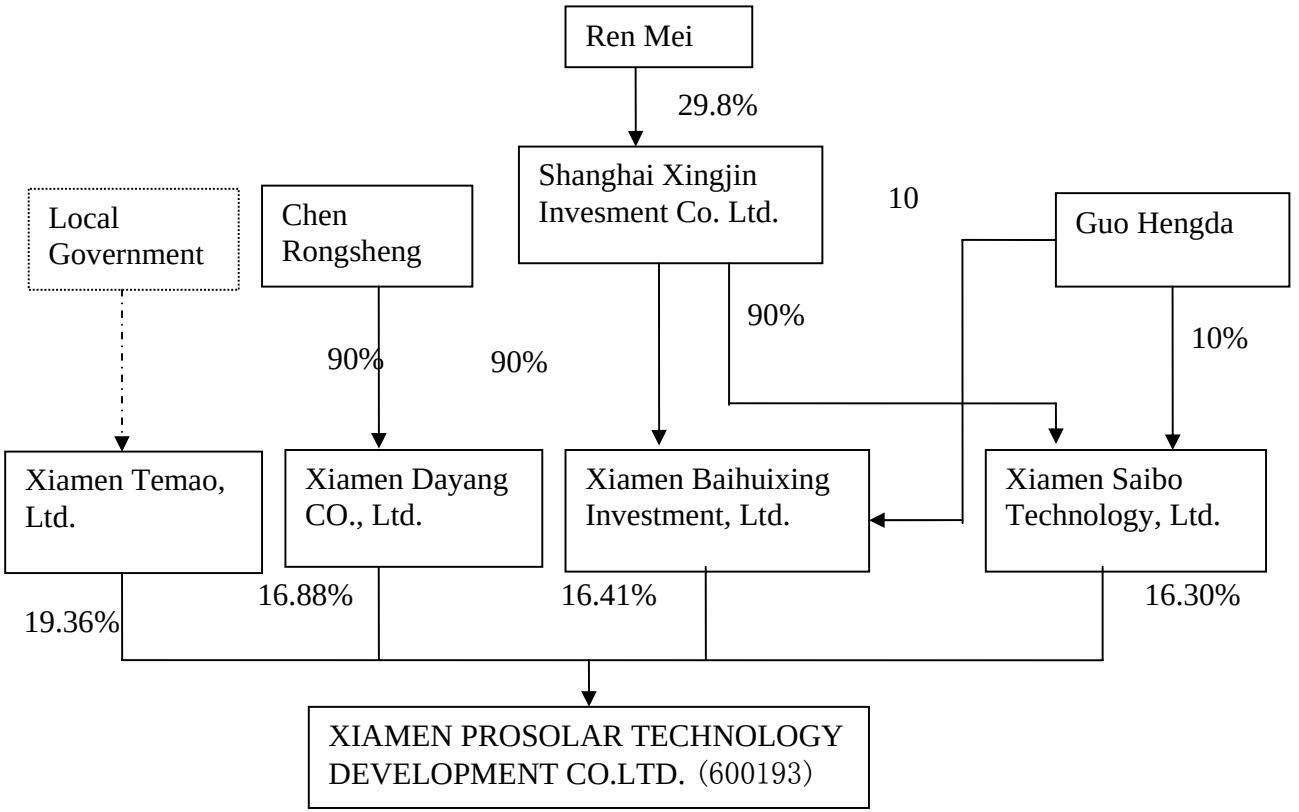
Source: The 1994 Annual Report of Changchai Company, Ltd.

Figure 2
A listed Company Controlled by A Local Government through A Two-layer Pyramid



Source: The 2001 Annual Report of Guanzhou Pearl River Industrial Development Co. Ltd..

Figure 3
Control Pyramids of An Entrepreneur-owned Listed Company



Sources: The 2001 Annual Report of Xiamen Prosolar Technology Development Co. Ltd. and the *New Fortune Magazine* (2001.08).

Table 1

Sample

The sample is composed of 742 local government-controlled firms and 130 firms (52 of which go to public through IPO) controlled by private entrepreneurs, totally representing around 70% of all IPO firms before 2001. To be included in the sample, the ultimate owner must possess over 10% of control rights over listed firms and all data used in the analysis must be available. The identity of ultimate shareholder is identified based on information in annual reports of 2001 and other reference materials in IPO prospectuses, media reports and company websites.

Year	Firms Controlled by Local Government	Firms Controlled by Private Owner			Total IPO Sample	As a percenterage of total IPO firms
		Through IPO	Through Takeover	Total		
Before 1993	36	1	0	1	37	69.81%
1993	93	4	0	4	97	78.23%
1994	79	3	3	6	82	73.87%
1995	17	0	0	0	17	70.83%
1996	133	9	3	12	142	70.30%
1997	134	6	4	10	140	67.96%
1998	74	6	12	18	80	75.47%
1999	61	6	17	23	67	68.37%
2000	65	8	19	27	73	53.28%
2001	50	9	20	29	59	74.68%
Total	742	52	78	130	794	69.65%

Table 2
Corporate Pyramids in China

Panel A: Pyramidal Layers

This panel reports the distribution of the number of corporate pyramidal layers, which is defined to be one when a state asset management agency directly controls the listed firm, two when there is an intermediate company between the government agency and the listed firm, and so on. The number of pyramids is counted from the longest control chain in case of multiple chains.

Number of Corporate Layers	Government-controlled Firms		Privately-controlled Firms	
	N	Percentage(%)	N	Percentage(%)
1	200	26.95	1	0.77
2	452	60.92	78	60.00
3	82	11.05	39	30.00
>=4	8	1.08	12	9.23
Total	742	100	130	100

Panel B: Ratio of Cash Flow to Voting Rights

Ratio of cash flow to voting rights of the ultimate controlling owner captures the divergence between these two rights.The calculation of cash flow and voting rights follows the procedure in La Porta et al (1999).

	N	Mean	Median	Std. Deviation	Min	Max
Government-controlled Firms	742	0.97	1.00	0.11	0.11	1.00
Privately-controlled Firms	130	0.54	0.51	0.25	0.07	1.00

Table 3
Descriptive Statistics of Independent Variables

Total Assets is the log of total assets by the end of IPO year; M/B is the market value divided by book value of total equity at the end of IPO year; Leverage is the total liability divided by total sales; Total Assets, M/B and Leverage are all winsorized at top and bottom 1%. Due to the data problem prior to 1993, we substitute with data of 1993 for firms went public before 1993. Wealth is the absolute value of entrepreneurs' personal wealth disclosed by *New Fortune* in a survey on Top-400 richest in China in 2002, if the ultimate owner is not in the list, we set his wealth to be one hundred million, the middle point of lowest boundary of the list and zero; Marketization, Legal Environment and Property Rights are indexes compiled by Fan and Wang (2000) to capture the development of markets, legal environment and protection for property rights at the provincial level for year 1999 and 2000; Deregulation, an index compiled by Demruger et al. (2003) based on the preferential policies granted to the provinces, measures the level of deregulation and competition of a region; R&D, which includes expenditures on fundamental research, application research, experimental development and capital construction for scientific research in regions in year 2000, is collected from the National Bureau of Statistics; Unemployment is the officially reported unemployment rate for each year at the provincial level; Fiscal surplus is a dummy variable, which equals to 1 if the fiscal surplus is in the top quartile of all the provinces and 0 otherwise. A more detailed description of these macro variables are presented in Appendix 1.

	N	Mean	Median	Std. Deviation	Min	Max
Government-controlled Firms						
Total Assets	742	20.44	20.35	0.85	18.78	23.13
M/B	742	4.28	3.97	1.90	0.99	16.58
Leverage	742	0.99	0.72	1.42	0.12	20.02
Privately-controlled Firms						
Wealth (100 Million)	130	4.24	1.00	6.72	1.00	52.40
Total Assets	130	20.16	20.23	0.71	18.78	22.76
M/B	130	7.14	5.78	4.79	0.00	25.80
Leverage	130	1.71	1.08	2.30	0.12	16.09
Macro Variables						
Markitzation	30	5.71	5.57	1.38	2.75	8.26
Legal Environment	30	5.12	5.03	1.20	2.44	7.75
Property Rights	30	6.22	6.32	1.48	2.53	8.85
Deregulation	30	0.92	0.67	0.68	0.33	2.86
R&D(%)	30	0.89	0.61	1.15	0.11	6.30
Unemployment(%)	220	3.06	3.20	1.12	0.40	7.40
Fiscal Surplus(%)	220	0.25	0.00	0.43	0.00	1.00

Table 4
Regression Results of the Determinants of Corporate Pyramids of Government-controlled Firms (I)

The dependent variable is the number of corporate pyramidal layers between government and listed firm. Definition of independent variables is presented in Table 3. In addition Regulated Industry equals one if the firm is in the resources, public utilities, finance, or transportation sectors. All of the regressions include year dummies (not reported). Ordered probit model is adopted.. Z-value is reported in parentheses. Asterisks denote levels of statistical significance: *** 1%, ** 5%, and * 10%.

Independent Variables	(1)	(2)	(3)	(4)	(5)
Unemployment		-0.123			-0.064
		(-3.65)***			(-1.92)*
Fiscal Surplus			0.539		0.410
			(2.35)**		(1.86)*
R&D				0.109	0.048
				(3.01)***	(1.07)
Total Assets	0.211	0.183	0.184	0.199	0.171
	(3.43)***	(3.17)***	(3.18)***	(3.31)***	(3.12)***
M/B	0.048	0.044	0.040	0.049	0.040
	(1.49)	(1.33)	(1.19)	(1.53)	(1.21)
Leverage	0.017	0.019	0.018	0.020	0.020
	(0.5)	(0.55)	(0.5)	(0.55)	(0.54)
Regulated Industry	0.131	0.116	0.138	0.129	0.127
	(0.81)	(0.68)	(0.86)	(0.78)	(0.76)
N	742	742	742	742	742
Pseudo R-square	0.079	0.084	0.088	0.084	0.091

Table 5
Regression Results of the Determinants of Corporate Pyramids of Government-controlled Firms (II)

The dependent variable is the number of corporate pyramidal layers between government and listed firm. Definition of independent variables is presented in Table 3. In addition Regulated Industry equals one if the firm is in the resources, public utilities, finance, or transportation sectors. All of the regressions include year dummies (not reported). Ordered probit model is adopted for all four models. Z-value is reported in parentheses. Asterisks denote levels of statistical significance: *** 1%, ** 5%, and * 10%.

Independent Variables	(1)	(2)	(3)	(4)
Markitzation	0.092			
	(1.92)*			
Legal Environment		0.183		
		(3.09)***		
Property Rights			0.102	
			(2.77)***	
Deregulation				0.240
				(2.12)**
Unemployment	-0.020	0.041	-0.011	-0.013
	(-0.42)	(0.69)	(-0.28)	(-0.27)
Fiscal Surplus	0.420	0.285	0.288	0.326
	(2.02)**	(1.55)	(1.4)	(1.46)
R&D	0.066	0.037	0.068	0.085
	(1.33)	(0.74)	(1.4)	(1.54)
Total Assets	0.155	0.139	0.159	0.147
	(2.78)***	(2.61)***	(2.97)***	(2.61)***
M/B	0.037	0.035	0.038	0.033
	(1.11)	(1.08)	(1.16)	(1.02)
Leverage	0.020	0.016	0.014	0.012
	(0.55)	(0.4)	(0.36)	(0.3)
Regulated Industry	0.112	0.086	0.106	0.097
	(0.71)	(0.53)	(0.61)	(0.65)
N	742	742	742	739
Pseudo R-square	0.095	0.100	0.096	0.102

Table 6

Regression Results of the Determinants of Corporate Pyramids of Entrepreneur-controlled Firms

For model (1) through model (8), the dependent variable is the number of corporate pyramidal layers between entrepreneur and listed firm. Ordered probit model is adopted for all eight models. The z-values are reported in parentheses. For Model (9), the dependent variable is the ratio of cash flow to voting rights. Ordinary least squares method is adopted for estimating this model. T-statistics are reported in parentheses. Definition of independent variables is presented in Table 3 and Appendix 1. In addition Regulated Industry equals one if the firm is in the resources, public utilities, finance, or transportation sectors. All of the regressions include year dummies (not reported). Asterisks denote levels of statistical significance: *** 1%, ** 5%, and * 10%.

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Markitzation					-0.023				
					(-0.31)				
Legal Environment						-0.105			
						(-0.94)			
Property Rights							-0.106		
							(-1.06)		
Deregulation								-0.025	
								(-0.24)	
Unemployment		0.131							
		(1.51)							
Fiscal Surplus			-0.060						
			(-0.15)						
R&D				-0.096					
				(-1.23)					
Wealth	-0.199	-0.212	-0.200	-0.191	-0.203	-0.224	-0.235	-0.198	0.051
	(-2.63)***	(-2.74)***	(-2.69)***	(-2.3)**	(-2.81)***	(-3.41)***	(-3.49)***	(-2.65)***	(2.36)**
Total Assets	0.103	0.117	0.109	0.092	0.104	0.148	0.168	0.097	0.030
	(0.6)	(0.66)	(0.52)	(0.53)	(0.58)	(0.67)	(0.71)	(0.51)	(0.74)
M/B	0.054	0.057	0.056	0.054	0.055	0.062	0.065	0.054	-0.004
	(4.79)***	(4.97)***	(2.71)***	(5.15)***	(4.18)***	(3.53)***	(3.02)***	(4.33)***	(-0.78)
Leverage	0.069	0.068	0.070	0.070	0.070	0.071	0.071	0.070	-0.017
	(2.95)***	(3.24)***	(2.95)***	(3.13)***	(2.89)***	(3.35)***	(3.11)***	(2.81)***	(-1.73)*
Regulated Industry	0.048	0.006	0.035	0.044	0.033	0.010	0.092	0.027	-0.045
	(0.10)	(0.01)	(0.07)	(0.09)	(0.07)	(0.02)	(0.17)	(0.06)	(-0.37)
N	130	130	130	130	130	130	130	128	130
Pseudo R-square	0.076	0.079	0.076	0.078	0.076	0.082	0.085	0.075	0.11

Table 7
Corporate Pyramids and IPO Initial Returns (Underpricing)
Initial return is the difference between the IPO-day closing price and offering price divided by the offering price. The return is winsorized at top- and bottom-one percent.

Layers	N	Mean	Median	Std. Dev.	Min	Max
Government-controlled Firms						
1	184	3.770	1.761	4.840	0.007	22.290
2	439	2.090	1.233	3.340	0.007	22.290
3	76	2.282	1.119	3.568	0.007	18.270
>=4	7	1.500	1.381	0.834	0.352	2.632
Total	706	2.545	1.344	3.864	0.007	22.290
Privately-controlled Firms						
1	1	2.081	2.081	.	2.081	2.081
2	34	3.033	1.437	4.535	0.065	22.290
3	13	1.556	1.559	0.698	0.442	2.454
>=4	3	1.140	0.929	0.486	0.801	1.700
Total	51	2.527	1.462	3.770	0.065	22.290

Table 8
Regression Results of the Effects of Corporate Pyramids on the IPO Initial Returns of Government-controlled Firms

The dependent variable is IPO initial return measured as the difference between the IPO-day closing price and offering price divided by the offering price. Sales is the log of total sales in IPO year; Leverage is the long-term liability divided by total sales in IPO year; Market Return is the return of the corresponding market of the IPO firm on the initial return day; Proceeds is the total amount raised from IPO standardized by total equity at the IPO year end. Other independent variables are defined in Table 3 and Appendix 1. In addition Regulated Industry equals one if the firm is in the resources, public utilities, finance, or transportation sectors. The regressions also include year dummies (not reported). Ordinary least squares regression is adopted for all the models. The t-statistics, in absolute terms, are reported in parentheses. Asterisks denote levels of statistical significance: *** 1%, ** 5%, and * 10%.

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Layers	-0.410	-0.362	-0.398	-0.354	-0.423	-0.446	-0.453
	(2.09)**	(1.83)*	(2.01)**	(1.80)*	(2.15)**	(2.27)**	(2.30)**
Markitzation	-0.227						
	(2.38)**						
Legal Environment		-0.255					
		(2.32)**					
Property Rights			-0.141				
			(1.61)				
Deregulation				-0.560			
				(3.50)***			
Unemployment					0.126		
					(0.96)		
Fiscal Surplus						0.275	
						(0.72)	
R&D							0.073
							(0.64)
Log(sales)	-0.838	-0.825	-0.864	-0.839	-0.862	-0.883	-0.890
	(6.83)***	(6.67)***	(7.08)***	(6.90)***	(6.99)***	(7.26)***	(7.28)***
Leverage	-0.213	-0.200	-0.206	-0.193	-0.217	-0.224	-0.223
	(2.33)**	(2.18)**	(2.24)**	(2.12)**	(2.37)**	(2.45)**	(2.43)**
Market Return	-2.179	-1.760	-1.864	-1.782	-2.144	-2.154	-2.152
	(0.50)	(0.40)	(0.43)	(0.41)	(0.49)	(0.49)	(0.49)
Proceeds	-9.832	-9.750	-9.708	-9.936	-9.673	-9.602	-9.675
	(15.86)***	(15.79)***	(15.70)***	(16.04)***	(15.64)***	(15.34)***	(15.64)***
Regulated industry	-0.436	-0.396	-0.457	-0.398	-0.473	-0.490	-0.505
	(1.04)	(0.94)	(1.09)	(0.95)	(1.12)	(1.17)	(1.20)
Constant	27.321	26.942	27.230	26.602	25.917	26.498	26.799
	(10.99)***	(10.89)***	(10.89)***	(10.77)***	(9.94)***	(10.62)***	(10.77)***
Observations	706	706	706	703	706	706	706
R-squared	0.34	0.34	0.34	0.35	0.34	0.34	0.34

Table 9
Regression Results of the Effects of Corporate Pyramids on IPO Initial Returns of Entrepreneur-controlled Firms

The dependent variable is IPO initial return measured as the difference between the IPO-day closing price and offering price divided by the offering price. Sales is the log of total sales in IPO year; Leverage is the long-term liability divided by total sales in IPO year; Market Return is the return of the corresponding market of the IPO firm on the initial return day; Proceeds is the total amount raised from IPO standardized by total equity at the IPO year end. Regulated Industry equals one if the firm is in the resources, public utilities, finance, or transportation sectors. Other independent variables are defined in Table 3 and Appendix 1. Ordinary least squares regression is adopted for all the models. The regressions also include year dummies (not reported). The t-statistics, in absolute terms, are reported in parentheses. Asterisks denote levels of statistical significance: *** 1%, ** 5%, and * 10%.

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Layers	-0.930	-0.914	-0.889	-1.041	-1.050	-0.933	-0.882
	(1.41)	(1.43)	(1.38)	(1.56)	(1.65)	(1.46)	(1.40)
Markitzation	0.028						
	(0.08)						
Legal Environment		0.223					
		(0.55)					
Property Rights			0.176				
			(0.47)				
Deregulation				0.370			
				(0.61)			
R&D					-0.604		
					(1.21)		
Unemployment						0.927	
						(0.66)	
Fiscal Surplus							0.533
							(1.12)
Log(sales)	-1.292	-1.392	-1.382	-1.394	-1.519	-1.380	-1.166
	(1.70)*	(1.81)*	(1.78)*	(1.82)*	(2.00)*	(1.82)*	(1.57)
Leverage	0.141	0.186	0.157	0.291	0.285	0.251	0.365
	(0.13)	(0.18)	(0.16)	(0.28)	(0.29)	(0.25)	(0.36)
Market Return	-14.726	-16.393	-15.311	-18.524	-18.599	-14.477	-16.254
	(0.69)	(0.80)	(0.75)	(0.87)	(0.92)	(0.72)	(0.82)
Proceeds	-10.897	-10.824	-10.899	-10.686	-10.648	-11.089	-11.413
	(4.38)***	(4.69)***	(4.74)***	(4.58)***	(4.69)***	(4.84)***	(4.97)***
Regulated industry	-1.538	-1.302	-1.471	-1.273	-1.339	-1.510	-1.932
	(0.75)	(0.68)	(0.79)	(0.66)	(0.74)	(0.82)	(1.05)
Constant	39.029	39.472	39.464	40.253	44.800	39.955	36.763
	(2.78)***	(2.83)***	(2.83)***	(2.87)***	(3.09)***	(2.86)***	(2.64)**
Observations	51	51	51	51	51	51	51
R-squared	0.59	0.59	0.59	0.59	0.60	0.59	0.60

Appendix 1
Definitions of Macro Variables

Variable	Description	Sources
Marketization	This is a comprehensive index that captures the regional market development of the following aspects: (1) relationship between government and market, such as role of market in allocating resources and enterprises' burden in addition to normal taxes; (2) development of non-state business, such as ratio of industrial output by private sector to total industrial output; (3) development of product market, such as regional trade barrier; (4) development of factor market such as FDI and mobility of labor; (5) development of market intermediaries and legal environment such as protection of property rights. We use the average of the 1999 and 2000 indexes in our analyses.	Fan and Wang (2001)
Legal Environment	A component of marketization index, which measures the development of market intermediaries, protection of property rights, protection of copyrights and consumers. We use the average of the 1999 and 2000 indexes in our analyses.	Fan and Wang (2001)
Property rights	A component of the index of legal environment, which measures (1) market order, calculated based on total economic legal cases standardized by GPD of the region, and (2) court efficiency, a ratio of the solved legal cases to total cases received. We use the average of the 1999 and 2000 indexes in our analyses.	Fan and Wang (2001)
Deregulation	The amount of preferential treatments granted to the region by central government to set up special economic zones from 1978 to 1998.	Demruger et al. (2002)
Unemployment (%)	The unemployment rate officially reported data for each province from 1993 to 2001.	China Information Bank
Fiscal Surplus	A dummy variable, equals one if the fiscal surplus standardized by GDP is among the top quartile in the country, and zero otherwise.	China Information Network Data Co., Ltd.
R&D (%)	Expenditures on fundamental research, application research, experimental development and capital construction for scientific research in the region.	National Bureau of Statistics