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Family Business Groups and Organizational Structure: A Study of Bank Pyramidal Ownership in Thailand

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Abstract

This paper investigates how banks and finance companies operate in a family business group. Using uniquely detailed ownership data from Thailand, we find that the controlling families extensively use pyramids to control banks and finance companies and assign different lending strategies across pyramidal tiers. Lower-tier banks tend to extend loans more aggressively and perform more poorly, while upper tier banks carry out more pro table investments. After the crisis hit, upper-tier banks survived and almost all lower-tier banks went bankrupt. Our results suggest that the multilayer organizational structure of bank ownership can affect a bank´s lending behavior and its resistance to economic shocks.

Keywords: Family business group, Pyramid, Ownership structure, Family-owned Bank, Thailand

JEL Classifications: G21, G32

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Abstract

This paper investigates how banks and finance companies operate in a family business group. Using uniquely detailed ownership data from Thailand, we find that the controlling families extensively use pyramids to control banks and finance companies and assign different lending strategies across pyramidal tiers. Lower-tier banks tend to extend loans more aggressively and perform more poorly, while upper tier banks carry out more profitable investments. After the crisis hit, upper-tier banks survived and almost all lower-tier banks went bankrupt. Our results suggest that the multilayer organizational structure of bank ownership can affect a bank's lending behavior and its resistance to economic shocks.

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1 Introduction

A growing body of research shows that a significant number of banks and finance companies in many countries around the world are family owned (Caprio, Laeven, and Levine, 2007). For example, Hong Kong's largest locally owned bank, the Bank of East Asia, is owned by the David Li family. Sweden's largest bank, the SEB Bank, is controlled by the Wallenberg family. In Chile, the Banco de Chile is controlled by one of the country's wealthiest families, the Luksić family. In the Philippines and Indonesia, more than two-thirds of the banks are family owned. Turkey presents a more extreme case where almost all banks are owned by families. Many top finance companies in India are also owned by family business groups. Despite the prevalence of family group involvement in the financial and nonfinancial sectors (e.g., La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002), there is very little systematic evidence documenting how families own banks and other financial institutions.

Our study extends the existing literature by showing how banks operate as part of a family-owned business group. We use data from Thailand prior to the 1997 East Asian financial crisis as almost all Thai commercial banks and finance companies, hereafter called banks, belonged to business groups owned by wealthy families.

We begin our analysis by detailing the organizational ownership structure of an entire family business group. Our detailed ownership data allow us not only to draw a broader picture of the family business group but also to precisely define where banks are situated within the group. We find that pyramids were extensively used to control banks and firms. Figure 1 shows the ownership and control structure of the Ayudhya Group, owned by the Ratanarak family. Prior to the crisis, this group owned one commercial bank, one finance company, two insurance companies, and a number of other nonfinancial companies. To control the Bank of Ayudhya, the family owned only 0.18% directly; but controlled 31.6% of voting rights and 21.40% of cash flow rights in the bank[1] via an ownership arrangement with the other 13 group companies.

[1]Similar evidence that groups have survived despite the crisis is also observed in other East Asian countries, namely Malaysia, Korea, Taiwan, and Singapore. Khanna and Yafeh (2007) provide a detailed discussion of this issue.

In our sample, the controlling family owned, on average, 21.2% of cash flow and 27.7% of voting rights. Interestingly, we find no relationship between the ratio of cash flow rights to voting rights—a proxy commonly used to measure the expropriation problems caused by pyramids—and various profitability and performance variables, namely return on assets (ROA), return on equity (ROE), and Tobin's q.

This evidence casts doubt on the traditional view that pyramids are organized for the expropriation of minority shareholders. Theoretically, if expropriation were the main objective, the controlling family should hold a small percentage of cash flow rights to minimize expropriation costs. Our evidence, however, contradicts the expropriation hypothesis and is in fact consistent with evidence from other countries: Europe, Canada, Turkey, India, and Brazil. Section 2 provides a detailed discussion.

In addition, expropriation cannot be conducted routinely as investors would price such practices and consequently the family would end up bearing higher costs of capital. As recent studies have also pointed out, it does not make sense for the family to organize pyramids to maximize expropriation (Khanna and Yafeh, 2007).

Another hypothesis is that pyramids provide financial advantages. When structuring a group in a pyramid the controlling family chooses a firm's position in addition to determining the number of shares to own (Morck and Nakamura, 2004). The family has more direct ownership of firms that are important to them and these firms rank higher in the pyramid.

We build on this argument by showing that pyramids also serve to insulate the entire group as well as the family from negative returns. The family designs investment strategies based on the position of the firms in the pyramid. Firms lower in the pyramid are used to undertake risky investments, while the firms nearest the apex carry out safer investments. If risky investments are unprofitable the lower-tier firms can be sold and the group does not lose significant control over other group firms.

Thai banks provide a unique research setting to identify the risk-taking mechanisms of family business groups using a simple and clear variable: loan growth. Prior to the 1997 crisis, loans were almost the only investment undertaken by Thai banks, accounting for more than 90% of their assets. Therefore the bank's lending behavior alone conveys

important information on future cash flows and solvency.[2] High loan growth indicates high risk taking if banks have high exposure to the real estate sector, which is vulnerable to economic conditions. In fact, by 1996, the loan exposure of the real estate sector in Thai bank was around 30-40% of total loans with a value of US$160 billion.

This period also marked an economic downturn for Thailand as shown by the GDP growth rate and the Thai Stock Market index (Figures 2A and 2B). Starting in 1993 the market index declined. The two-digit GDP growth rate sustained in 1988-1990 declined to single-digit growth in 1991 and onwards. Given this economic situation, the families would have to carefully design the investment strategies of their entire group.

The banks in our sample are classified into upper- and lower-tier banks based on their location in the pyramid controlled by the founding family. In both upper- and lower-tier banks, the family holds a very similar ownership stake as measured by cash flow and voting rights. According to the expropriation hypothesis, upper- and lower-tier banks should exhibit similar performance. Instead we find that lower-tier banks are associated with having 50% more loan growth and markedly lower profitability than upper-tier banks—21% lower in terms of ROA and 50% lower in terms of ROE. Our results, therefore, do not support the expropriation hypothesis.

When the crisis hit Thailand about 70% of the upper-tier banks survived and remained family owned. In contrast, almost all of the lower-tier banks were either nationalized or sold. In the process the family groups not only survived but also remained wealthy and still control many companies (Polsiri and Wiwattanakantang, 2006).

While our empirical evidence shows correlations and does not necessarily establish a causal effect, the results are consistent and support our hypothesis: pyramids allow the families to protect the entire group as well as themselves by concentrating risky projects in lower-tier firms and also to minimize negative shocks when the risky investments do not pay off.

This paper is part of an ongoing study of pyramids beyond their role for expropria-

[2] In contrast it is very complicated to analyze the risk taking behavior of non-financial firms as they have diversified investment portfolios. In fact researchers in the corporate finance literature have to use much noisier and inaccurate variables—beta, standard deviation of cash flows, capital expenditure, and research and development expenditure—to measure the risk taking of non-financial firms.

tion. In particular, pyramids provide financial advantages by allowing the family to pool the group firms' retained earnings to finance new investments. Almeida and Wolfenzon's (2006a) rigorous model shows that the controlling family places new firms, which generate smaller profits, lower down in the pyramids. The negative relationship between the family's ownership and firm performance is therefore by selection and does not necessarily imply expropriation. Empirical evidence based on Korean *chaebols* (Almeida, Park, Subrahmanyam, and Wolfenzon, 2011) and international firms (Masulis, Pham, and Zein, 2011) supports this hypothesis. We cannot investigate the selection hypothesis for our sample, however, because the Thai Ministry of Finance ceased issuing licenses for banks and finance companies in 1977. Our dataset does not therefore include any new banks.

The remainder of this paper is organized as follows. In Section 2, we review the existing literature on pyramids and develop the testable hypotheses. Section 3 describes the data and sample. Section 4 presents the empirical results. In Section 5, we discuss what happened to banks in different locations in the pyramids after the 1997 financial crisis. Section 6 discusses the alternative hypotheses. Section 7 concludes the paper.

[Figure 1, Figure 2A and 2B about here]

2 Hypothesis development

2.1 Related literature

Extensive studies have emerged in recent years addressing the ambiguities surrounding the creation of business groups, particularly the question of why business groups are typically organized as pyramids. The conventional view argues that a pyramidal structure is adopted by the controlling family to maintain or increase its control of several firms within the business group. Pyramids create a separation of ownership from control that allows families to divert resources among the firms at the expense of minority shareholders (e.g., Johnson, La Porta, Lopez-de-Silanes, and Shleifer, 2000; Morck, Wolfenzon, and Yeung, 2005). A large body of empirical research finds that group firms with a divergence of cash flow rights

and control rights have lower firm valuations.[3]

The traditional view is challenged by recent empirical findings, however. Numerous studies show that in many countries the controlling family owns large cash flow stakes that are more than enough to achieve control of the firms. Pyramids also do not necessarily separate cash flow rights from voting rights. Almeida and Wolfenzon (2006a) provide a detailed discussion and evidence from many countries. Attig, Fischer, and Gadhoum (2004) find that in the case of Canadian firms, the average controlling family owns 31.78% of the cash flow rights. Faccio and Lang (2002), Dermirag and Serter (2003), and Valadares and Leal (2000) find that in the case of firms in Europe, Turkey, and Brazil, the separation of ownership and control is minimal. Similarly, Polsiri and Wiwattanakantang (2006) find that in the case of nonfinancial companies in Thailand, the controlling family owns about 39% of the cash flow rights.

Khanna and Yafeh (2007) and Almeida and Wolfenzon (2006a), among others, raise several questions refuting the traditional view: What induces outside investors to invest in situations in which their investments are likely to be expropriated? As shown by Faccio, Lang, and Young (2001) and Morck, Strangeland, and Yeung (2000), if the expropriation reflected high dividends or low equity prices, why would the controlling family continue to design an ownership structure to maximize it? Does the negative relationship between pyramidal ownership and firm performance always imply expropriation?

A growing body of research has provided other rationales for building pyramids. Numerous studies argue that pyramids create a group's internal capital market (e.g., Shin and Park, 1999; Friedman, Johnson, and Mitton, 2003; Cestone and Fumagalli, 2005; Almeida and Wolfenzon, 2006a, 2006b). The ability to use the retained earnings of existing group firms allows the controlling family to design their investment strategies. By pooling and transferring funds, group firms can share the costs of low-profit investment. In addition, Khanna and Yafeh (2005) show that internal capital markets provide efficient mutual insurance or risk sharing among group firms, in particular in countries where external financial markets are underdeveloped. This feature is a source of group value that might compensate

[3]See Bertrand, Mehta, and Mullainathan (2002); Claessens, Djankov, Fan, and Lang (2002); Mitton (2002); Lins (2003); Lemmon and Lins (2003); and Joh (2003).

outside investors for the expropriation risk.

In this study, we extend this analysis by testing whether ownership structure affects the investment decisions of the group's firms. We examine cases in which the separation of ownership and control is insubstantial.

2.2 Hypotheses

We develop our hypotheses based on the argument put forward by Morck and Nakamura (2004). In this study, they analyze the ownership structure of the 10 major zaibatsu family-owned business groups during the pre-World War I period in Japan. Morck and Nakamura (2004) argue that the controlling family does not only carefully select what stakes each company should own in other group firms but also each firm's placement within the group. Core firms that the family considers important to the group are closer to the apex, while noncore firms are lower in the pyramid. This ownership structure facilitates tunneling, as income and assets can be concentrated in the upper-tier firms. Losses and debts, however, are channeled through the lower-tier firms. For example, in the Mitsui, Mitsubishi, and Sumitomo *zaibatsu*, banks were considered the core business and hence were near the apex of the pyramid. However, in the Suzuki *zaibatsu*, the group's bank was not its core firm and hence was situated deep down in the pyramid. The bank was used to provide loans to other group firms. The bank failed due to the high concentration of its loans in group's firms that suffered financial distress.

We extend this argument by investigating the banks' lending decisions. We hypothesize that pyramids can reduce the negative impact on the group's overall net return when the economic environment is unfavorable. Figure 3 illustrates the basic idea. Family Z owns a bank and a number of other firms in the business group. We present two cases of different ownership structure. In Case 1, Bank X is in the second tier, indicating the importance of this bank for the controlling family. In Case 2, Bank Y is in the third tier, indicating that Bank Y is not a core firm for this family. With both Bank X and Bank Y, however, the ratio of ownership to control rights in the hands of the family is exactly the same.

In both cases, the expropriation hypothesis predicts that the degree of expropriation by

the controlling family should be the same for Bank X and Bank Y. Hence, Bank X and Bank Y should have similar performance. The expropriation hypothesis is silent about investment strategies across firms in the pyramid tiers. However, our risk-sheltering hypothesis predicts that Bank Y located at a lower-tier than Bank X will have lower performance.

Because the family has great concern for the stability of the entire group, the family would therefore assign investment projects based on risk levels to different firms according to their location in the pyramid tier. Lower tier banks should undertake riskier projects than banks in upper tiers.

As our focus is on lending behavior, our hypothesis suggests that Bank Y is more likely to extend riskier loans. Bank X, which is in an upper tier, is more likely to hold safer loans. By definition, riskier loans have a higher pay-off in good states than safer projects. In bad states, however, the return of riskier projects is less than that of safer projects. Hence the return of Bank Y is lower than that of Bank X. When the downside of these risky loans is extremely high, the family can also decide to sell poorly performing banks in lower tiers. In Case 1, if the family relinquishes Bank X, the group will lose control of two companies, B and C. In Case 2, however, the controlling family will lose control of Company C if Bank Y is liquidated. Pyramids, therefore, make the entire group less sensitive to negative shocks.

Suppose an extreme case where the family owns 100% of all firms and banks in the pyramidal tiers. The expropriation hypothesis predicts no expropriation and no difference in performance across the firms in different tiers. As shown earlier, pyramids do provide risk-sheltering advantages, for example, by allocating higher risk projects to lower tier banks. And our hypothesis predicts that these banks might end up having lower performance under poor economic circumstances.

Finally, when compared to a horizontal ownership structure, pyramids can also help the family to minimize *personal* risk exposure to corporate bankruptcy as well as lawsuits. In limited circumstances the Thai courts can, as in many other countries, "pierce the corporate veil." That is, the separate legal personality of a company is disregarded, and controlling shareholders become subject to the legal consequences of the company's acts. Therefore, if the family owns numerous firms directly—a horizontal ownership structure—it might expose

itself to personal risk and lawsuits. In contrast, the longer control chain in a pyramid—firms owning other firms—could shield the family against potential lawsuits and provide better protection of personal assets.

[Figure 3 about here]

3 Data

3.1 Sample

We focus on all commercial banks and finance companies that were listed on the Stock Exchange of Thailand during 1992–1996. Because our focus is on the role of family control, we exclude state-owned financial institutions. Our final sample consists of 215 bank-year observations representing 13 commercial banks and 36 finance companies. The number of banks varies each year due to exit and entry patterns within the exchange. The sample coverage accounts for 71.2% of the total assets of the financial sector. Table 1 describes the sample. Hereafter, "banks" will be used to refer to both commercial banks and finance companies in our sample.

It should also be noted that most of the banks were founded by wealthy families. These family-owned banks had long enjoyed a high degree of protection against competition from both local and foreign competitors in two important ways. First, there was a moratorium on the granting of new licenses by the central bank. Second, until the financial crisis in 1997, foreign shareholding was limited to 25%.

[Table 1 about here]

3.2 Ownership data

To construct the ownership structures of family groups and trace ultimate ownership, we use the standard method suggested by La Porta, Lopez-de-Silanes, and Shleifer (1999); Claessens, Djankov, and Lang (2000); and Faccio and Lang (2002). In this study, we adopt a threshold of 10% control rights to define the ultimate owner.

We use a number of databases to trace ultimate ownership. The main source of the ownership data is the companies' annual reports (FM 56-1). The annual reports are reproduced by the Stock Exchange of Thailand in two databases, the I-SIM CD-ROM and the SETSMART online service. The FM 56-1 file includes shareholders with shareholdings of at least 0.5% and a list of affiliated companies and their shareholdings. We also use the Business On Line (BOL) database to obtain the ownership information of nonlisted companies. BOL is the sole agent with a license from the Ministry of Commerce to reproduce the accounting and ownership information of all companies registered at the Ministry of Commerce.

We treat all family members as well as companies ultimately owned by these members as a single shareholder to account for the fact that it is a common practice in Thailand for businesses to be closely tied to an extensive family. A shareholder, therefore, includes individuals with the same surname as well as extended families linked through marriage. Surnames can be used to trace family relationships as family names in Thailand are unique and only people belonging to a family may use that family's name.

We use multiple data sources to identify family trees. The FM 56-1 file provides the information on the relationships between the major shareholders and the board members. For established families, we were able to trace family relationships using various documents that provide a genealogical diagram of the top business group families. Brooker Group (2001) provides the list of the top 150 families, the affiliated companies, and family relationships. Sappaiboon (2000; 2001) provides detailed information on family trees of the upper 100 families. For less established families, however, we were unable to trace the relationship beyond the last name and the family information provided in the FM 56-1. Therefore, some of our financial data may underestimate the real value held by such families.

3.3 The pyramidal structure

In the following analysis, we draw the ownership structure to identify which tier banks inhabit within a family business group. We stop drawing pyramidal tiers when all banks and other listed companies that a family owns are identified. We present an example of ownership structure to illustrate our database and variables. Figure 1 shows the ownership

structure of the Ratanarak family group as of 1996. This group is also known as the Ayudhya Group and illustrates how we allocate the firms to each of the pyramidal tiers and calculate cash flow and voting rights. The Ratanarak family forms an enormous pyramid with both financial and nonfinancial companies. The group also owns seven publicly traded firms and is indeed one of the most complicated cases in our sample.

The Ratanaraks own one bank, the Bank of Ayudhya PCL. (BAY), and one finance company, the Ayudhya Investment and Trust PCL. (AITCO). We focus primarily on these two banks, as they are part of our sample. Both BAY and AITCO are controlled by the Ratanarak family, characteristically through a pyramid of companies that have shares with a variance between cash flow and voting rights.

The Ratanarak family places five holding companies at the apex of the pyramid—the Ratanarak Company, the K Group, the CKR Company, Super Assets, and CKS Holding—to control other companies within the group. Besides these holding companies, the Bangkok Broadcasting & TV Co.Ltd. (BBTV), which operates a military TV channel, is also positioned at the apex. The Ratanaraks directly control 29.3% of the voting rights and 26.2% indirectly, via CKS Holding. Since there are more direct shareholdings than indirect shareholdings, we place BBTV in the first tier. BBTV in turn owns the following three holding companies: Great Luck Equity (30% of the votes), Great Fortune Equity (100% of the votes), and BBTV Asset Management (25% of the votes). Great Fortune Equity and BBTV Asset Management are therefore placed in the second tier of the pyramid.

The mechanism the Ratanarak family used to control BAY is not straightforward. The Ratanaraks directly own only a 0.18% stake in BAY. But a control arrangement with 13 group companies gives the family control over 31.6% of voting rights and 21.4% of cash flow rights in BAY. Each of these 13 companies actually owns a small stake that ranges from 0.57% to a maximum of 5%. Since 17.24% of the voting rights in BAY are held by the group's first-tier firms, we place BAY in the second tier.

The Ratanaraks also control another three listed companies in the financial services industry that are in the third tier. We present only the ownership of AITCO because it is a finance company that appears in our sample. The other two companies, Ayudhaya Insurance

PCL. (AYUD) and Ayudhaya Jardine CMG Life PCL. (AYUCO), are insurance companies and are not in our sample. The Ratanaraks control 59.63% of the voting rights and 35.45% of the cash flow rights of AITCO. Their direct ownership constitutes only 9.21%. The rest is controlled through a chain of companies, namely BAY (10%), Super Assets (3.58%), Great Luck Equity (8%), Great Fortune Equity (6.23%), BBTV (7.05%), CKS Holding (5.33%), AYUD (4.1%), and AYUCO (6.13%). We place AITCO in the third tier in the pyramid because its voting rights are concentrated in the second-tier companies, specifically BAY (10%), Great Luck Equity (8%), and Great Fortune (6.23%).

In sum, the placement of companies appears to be consistent with the fact that banking has been the Ratanarak family's primary line of business since the group was established in the 1960s. Accordingly, BAY has served as a core firm of the group, which explains its position near the apex. The group later diversified into other financial services and insurance. Another significant expansion was the addition of nonfinancial businesses, namely construction materials. Therefore, the bank is in a high tier, with the other firms filling the lower tiers.

4 Empirical analysis

In this section, we investigate how a pyramidal ownership structure affects a bank's lending behavior and its profitability. Our hypothesis is that banks near the lower tiers on the pyramid are more likely to extend risky loans. Therefore, lower-tier banks will in theory generate smaller profits.

4.1 Methodology

4.1.1 Locations of banks in pyramids

We begin this analysis by classifying the banks in our sample based on their location in the pyramid. Table 2A exhibits the results. We observe four tiers in the pyramid. None of the banks was placed in the first tier. Banks were concentrated mostly in the second and third tiers. Only three banks were placed in the fourth tier. Due to the small sample size of the

fourth-tier banks, we could not compare the banks' investment activities and profitability by specific tier. Therefore, in the following analysis, we classify the banks into two groups: upper tier and lower tier. A bank is classified in the upper tier if it is in the second tier. A bank is classified in the lower tier if it is located in the third or fourth tier. The upper-tier banks account for 33% and the lower-tier banks 67% of the total sample.

Table 2B shows the ultimate ownership stake of the controlling family. The findings for sample as a whole show that the controlling family owns a relatively large stake. The mean voting rights is 27.7%, while the mean cash flow rights is slightly lower, at 21.2%. The mean deviation of banks' ownership and control rights in our sample is 0.73, which is relatively low. In the upper-tier banks, on average the controlling family owns 23.3% of the cash flow rights and 28.9% of the voting rights. In the lower-tier banks, the controlling family owns 20.3% of the cash flow rights and 27.1% of the voting rights. The univariate tests show that ownership by the controlling family is not significantly different between the upper-tier and lower-tier banks.

4.1.2 Definition of risky investments and profitability

We consider high loan growth as a sign of risky investment because the banks were operating in an economic downturn starting from around 1993, which might reflect fewer "good" lending opportunities. To respond to the economic environment, banks should have sought new investment opportunities and reduced corporate and real estate loans. Many banks, however, aggressively extended real estate loans. The banking literature also shows that banks with excessive loan growth are risky: loan growth is associated with low profitability, low capital ratio, high loan losses, and low bank solvency (e.g., Foos, Norden, and Weber, 2010).

Capital ratio might not be a good measure of risk-taking behavior for banks because capital ratios are influenced by various factors besides bank investment strategies. In particular, banks are constrained by regulations to maintain a minimum capital requirement. Also, capital ratios are strongly influenced by government guarantees such as implicit and explicit deposit insurance, the "too big to fail" policy, and lender of last resort support,

which have been applied in Thailand since the early 1990s. Many studies show that banks may have a target capital ratio, minimizing capital ratio variation (Berger, DeYoung, Flannery, Lee, and Oztekin, 2008; Memmel and Raupach, 2010). In fact, there is remarkably little variation in capital ratios in our sample. As shown in Table 3, the mean capital ratios is 9.9% for upper-tier banks and 10.4% for lower-tier banks, and the difference is not statistically significant at the conventional levels.

To investigate whether or not lending is excessively risky, we relate loan growth to profitability. Specifically, if lending were risky, it would be associated with low profitability. We measure profitability by the ratio of earnings before taxes to total assets (ROA) and the ratio of net income before extraordinary items to total equity (ROE).

[Table 2A and Table 2B about here]

4.2 Univariate analysis

In this section, we run univariate tests comparing loan growth, profitability, and other firm characteristics of the upper- and lower-tier banks. Table 3 presents results that strongly support our hypothesis. The lower-tier banks have higher loan growth and lower profitability than the upper-tier banks. The t-statistics of the test of means (t-test) and the z-statistics of the test of medians (Wilcoxon rank-sum test) are strongly significant at the 1% level. Average loan growth is 31% for the lower-tier banks, which is significantly higher than the 20.9% for the upper-tier banks. As for profitability, the average ROA for the lower-tier banks is 1.9%, which is significantly lower than the 2.7% of the upper-tier banks. Similar results are observed for the ROE.

Regarding other firm characteristics, apart from the fact that upper-tier banks are significantly larger than lower-tier banks, both groups are similar in terms of the ratio of equity-to-total assets, the ratio of total loans to total assets. The market valuations measured by Tobin's q and market-to-book ratio are also not different between two groups.

[Table 3 about here]

4.3 Multivariate analysis

4.3.1 Model specification

We employ regression analysis to investigate whether a bank's location in the pyramid is related to its lending behavior and profitability. We conduct two regressions. First, the loan growth regression uses the one-year growth rate of the total outstanding loan as the dependent variable. Second, the profitability regression uses the pre-tax earnings divided by total assets, or ROA, as the dependent variable.

Our main independent variable is "*lower tier.*" It is set to one if the bank is in the third and fourth tier and zero otherwise. We estimate the effect of the bank's tier on loan growth and profitability. The benchmark banks are therefore the upper-tier banks.

In the loan-growth regression we control for the effect of cash flow by including ROA (Molyneux, Remolona, and Seth, 1998). Profitability generates internal cash flow and improves a bank's lending capacity (Houston, James, and Marcus, 1997). Banks might curtail lending when experiencing a shortage of investment funds or when banks' health deteriorates (Peek and Rosengren, 1997).

In the profitability equation, we include loan-growth to control for the quality of the bank's portfolio (Molyneux, Remolona, and Seth, 1998). Traditional lending activities are regarded as risky investments compared to investment in non-interest activities (Demirguc-Kunt and Huizinga, 2010). High loan growth is associated with high risk-taking if banks extend loans to negative NPV projects; lower lending standards; or lower collateral requirements. The greater the exposure to such loans, the higher the chance of loan default, and the lower the bank's profitability. We also include squared loan growth to control for any nonlinear effects of loan growth on profitability.

We use a number of independent variables to control for their effects on loan growth and profitability.

Ownership. The higher the ownership stake, the stronger the owner's incentive to pursue value maximization activities. We measure ownership using two variables: 1) the percentage of the family's cash flow rights; and 2) the ratio of the cash flow to control rights. According

to the expropriation hypothesis, banks in which the family has higher cash flow rights should experience higher profitability. The expropriation hypothesis, however, does not offer any prediction on investment strategy or loan growth.

Equity-to-asset ratio. Equity-to-asset ratio or capital ratio is defined as the bank's equity divided by total assets. Capital ratio indicates a bank's capital availability to absorb unexpected losses due to bad loans or other activities. The effect of capital ratio on bank risk-taking behavior and performance is unclear a priori. On one hand, capital ratio is a measure of bank solvency (Berger, 1995). Low capitalized banks face higher bankruptcy risk and are more likely to have difficulty raising additional funding from uninsured sources such as bonds (Bourke, 1989). Such banks have to rely on more costly funding sources and also forgo profitable lending opportunities (Peek and Rosengren, 1995; 1997). Low capitalized banks may also have less incentive to engage in the screening and monitoring of borrowers, which increases their exposure to loan defaults resulting in poorer performance (Calomiris and Kahn, 1991). On the other hand, banks are highly leveraged and by nature they may engage in more risk-taking, as is well documented in corporate finance theory (Acharya, Mehran, Schuermann, and Thakor, 2012; Admati, DeMarzo, Hellwig, and Pfleiderer, 2013).

Size. We use the logarithm of total assets as a proxy for size. Size captures various aspects of banks and may affect lending and profitability both positively and negatively. On one hand, larger banks are likely to have lower risk due to lending to larger firms (Berger, Miller, Petersen, Rajan, and Stein, 2005). Large banks are also perceived as less likely to fail. So large banks should have better access to sources of funding (Peek and Rosengren, 1997) and will therefore have greater lending capacity and be more profitable. On the other hand, large banks could face scale inefficiency from high agency problems and lack of managerial expertise (Berger, Hanweck, and Humphrey, 1987; Berger, Hasan, and Zhou, 2009). In addition, the implicit guarantee of "too-big-to-fail" is well known for undermining the market discipline of large banks. In fact, Bertay, Demirguc-Kunt, and Huizinga (2013) find that large banks have higher risk and lower return on assets, in particular in small countries.

Other control variables. We control for bank types by including a dummy variable,

finance company, that is one for finance companies and zero otherwise. Year dummies are included to control for economic conditions and the effect of regulation changes.

4.3.2 Main results

We employ the following two sets of regression techniques. First, we use the pooled Ordinary Least Squares (OLS) regression analysis in which standard errors are adjusted by clustering at the bank level. Second, we employ the random-effects panel data model to address potential biases arising from individual bank heterogeneity. Fixed-effects regressions are not feasible in our analysis because there is no within-bank position variation in the pyramids. In other words, our main explanatory variable, lower tier, is a time-invariant variable. We also perform Breusch and Pagan's (1980) Lagrange multiplier tests to examine whether errors are independent (OLS vs. random effects). Our results are robust when we use the two-stage least squares (2SLS) estimation technique to address potential concerns about the endogeneity of loan growth and profitability in the robustness check section.

Pyramidal tiers and loan growth

Table 4 reports the regression results when the dependent variable is loan growth. The results are consistent with the univariate tests. The estimated coefficients on the *lower tier* dummy variable are positive and strongly significant at the 1% level in all of the regressions. The evidence suggests that banks in the lower tiers tend to pursue a more aggressive lending policy than banks in the upper tiers of the pyramid. The estimated coefficients indicate that on average the lower-tier banks extend more loans than the upper-tier banks by about 9.5 percentage points.

Interestingly, in all of the regressions, none of the estimated coefficients on the ownership variables, cash flow rights or the ratio of cash flow to control rights, is statistically significant. These results support our hypothesis that location in the pyramids does matter in explaining the variation in loan growth.

The coefficients are as expected for the control variables. We find that bank size is negatively and significantly associated with loan growth. The results suggest that larger

banks are more reluctant to pursue riskier lending than smaller ones. Highly-capitalized banks appear to have lower loan growth. We find that more profitable banks tend to lend more. Lending behavior does not appear to be different between the commercial banks and finance companies.

Pyramidal tiers and profitability

In Table 5, we present the regression results of the relationship between the pyramidal tiers and profitability. Consistent with the univariate tests, we find that the estimated coefficients on the lower tier dummy variable are negative and strongly significant in all models at the 1% level. The regression results indicate that on average the ROA of the lower-tier banks is about one percentage point lower than that of upper-tier peers.

Similar to the previous regression results for loan growth, the estimated coefficients on cash flow rights and the ratio of cash flow to control rights are statistically insignificant in all models. This suggests that there is no relationship between the ownership variables and profitability.

The estimated results for other control variables are as expected. The results indicate that larger banks are more profitable than smaller banks. We find a strong correlation between equity-to-total assets ratio and profitability. Concerning the relation between profitability and loan growth, the estimated coefficients are not significant in all the OLS regressions. In the random-effects regressions, loan growth is positively associated with profitability. Finally, we find that finance companies are more profitable than commercial banks.

In sum, we find that banks situated lower in the pyramids are associated with poorer performance than those near the apex. The magnitude of the estimates indicates that the difference in profitability between lower- and upper-tier banks is economically significant. The ROA of lower-tier banks is about 1 percentage point lower than upper-tier banks. This difference in ROA is remarkable as it indicates a profitability gap of more than 21% over the average lower-tier bank's ROA of 1.9%. Making risky loans may be one of the reasons lower-tier banks perform more poorly than upper-tier banks. Our empirical results indicate that banks in the lower tiers extend more loan than upper-tier banks, by about 9.5 percentage

points. This 9.5 difference represents about 48.3% of the average lower-tier bank's loan growth of 31% and therefore is of important economic significance. As lower-tier banks have significantly lower profitability than upper-tier banks, these results suggest that loan growth can be considered risky.

Overall, our results are consistent with our hypothesis that families adopt their ownership structure to maximize the growth and stability of the group. We find that lower-tier banks associated with more loan growth and smaller profitability than upper-tier banks. Indeed, the fact that many lower-tier banks eventually failed after the 1997 financial crisis is consistent with our hypothesis. We will discuss the banks' fate in Section 5.

[Tables 4 and 5 about here]

4.3.3 Robustness checks

To check the robustness of our findings, we performed the following analyses.

Alternative measures of performance

Return on equity (ROE). ROE is defined as the ratio of net income before extraordinary items to the book value of equity. As suggested by Berger and Bouwman (2013), ROE is a comprehensive profitability measure because banks must allocate capital against every off-balance sheet activity they undertake. Hence, net income and equity both reflect the bank's on- and off-balance-sheet activities.

Table 6 presents the regression results. Our major finding remains the same. The estimated coefficients on the lower tier are negative and strongly significant at the 5% and 1% levels. The coefficients indicate that lower-tier banks' ROE is about 8.4 percentage points lower than that of upper-tier banks. In unreported results, we repeat the analysis using net interest margin as an alternative measure of a bank's profitability. The results are qualitatively similar to our main findings.

Market valuation. We follow the corporate finance literature by using Tobin's q and the market-to-book ratio. Tobin's q is total assets minus the book value of common equity and plus the market value of common equity divided by total assets. The market-to-book ratio is

defined as the market value of common equity divided by the book value of common equity. The regression results show that the market valuation of upper- and lower-tiers banks are not different.

Market-based performance measures have limitations, in particular in the case of banks. Unlike non-financial firms, a bank's equity is regulated via minimum capital requirements. In our sample, Thai banks maintained a low equity-to-total assets ratio of about 10% (Table 3) and there is very little variation across the sample. Tobin's q only evaluates the market value of equity, which is a very small part of total assets. Further, stock price movements in emerging economies may be less useful as processors of economic information than in advanced economies—they may be due to either politically driven shifts in property rights or noise trading (Morck, Yueng, and Yu, 2000).

The banking literature rarely uses market valuation as a performance measure. Insofar as there is no definitive evidence indicating that banks manipulate accounting in a systematic manner accounting data should provide reliable results. In fact, using ROA is very common in the literature. For example, ROA is used by Bertrand, Johnson, Samphantharak, and Schoar (2009) in their study on Thai business groups and by Masulis, Pham, and Zein (2011) in their study on business groups using international data.

Alternatives measures of risky investments

Abnormal loan growth. Abnormal loan growth is defined similarly to Foos, Norden, and Weber (2010) as the difference between a bank's loan growth rate and the median loan growth rate of all banks for the same year. This variable takes into account not just the bank level but also the loan market condition of the entire banking industry. Banks that have higher loan growth rates than their peers are considered risky if they lend to negative NPV projects, reduce interest rates, or grant loans with insufficient collateral. Our main results remain the same and are not reported here.

Alternative measures of pyramid tiers

We use the methodology introduced by Almeida, Park, Subrahmanyam, and Wolfenzon (2011) to construct an alternative measure of pyramid tiers. This methodology is a weighted

average positioning measure that takes into account the ultimate ownership by the family when a bank is owned by at least two affiliated firms. Each layer where the affiliated firm is located is given a weight according to the ultimate cash flow rights held by the family. The final position is then obtained by summing the weighted positions. The results obtained from this alternative pyramid tier variable are similar to our main results and are not reported here.

Potential multicollinearity problems

One might argue that commercial banks were located in upper-tiers while finance companies dominate the lower-tiers so our results are driven by finance companies. We test whether our regressions might suffer from the multicollinearity problem where the two variables finance company and lower tier are highly correlated.

First, the correlation coefficient of the lower-tier dummy variable and the finance company dummy variable is 0.29 indicating there is no strong relationship between the two variables. Second, we re-run the two sets of loan growth and ROA regressions separately for each of the dummy variables finance company and lower tier. Table 8 reports the regression results. The results of the first set (lower tier only), are presented in column 2. The results of the second set (finance company only) are presented in column 3. For comparison the main results (both lower tier and finance company) are presented in column 1. All results are very similar in terms of both magnitude and sign and remain strongly significant. The results indicate that our main regressions are less likely to suffer from multicollinearity problems.

In addition, we run regressions on a sub-sample that only includes finance companies. The results are reported in column 4. Our main results remained unchanged. Lower-tier finance companies are positively related to loan growth and negatively related to ROA. The estimated coefficients of the lower tier dummy are larger than the results of all samples in loan growth regressions and are the same in ROA regressions.

Endogeneity between loan growth and profitability

We address potential concerns about the endogeneity of loan growth and profitability. We employ the two-stage least squares (2SLS) estimation technique and estimate two equa-

tions in which loan growth and performance are simultaneously determined (Molyneux, Remolona, and Seth, 1998). To identify the equations system, we add one instrumental variable to the loan-growth and profitability equations. In the loan-growth equation, we include the rate of loan growth for the previous year. In the profitability equation, the ratio of staff costs to total operating expenses is included. Our findings are robust compared with those of the estimation method. In the loan-growth regression, the estimated coefficients on the lower-tier dummy are positive and statistically significant at the 5% level. In the ROA and ROE regressions, the estimated coefficients on the lower-tier dummy are negative. The coefficients are strongly significant at the 1% level in all regression models for ROA and at the 5% level for ROE. The estimates from the 2SLS regressions are also close to the estimates using the OLS and the random-effects methods. The results of Durbin-Wu-Hausman tests indicate that the pooled OLS estimates are unlikely to be biased due to the endogeneity problem.

[Tables 6 and 7 about here]

5 Did family-owned banks prevail after the financial crisis?

In this section, we investigate what happened to the banks after the 1997 financial crisis. If banks located in lower tiers undertook risky loans, lower-tier banks were more likely to be hit harder by the crisis and hence would be in financial trouble. We define a bank as failed if it was either closed down or nationalized by the government. Table 8 shows the number of banks in 2003 compared with the number in 1996. Banks were categorized based on their placement in the pyramids. Interestingly, we find that the survival rate of banks in upper tiers is significantly higher. About 70% of the banks in the second tier survived, while only 10% of the third-tier banks survived. None of the three banks locating in the fourth tier survived. This evidence indicates that the family allocated risky investment to lower-tier banks.

Interestingly, all the business groups that owned banks survived the crisis. They dramatically reorganized the pyramidal ownership structure (Polsiri and Wiwattanakantang,

2006). For example, the Ratanarak group became more focused on the financial services business, in particular the Bank of Ayudhya (BAY), which was the family's strength. The family relinquished their controlling stake in other businesses, namely Siam Cement City (SCCC), Karat Sanitaryware (KARAT), and many other companies in the construction business.

This evidence suggests that the pyramidal organizational structure and investment strategy shield the family making it less vulnerable in the event of a crisis.

[Table 8 about here]

6 Alternative hypotheses

Our findings are consistent with the risk-sheltering hypothesis and cannot be explained by alternative hypotheses. A brief discussion follows.

The expropriation hypothesis

If expropriation is the main objective for setting up pyramids, the controlling shareholder should hold very small cash flow rights and have large voting rights to control the firms' corporate policies. This creates a large separation between ownership and control in lower-tier firms versus upper-tier firms. The expropriation hypothesis predicts poorer performance for the firms with a large ownership and control gap.

Our findings do not support this hypothesis. In contrast, we find that pyramids do not necessarily create such a separation between ownership and control. In our sample, the family's ownership of lower-tier banks and upper-tier banks is not significantly different. Also, the family held large cash flow rights even in lower-tier banks: on average 23.3% of upper-tier banks and 20.3% of lower-tier banks (Table 2B). Our regression results in Tables 4-6 show that the ratio of cash flow to voting rights does not relate to loan growth and profitability.

As ownership is similar for upper and lower-tier banks, the expropriation hypothesis predicts that these two types of bank would have similar performance. In contrast, we find

that lower-tier banks are associated with lower profitability than upper-tier banks. All these results are inconsistent with the expropriation hypothesis.

The selection hypothesis

This hypothesis predicts that the family will use the group's internal capital markets to finance start-ups, and therefore places these new ventures at lower tiers. We cannot investigate this hypothesis, however, as our dataset does not include any new banks.

To establish a commercial bank or finance company in Thailand, one has to obtain a license from the Ministry of Finance. However, the Ministry of Finance, however, stopped issuing such licenses in 1977.[4] The Bank of Thailand also restricted the operations of foreign banks, only allowing offshore operations, and strictly limited the number of new domestic and foreign market entrants.

The regulation hypothesis

One might argue that Thai regulations explain the pyramidal organizational structure. For example, pyramids are used to shelter the group's assets from government interventions (Fan, Wong, and Zhang, 2013). Unlike neighboring countries, however, there has been no case of government harassment of corporate sectors in Thailand even among the Chinese ethnic group who dominate big businesses.

7 Conclusion

This paper investigates family-owned banks in Thailand. We begin our analysis by examining the ownership structure of banks and nonfinancial firms that have the same ultimate owner. Our investigation shows that some wealthy families own an extensive empire that includes banks and other nonfinancial firms in various industries. The mechanisms that the families use to control these firms are pyramids. We find that on average families set up pyramids of four tiers. A number of holding companies were placed at the apex. These

[4] A major reform occurred only recently in 2008 when the Financial Institutions Business Act (FIBA) replaced more than a dozen existing laws governing the operations of financial institutions. As a result of the new licensing regime, the number of licensed financial institutions has declined to 38 as of March 2010 (Baxter, 2010).

holding companies controlled other firms in the family group. About one-third of the banks in our sample were in the second tier in the pyramids, categorized as upper-tier banks. The other two-thirds were in the third and fourth tiers, classified as lower-tier banks.

We find that lower-tier banks are associated with more loans and perform more poorly than upper-tier banks. This result suggests that lower-tier banks might undertake risky investments. We show that these results are robust compared with those of different measures of performance and regression methods. Interestingly, we find that while most upper-tier banks survived after the crisis, most lower-tier banks failed.

This evidence is consistent with the notion that the controlling shareholder chooses not only what stakes to hold in each firm but also where to place the firms in the pyramids. In addition, we show that location in the pyramids is indeed relevant, as the controlling shareholder can choose different investment strategies for each firm. While "good investment" is concentrated in upper-tier firms, lower-tier firms are more likely to engage in risky investment. This ownership setting, therefore, can insulate the entire group from the adverse effect in "bad states" if an investment does not pay off, in which case the controlling family is able to maintain control over the other firms by selling poorly performing firms in the lower tiers.

Our results suggest that the regulatory authorities should not only look at the feasibility of extending banking licenses to the family groups; the control framework should also look at where the banks or the finance companies will be placed in the pyramid structure and how much direct control the controlling shareholders exercise on the banks owned within the business group.

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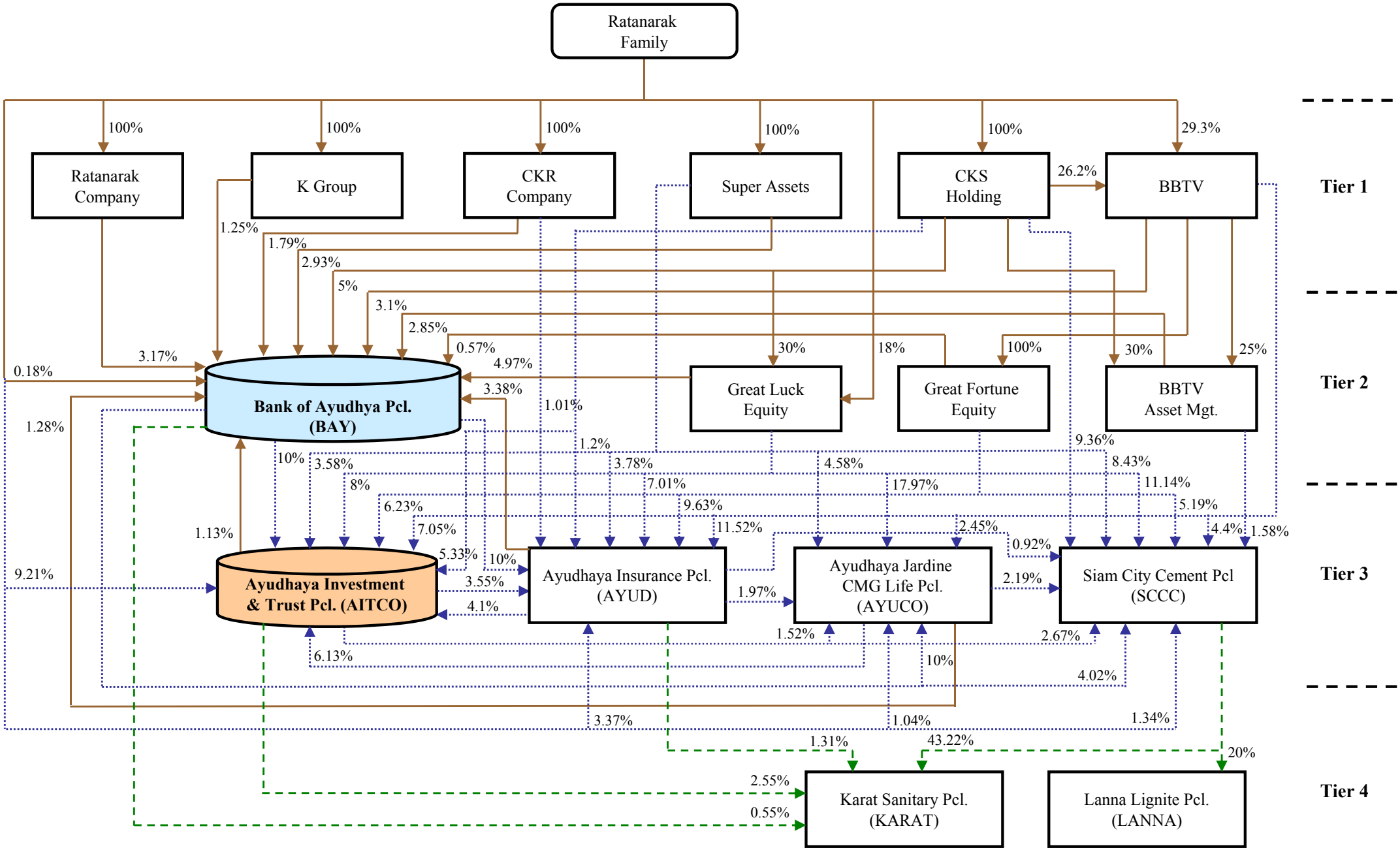
Figure 1: The Ratanarak business group



BAY: Ownership "O" = 21.40%, Control rights "C" = 31.60%, Ratio of ownership to control rights ("O/C") = 0.6772
AITCO: Ownership "O" = 35.45%, Control rights "C" = 59.63%, Ratio of ownership to control rights ("O/C") = 0.5945

Figure 2A: The annual percentage growth rate of GDP of Thailand

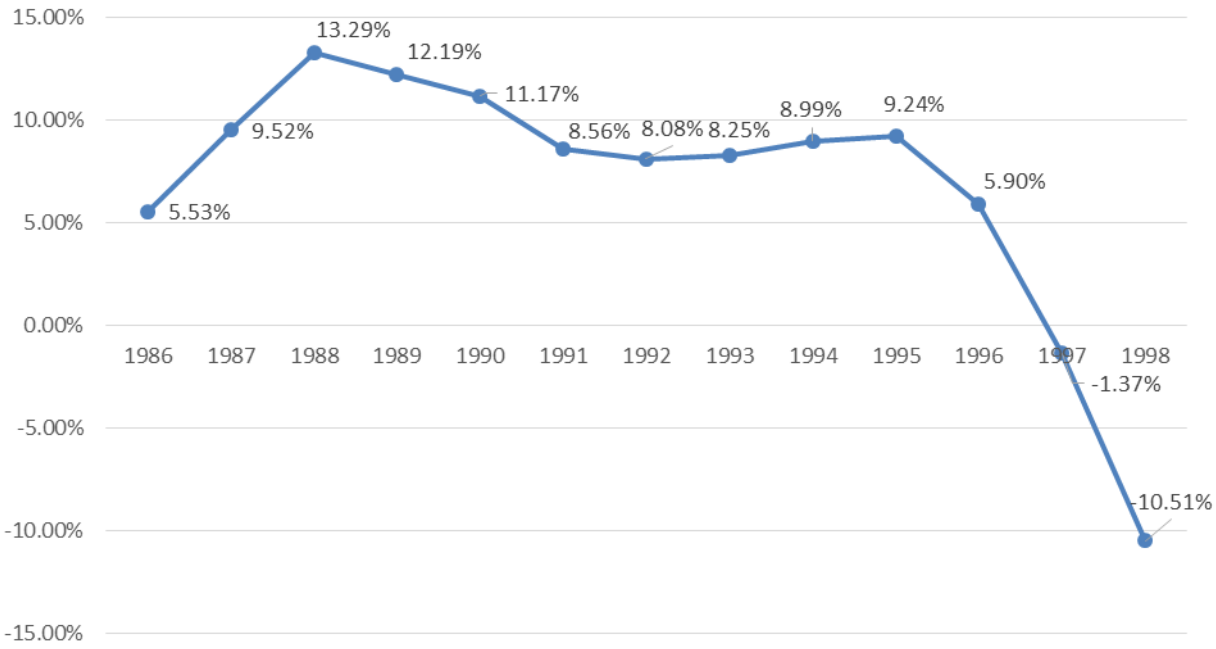


Figure 2B: Stock Exchange of Thailand (SET) Index

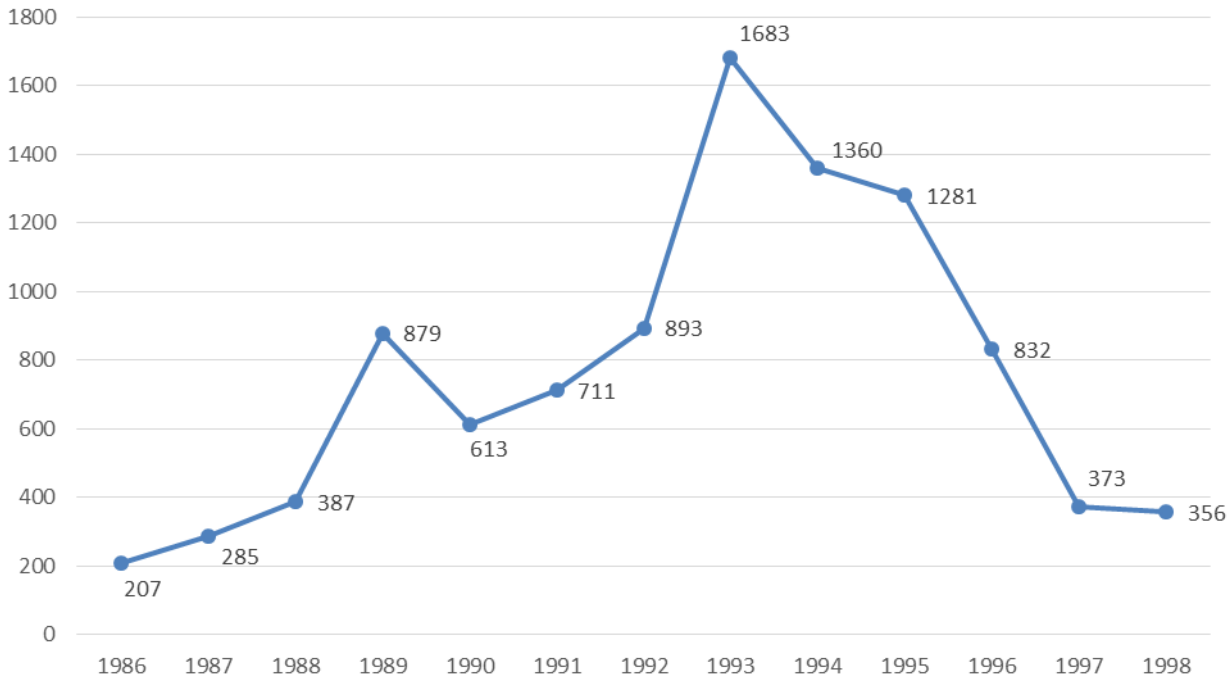
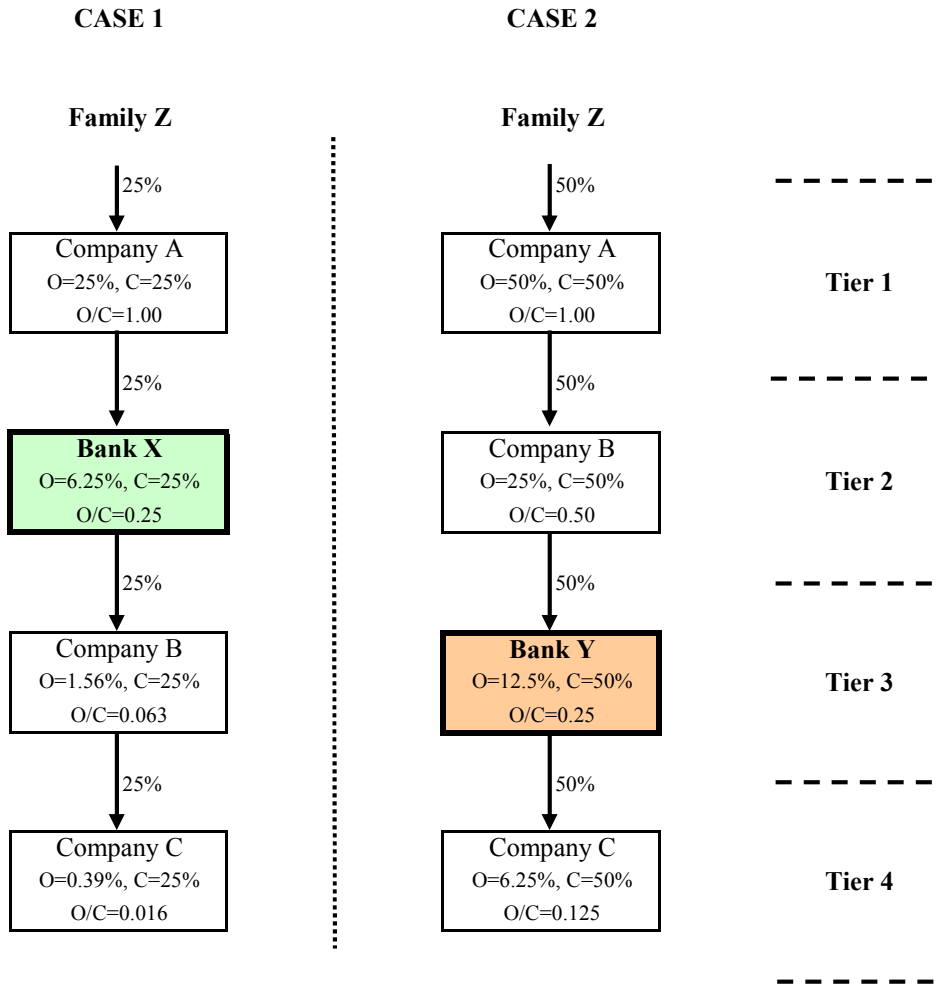


Figure 3: Pyramidal tiers



O = Ownership (cash flow rights)
C = Control rights (voting rights)
O/C = Ratio of ownership to control rights

Table 1: The sample

The sample includes all family-owned banks listed in the Stock Exchange of Thailand during 1992-1996.

	1992		1993		1994		1995		1996	
	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial banks	13	33.3%	13	31.0%	13	30.2%	12	27.9%	12	25.0%
Finance companies	26	66.7%	29	69.0%	30	69.8%	31	72.1%	36	75.0%
Total sample	39	100.0%	42	100.0%	43	100.0%	43	100.0%	48	100.0%

Table 2A: Pyramidal tiers

The table reports the distribution of the sample classified according to which tier in the pyramid the bank is located.

	1992		1993		1994		1995		1996	
	No.	%	No.	%	No.	%	No.	%	No.	%
Upper tier										
Tier 1	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 2	14	35.9%	14	33.3%	14	32.6%	14	32.6%	14	29.2%
Lower tier										
Tier 3	23	59.0%	25	59.5%	26	60.5%	26	60.5%	31	64.6%
Tier 4	2	5.1%	3	7.1%	3	7.0%	3	7.0%	3	6.3%
Total sample	39	100.0%	42	100.0%	43	100.0%	43	100.0%	48	100.0%

Table 2B: Ownership structure

The table reports the ownership structure according to which tier in the pyramid the bank is located.

		Cash-flow rights (O)	Control rights (C)	Cash-flow rights/ Control rights (O/C)
Total sample	Mean	21.2%	27.7%	0.73
	Median	19.3%	28.2%	0.78
	Std. Dev.	13.5%	12.5%	0.25
Upper tier	Mean	23.3%	28.9%	0.76
	Median	21.2%	30.7%	0.79
	Std. Dev.	14.8%	13.3%	0.20
Lower tier	Mean	20.3%	27.1%	0.71
	Median	18.9%	25.7%	0.78
	Std. Dev.	12.8%	12.0%	0.27
Difference in mean [Upper - Lower]		3.0%	1.8%	0.04
t-statistics (*t*-test)		(1.55)	(1.01)	(1.20)
Difference in median [Upper - Lower]		2.3%	5.0%	0.01
z-statistics (Wilcoxon rank-sum test)		(1.21)	(1.00)	(1.00)

Table 3: Summary statistics

The table reports summary statistics. Lower tier is the bank that is placed at the third and fourth tiers in the pyramid. Upper tier is the bank that is placed at the second tier of the pyramid. Loan growth is defined as the one-year growth rate of the total outstanding loan. Abnormal loan growth is defined as the difference between an individual bank's loan growth and the median loan growth of all banks in the same year. ROA is defined as pre-tax earnings divided by total assets. ROE is defined as net income before extraordinary items divided by total equity. Tobin's q is defined as total assets minus the book value of equity plus the market value of equity divided by total assets. M/B ratio is defined as the market value of equity divided by the book value of equity. Log(total assets) is the logarithm of total assets. Equity-to-total assets ratio is defined as total equity divided by total assets. Loans/total assets is defined as total loans outstanding divided by total assets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

		Lower-tier	Upper-tier	Difference [Lower - Upper]	*t*-statistics (*t*-test)	*z*-statistics (Wilcoxon rank-sum test)
Loan growth	Mean	0.310	0.209	0.101	3.19***	3.13***
	[Median]	[0.252]	[0.198]	[0.054]		
Abnormal loan growth	Mean	0.087	-0.019	0.106	3.53***	3.81***
	[Median]	[0.018]	[-0.043]	[0.061]		
Return on assets (ROA)	Mean	0.019	0.023	-0.004	-2.92***	-3.29***
	[Median]	[0.019]	[0.024]	[-0.005]		
Return on equity (ROE)	Mean	0.125	0.191	-0.066	-2.91***	-4.31***
	[Median]	[0.122]	[0.186]	[-0.064]		
Tobin's q	Mean	1.197	1.151	0.046	1.35	0.22
	[Median]	[1.116]	[1.101]	[0.015]		
M/B ratio	Mean	2.875	2.553	0.322	0.97	0.51
	[Median]	[2.244]	[2.129]	[0.115]		
Log (total assets)	Mean	4.420	4.809	-0.389	-5.25***	-4.24***
	[Median]	[4.337]	[4.731]	[-0.394]		
Equity-to-total assets ratio	Mean	0.104	0.099	0.005	0.89	0.97
	[Median]	[0.095]	[0.089]	[0.006]		
Loans/total assets	Mean	0.811	0.822	-0.011	-1.33	-1.58
	[Median]	[0.829]	[0.833]	[-0.004]		

Table 4: Pyramidal tiers and loan growth

The dependent variable is loan growth. Column 1-3 show pooled OLS regression results. Column 4-6 show random-effects regression results. Loan growth is defined as the one-year growth rate of the total outstanding loan. Lower tier equals one if the bank is located at the third and fourth tiers, and zero otherwise. Cash flow rights is the percentage of ownership held by the controlling family. Cash flow rights/control rights is the ratio of cash flow rights to control rights held by the controlling family. Size is the logarithm of total assets. Equity-to-total assets ratio is defined as total equity divided by total assets. ROA is defined as pre-tax earnings divided by total assets. Finance company equals one if the bank is a finance company, and zero otherwise. Finance company equals one if the bank is a finance company, and zero otherwise. Numbers in parentheses of OLS regressions are *t*-statistics from heteroskedasticity-robust standard errors with clustering at the bank level. Numbers in parentheses of random-effects regressions are *z*-statistics from heteroskedasticity-robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OLS			Random-effects		
	[1]	[2]	[3]	[4]	[5]	[6]
Lower tier	0.094***	0.099***	0.095***	0.094***	0.099***	0.094***
	(2.75)	(2.94)	(2.74)	(2.60)	(2.69)	(2.60)
Cash flow rights/100		0.115			0.113	
		(1.05)			(0.92)	
Cash flow rights/control rights			0.016			0.013
			(0.23)			(0.19)
Size	-0.087**	-0.075*	-0.083*	-0.083*	-0.071	-0.080*
	(-2.06)	(-1.86)	(-1.93)	(-1.86)	(-1.51)	(-1.68)
Equity-to-total assets ratio	-1.434***	-1.488***	-1.454**	-1.475***	-1.523***	-1.489***
	(-2.71)	(-2.80)	(-2.58)	(-2.95)	(-3.02)	(-2.94)
ROA	2.446*	2.389*	2.457*	2.501**	2.455**	2.508**
	(1.94)	(1.94)	(1.94)	(2.55)	(2.50)	(2.55)
Finance company	0.022	0.027	0.026	0.025	0.031	0.029
	(0.41)	(0.50)	(0.44)	(0.45)	(0.54)	(0.49)
Constant	0.605***	0.523**	0.575**	0.589**	0.505*	0.562**
	(2.67)	(2.40)	(2.37)	(2.39)	(1.92)	(2.00)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	204	204	204	204	204	204
Adjusted R-squared	0.231	0.235	0.231	0.231	0.235	0.231
p -value of Breusch and Pagan Lagrangian multiplier test				0.329	0.394	0.335

Table 5: Pyramidal tiers and return on assets (ROA)

The dependent variable is profitability (ROA). Column 1-3 show pooled OLS regression results. Column 4-6 show random-effects regression results. ROA is defined as pre-tax earnings divided by total assets. Lower tier equals one if the bank is located at the third and fourth tiers, and zero otherwise. Cash flow rights is the percentage of ownership held by the controlling family. Cash flow rights/control rights is the ratio of cash flow rights to control rights held by the controlling family. Size is the logarithm of total assets. Equity-to-total assets ratio is defined as total equity divided by total assets. Loan growth is defined as the one-year growth rate of the total outstanding loan. Finance company equals one if the bank is a finance company, and zero otherwise. Numbers in parentheses of OLS regressions are *t*-statistics from heteroskedasticity-robust standard errors with clustering at the bank level. Numbers in parentheses of random-effects regressions are *z*-statistics from heteroskedasticity-robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OLS			Random-effects		
	[1]	[2]	[3]	[4]	[5]	[6]
Lower tier	-0.010***	-0.010**	-0.010***	-0.010***	-0.010***	-0.010***
	(-2.72)	(-2.62)	(-2.73)	(-3.72)	(-3.52)	(-3.72)
Cash flow rights/100		0.005			0.006	
		(1.09)			(0.63)	
Cash flow rights/control rights			-0.003			-0.003
			(-0.93)			(-0.55)
Size	0.008***	0.009***	0.007**	0.008**	0.009**	0.008**
	(3.01)	(3.02)	(2.51)	(2.45)	(2.52)	(2.08)
Equity-to-total assets ratio	0.176***	0.173***	0.180***	0.159***	0.156***	0.161***
	(5.07)	(4.88)	(5.14)	(4.49)	(4.38)	(4.49)
Loan growth	0.027	0.027	0.027	0.029**	0.029**	0.029**
	(1.41)	(1.41)	(1.42)	(2.42)	(2.42)	(2.42)
Loan growth-squared	-0.014	-0.014	-0.014	-0.016	-0.016	-0.016
	(-0.88)	(-0.90)	(-0.90)	(-1.48)	(-1.51)	(-1.48)
Finance company	0.013***	0.014***	0.012**	0.014***	0.015***	0.014***
	(2.84)	(2.86)	(2.62)	(3.48)	(3.51)	(3.05)
Constant	-0.054***	-0.057***	-0.047**	-0.053***	-0.057***	-0.047**
	(-3.31)	(-3.30)	(-2.61)	(-2.83)	(-2.87)	(-2.17)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	204	204	204	204	204	204
Adjusted R-squared	0.448	0.450	0.450	0.447	0.449	0.449
p -value of Breusch and Pagan Lagrangian multiplier test				0.000***	0.000***	0.000***

Table 6: Robustness checks: Return on equity (ROE)

The dependent variable is ROE. Column 1-3 show pooled OLS regression results. Column 4-6 show random-effects regression results. ROE is defined as net income before extraordinary items divided by total equity. Lower tier equals one if the bank is located at the third and fourth tiers, and zero otherwise. Cash flow rights is the percentage of ownership held by the controlling family. Cash flow rights/control rights is the ratio of cash flow rights to control rights held by the controlling family. Size is the logarithm of total assets. Equity-to-total assets ratio is defined as total equity divided by total assets. Loan growth is defined as the one-year growth rate of the total outstanding loan. *Finance company* equals one if the bank is a finance company, and zero otherwise. Numbers in parentheses of OLS regressions are *t*-statistics from heteroskedasticity-robust standard errors with clustering at the bank level. Numbers in parentheses of random-effects regressions are *z*-statistics from heteroskedasticity-robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OLS			Random-effects		
	[1]	[2]	[3]	[4]	[5]	[6]
Lower tier	-0.084**	-0.082**	-0.084**	-0.086***	-0.085***	-0.086***
	(-2.34)	(-2.31)	(-2.34)	(-3.28)	(-3.14)	(-3.26)
Cash flow rights/100		0.021			0.025	
		(0.59)			(0.27)	
Cash flow rights/control rights			-0.011			-0.010
			(-0.48)			(-0.20)
Size	0.064***	0.066***	0.062***	0.065**	0.067**	0.062*
	(3.41)	(3.41)	(3.12)	(1.99)	(1.97)	(1.78)
Equity-to-total assets ratio	-0.086	-0.099	-0.072	-0.193	-0.211	-0.188
	(-0.51)	(-0.58)	(-0.41)	(-0.55)	(-0.59)	(-0.53)
Loan growth	0.310	0.310	0.310	0.314***	0.314***	0.314***
	(1.42)	(1.41)	(1.42)	(2.62)	(2.62)	(2.61)
Loan growth-squared	-0.193	-0.194	-0.193	-0.200*	-0.202*	-0.201*
	(-1.06)	(-1.06)	(-1.06)	(-1.87)	(-1.88)	(-1.87)
Finance company	0.114**	0.115**	0.111**	0.122***	0.123***	0.119***
	(2.32)	(2.32)	(2.29)	(3.08)	(3.08)	(2.80)
Constant	-0.308**	-0.322**	-0.285**	-0.304*	-0.320*	-0.284
	(-2.54)	(-2.52)	(-2.22)	(-1.69)	(-1.67)	(-1.36)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	204	204	204	204	204	204
Adjusted R-squared	0.268	0.268	0.268	0.267	0.267	0.340
p -value of Breusch and Pagan Lagrangian multiplier test				0.012**	0.012**	0.013**

Table 7: Robustness checks: Multicollinearity

Panel A shows pooled OLS regression results of loan growth regressions. Loan growth is defined as the one-year growth rate of the total outstanding loan. Panel B shows pooled OLS regression results of ROA. Column 1 presents the main results including both lower tier and finance company variables. Column 2 presents the results including only lower tier variable. Column 3 presents the results including finance company only. Column 4 presents the results of the sub-sample including finance companies only. ROA is defined as pre-tax earnings divided by total assets. Lower tier equals one if the bank is located at the third and fourth tiers, and zero otherwise. Size is the logarithm of total assets. Equity-to-total assets ratio is defined as total equity divided by total assets. Finance company Numbers in parentheses are *t*-statistics from heteroskedasticity-robust standard errors with clustering at the bank level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panle A: Loan growth regressions				
	[1]	[2]	[3]	[4]
Lower tier	0.094***	0.096***		0.163***
	(2.75)	(2.89)		(4.26)
Size	-0.087**	-0.099***	-0.103**	-0.147**
	(-2.06)	(-3.33)	(-2.30)	(-2.17)
Equity-to-total assets ratio	-1.434***	-1.376***	-1.447**	-1.918**
	(-2.71)	(-2.74)	(-2.67)	(-2.61)
ROA	2.446*	2.560**	1.708	4.541
	(1.94)	(2.18)	(1.43)	(1.48)
Finance company	0.022		0.045	
	(0.41)		(0.82)	
Constant	0.605***	0.667***	0.736***	0.831**
	(2.67)	(3.99)	(3.23)	(2.60)
Year dummies	Yes	Yes	Yes	Yes
Number of observations	204	204	204	140
Adjusted R-squared	0.231	0.230	0.197	0.266
Mean VIF	1.89	1.54	1.94	1.99
Panel B: ROA regressions				
	[1]	[2]	[3]	[4]
Lower tier	-0.010***	-0.009**		-0.009**
	(-2.72)	(-2.53)		(-2.46)
Size	0.008***	0.001	0.010***	0.010**
	(3.01)	(0.41)	(3.83)	(2.69)
Equity-to-total assets ratio	0.176***	0.228***	0.186***	0.172***
	(5.07)	(5.62)	(4.48)	(4.60)
Loan growth	0.027	0.029	0.019	0.004
	(1.41)	(1.47)	(1.06)	(0.50)
Loan growth-squared	-0.014	-0.014	-0.010	0.004
	(-0.88)	(-0.90)	(-0.64)	(0.55)
Finance company	0.013***		0.012***	
	(2.84)		(2.72)	
Constant	-0.054***	-0.017***	-0.070***	-0.047**
	(-3.31)	(-1.27)	(-4.15)	(-2.53)
Year dummies	Yes	Yes	Yes	Yes
Number of observations	204	204	204	140
Adjusted R-squared	0.448	0.407	0.448	0.684
Mean VIF	2.72	2.56	2.85	2.67

Table 8: Family-owned banks after the financial crisis

The table shows the number of family-owned banks before and after the 1997 financial crisis. Pre-crisis is as of 1996. Post-crisis is as of 2003. A bank was failed if it was either closed down or nationalized as of 2003. Lower tier is the bank that is placed at the third and fourth tiers in the pyramid. Upper tier is the bank that is placed at the second tier of the pyramid.

	Pre-crisis (as of 1996)	Post-crisis (as of 2003)			
		Survived		Failed	
		No.	%	No.	%
Total sample					
Upper tier	14	10	71.4%	4	28.6%
Lower tier	34	3	8.8%	31	91.2%
Total	48	13	27.1%	35	72.9%
Commercial banks					
Upper tier	7	6	85.7%	1	14.3%
Lower tier	5	0	0.0%	5	100.0%
Total	12	6	50.0%	6	50.0%
Finance companies					
Upper tier	7	4	57.1%	3	42.9%
Lower tier	29	3	10.3%	26	89.7%
Total	36	7	19.4%	29	80.6%

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