The controlling shareholder's personal stock loan and firm performance

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Abstract

This paper studies companies that have a controlling shareholder.   In particular, it examines the relationship between firm performance and its controlling shareholder's personal loan.   We present a model to identify two effects of a personal loan that is secured by stocks.   The loan can be beneficial ex ante, because it relaxes the wealth constraint of controlling shareholders and allows firms to invest in good projects. The loan can also be harmful ex post, because it will create an incentive for controlling shareholders to pursue risky projects. We use a sample of listed companies in Taiwan to test our hypotheses and find consistent evidence.

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1. Introduction

Around the world, there are two major types of ownership structure for corporations: widely held and concentrated ownership. Berle and Means (1932) first draw our attention to widely held corporations, which are run by professional managers who have very little equity ownership and therefore may not serve shareholders' interests. In widely held corporations, each shareholder also holds a small percentage of shares that gives him or her little incentive to monitor professional managers. As a result, financial economists have put a lot of effort towards studying these firms, and the important question to address is how to develop efficient mechanisms to motivate and monitor professional managers.

Not until recently did researchers realize that widely held corporations are only prevalent in the United States and Britain. Another type of ownership structure is concentrated ownership with the existence of a controlling shareholder. Claessens, Djankov, and Lang (2000), Faccio and Lang (2000), and La Porta, Lopez-de-Silanes, and Shleifer (1999) find that, for most European and Asian companies, there exists at least one large shareholder and they maintain their control by constructing a pyramid structure or by holding executive positions. Given their large shareholdings, the power of these controlling shareholders is not checked by other shareholders. La Porta, Lopez-de-Silanes, and Shleifer (1999) therefore suggest that "the theory of

corporate finance relevant for most countries should focus on the incentives and opportunities of controlling shareholders to both benefit and expropriate the minority shareholders."   This paper studies the incentives of controlling shareholders with personal leverage.

For controlling shareholders in companies with concentrated ownership, it is important to maintain their controlling rights. The maintenance of controlling right is closely related to the maintenance of a sufficient ownership of shares.   This is not an easy task given the personal wealth constraint.   One class of solutions for relaxing the personal wealth constraint includes various ownership structures, for example, multiple classes of shares, cross-shareholding, or pyramid structures (Bebchuk, Kraakman, and Triantis, 1998; La Porta, Lopez-de-Silanes, and Shleifer, 1999).

This paper discusses an alternative way that allows controlling shareholders to relax their personal wealth constraint: personal loans secured by the stock of the company that they control.   We present a simple model to study the beneficial and side effects of stock loans.   Using stock loans permit controlling shareholders to provide financing to the firm that has a good investment opportunity without sacrificing his shareholding percentage.   Therefore, stock loans can improve the ex ante investment efficiency of the firm.   Stock loans, however, can create an agency problem such that controlling shareholders will be more likely to choose a riskier

project.   As a result, stock loan financing will cause ex post investment inefficiency.

Our model provides a number of hypotheses regarding the determinant and the performance implication of stock loan financing.   To test these hypotheses, we use a sample of companies listed on the Taiwan Stock Exchange and the Over-the-counter Market.   The sample offers a rare opportunity to examine stock loans of controlling shareholders, because the government requires listed companies to report the percentage of shares that is owned by their directors, which are secured for personal loans.

We provide evidence that personal stock loan financing is positively correlated with firm risk, which is consistent with our agency cost hypothesis.   This particular type of agency cost is not mentioned in the literature, but it is a part of agency costs that will occur in a controlling shareholder economy.   Claessens, Djankov, Fan, and Lang (1999) find evidence that the pyramid structure, which is prevalent in such an economy, can create an agency problem by separating cash flow rights from voting rights.

We also provide evidence that personal stock loan financing is related to the demand and supply of the firm's financing.   It supports our hypotheses that the personal wealth constraint is important and that personal financing is related to corporate financing in a controlling shareholder economy.   Previous researchers

already have mentioned that one of the objectives for designing multiple classes of shares or a pyramid structure is to relax the personal wealth constraint, but they do not provide any evidence.   This paper is the first of its kind to provide evidence on the wealth constraint of controlling shareholders.

Another contribution of this paper is to emphasize the linkage between personal leverage and firm behavior.   This is in contrast to the linkage between corporate leverage and firm behavior emphasized in the literature. Our model shows that a stock loan is riskier than a corporate bond.   Therefore, it predicts that, for firms controlled by large shareholders, corporate performance will be more sensitive to the leverage ratio of personal stock loans than to the corporate leverage ratio.   This prediction is verified by our empirical results.

Although the evidence provided in this paper is only limited to an emerging capital market (Taiwan), some anecdotal evidence suggests that it can also be relevant for a developed market.   The New York Times on August 10, 2001 reported an incidence to suggest that personal leverage does affect firm behavior even in the U.S. According to these newspapers, WorldCom's chief executive, Bernard J. Ebbers, owned U.S.$238 million worth of WorldCom and MCI stock, which is a tracking stock issued by WorldCom, but he owed more than $268 million on loans secured by that stock.   To accommodate Mr. Ebbers' personal need, WorldCom paid a U.S.$2.4

cash dividend to MCI stockholders, which amounted to a 21.4% yield.   WorldCom

also agreed to cover a loan of $198.7 million that Mr. Ebbers owed to the company

and the Bank of America, who provided financing to WorldCom.   Also, WorldCom

provided $141 million personal financing to Mr. Ebbers.

The evidence provided in this paper suggests that we should pay more attention

to the disclosure requirement of executives' personal financing conditions.   In the

U.S., the SEC does not require an executive to disclose stock loans unless he owns

more than 5% of the company's stock.   Even when he owns more than 5%,

disclosure rules are murky.   Legal professionals are also divided on whether such a

disclosure should be mandatory to the board, not to mention to the public (Barron's,

12/18/2000).   This paper suggests that investors have a very good reason to be

concerned about such loans.

The rest of the paper is organized in four sections.   Section 2 presents our

model and discusses testing hypotheses.   Section 3 describes the sample and Section

4 reports empirical evidence.   Section 5 concludes the paper.

2.   A Simple Model of Stock Loan Financing

In this section we develop a simple model to study the relationship between

stock loan financing and firms' investment decisions.   We show that for firms

managed by large shareholders, corporate performance is sensitive to the stock loan

leverage ratio.   We also demonstrate that a controlling shareholder will pursue more

risks if he relies more heavily on stock loan financing.

Consider a three-date (dates 0, 1, and 2) model.   All parties in the model are

risk neutral, and the risk free rate is zero.   At date 0, an entrepreneur sets up a firm

with limited liability.   The entrepreneur is the owner/manager of the firm.   The

firm's only asset is an investment opportunity, which is described as follows.   If the

entrepreneur invests 1 at date 0, then he can choose between a safe project and a risky

project at date 1.   Both projects generate cash flows at date 2. If the safe project is

chosen, then the cash flow realized at date 2 is always 1.   If the risky project is

chosen, then the cash flow realized at date 2 is R with probability p and is r with

probability $1 - p$, where $R > 1 > r$.

At date 0, p is a random variable; its density and cumulative functions are g and

G, respectively.   At date 1, the value of p is realized and becomes the entrepreneur's

private information before he makes the project choice.   Given p, the present value

of the risky project is:

$$PV(p) \equiv p\,R + (1-p)\,r. \tag{1}$$

We shall assume that:

$$\int_{p=0}^{1} PV(p)dG(p) < 1. \tag{2}$$

This assumption implies that the investment opportunity should not be undertaken at

date 0 if the entrepreneur will always choose the risky project at date 1.

At date 0, the entrepreneur can finance the project from several sources. First, he can invest his own money. Second, he can issue equity and/or a corporate bond in the name of the firm, and use the proceeds to invest. New securities are fairly priced in the sense that investors holding these securities receive a zero expected rate of return. Third, the entrepreneur can raise funds from stock loan financing. That is, he can borrow from a bank in his own name, and pledge his shares of the firm as collateral. The loan is also fairly priced, which means the bank will lend money if the expected rate of return from lending is non-negative.

The total number of the firm's shares is normalized to 1. The entrepreneur holds a share, and receives E from selling $1-a$ share to investors. As for debt financing, both the corporate bond and stock loan mature at date 2. The face value of the corporate bond is D, and the face value of the stock loan is F. The entrepreneur raises B from selling the corporate bond, and raises X from a stock loan. The value of the entrepreneur's wealth is W. At date 0, the entrepreneur can raise enough money to undertake the investment opportunity if and only if $E + B + X + W \geq 1$.[1] Note that, since securities and the loan are fairly priced, the entrepreneur is the one who will receive all the investment gains or losses. Therefore, at date 0 he will

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[1] Note that the entrepreneur need not contribute anything to the firm if $E + B + X \geq 1$. Otherwise, if $E + B + X < 1$, then the entrepreneur has to contribute $1 - (E + B + X)$ if he wants to invest at date 0.

invest only if the investment opportunity has a positive net present value.

To make the model more realistic, we make several assumptions about the financing channels. First, the entrepreneur has to hold enough shares to maintain his control of the firm. Therefore, a must be no less than a_0, where a_0 is a constant and $0 < a_0 < 1$. Second, corporate bankruptcy is extremely costly, so the corporate bond has to be riskless. Since the firm's realized cash inflow is either R or r and $R > r$, then this assumption is equivalent to $D \leq r$. This is a very strong assumption and it only serves to simplify the analysis. Our conclusions can still hold under a weaker assumption. The important point is that, beyond a certain level, the corporate bond will become extremely costly and the entrepreneur will not use this channel to finance anymore. The cost of the corporate bond can be due to the bankruptcy cost, or the inflexibility imposed by its restrictive covenants.

Our final assumption is that the stock loan is risky such that the entrepreneur will prefer a riskless bond to stock loan financing when both are feasible. This assumption is based on the observation that, in reality, the stock loan's maturity will depend on the stock's market price. When the stock price falls below the face value of the stock loan, the bank would then confiscate the entrepreneur's shares and he is likely to lose control of the firm.

Therefore, investing at date 0 is feasible if $W \geq 1 - (E + B + X)$.

The model is solved backwards. We first investigate the entrepreneur's project

choice, and then study how equilibrium $\boldsymbol{a}$, $\boldsymbol{D}$, and $\boldsymbol{F}$ are determined at date 0. Since

our focus is how the stock loan affects the entrepreneur's investment decisions, we

first analyze the case where stock loan financing is not available in Section 2.1.

Section 2.2 will allow its availability and Section 2.3 discusses the empirical

implications of the model. For simplicity, assume that the entrepreneur will choose

the risky project if he is indifferent between the safe project and the risky project.

2.1. Stock loan is financing not available (F=0)

Suppose that the entrepreneur cannot use stock loan financing; so, $\boldsymbol{F = 0}$. At

date 1, the entrepreneur's payoff is $\boldsymbol{a}$ $\boldsymbol{(1 - D)}$ if he chooses the safe project, and is

$$\boldsymbol{a}\ [p\ (R - D) + (1 - p)\ (r - D)] = \boldsymbol{a}\ [PV(p) - D]$$

if he chooses the risky project. Therefore, the entrepreneur will choose the risky

project at date 1 if and only if $\boldsymbol{PV(p)}$ $\boldsymbol{^3}$ $\boldsymbol{1}$, or

$$p \geq \frac{1-r}{R-r} \equiv p^{*}. \tag{3}$$

Condition (3) implies that the entrepreneur's date 1 project choice is always efficient

when $\boldsymbol{F = 0}$.[2] Using (3), we can calculate the amount of money that the entrepreneur

can raise without stock loan financing. This result is stated in Proposition 1.

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[2] This result follows from the assumption that corporate bonds must be risk free. Given this
assumption, the entrepreneur's payoff is not a call option, so the agency costs of debt described in

Proposition 1. Suppose that the entrepreneur does not use stock loan financing.

(a) Given $\boldsymbol{a}$ and $\boldsymbol{D}$, the amount of money that the entrepreneur can raise from selling

shares and corporate bond is:

$$E + B = M_0(\boldsymbol{a}, D) \equiv (1 - \boldsymbol{a})[G(p^*) + \int_{p=p^*}^{1} PV(p)dG(p)] + \boldsymbol{a}D. \qquad (4)$$

(b) The maximal amount of money the entrepreneur can raise from selling equity and

corporate bonds is:

$$\overline{M}_0 = M_0(\boldsymbol{a}_0, r). \qquad (5)$$

Proof. Please see the Appendix.

From Proposition 1, when $\boldsymbol{W} < \boldsymbol{1} - \overline{M}_0$, the entrepreneur cannot invest at date 0

without stock loan financing. The assumptions that $\boldsymbol{a}^3\boldsymbol{a_0}$ and $\boldsymbol{D} \leq \boldsymbol{r}$ play important

roles in our analysis. From (4), if the entrepreneur can set $\boldsymbol{a} = \boldsymbol{0}$, then the amount of

money he can raise would be equal to the present value of the investment opportunity.

Stock loan financing would then be unnecessary in this case. If the firm is also

allowed to issue risky debt, then the entrepreneur will be able to raise more than $\overline{M}_0$

from selling equity and bonds.[3]   Under these assumptions, controlling shareholders

have to use stock loan financing to relax their personal wealth constraint.

2.2. Stock loan financing is available (F>0)

Jensen and Meckling (1976) do not arise.
[3] This claim can be proved rigorously.

Suppose that $W < 1 - \overline{M}_0$, such the entrepreneur cannot invest at date 0 without stock loan financing. In this case, F must be strictly positive if the investment is made at date 0. It can be shown that when $F > 0$, then $a = a_0$ and $D = r$.[4]

Intuitively, the entrepreneur uses stock loan financing only when (i) selling shares will endanger his control of the firm, and (ii) the firm's capacity for risk-free debt has been exhausted.

Given that $F > 0$, then at date 1 the entrepreneur's payoff is $a_0 (1 - r) - F$ if he chooses the safe project, and is $p [a_0 (R - r) - F]$ if he chooses the risky project.[5] Lemma 1 states the entrepreneur's choice in this case.

Lemma 1. Suppose that $W < 1 - \overline{M}_0$ and that the entrepreneur invests at date 0.

(a) At date 1, the entrepreneur chooses the risky project if and only if

$$p \geq p_1(F) \equiv \frac{a_0(1-r) - F}{a_0(R-r) - F}. \tag{6}$$

(b) $p_1(0) = p^*$ and $p_1(F)$ is decreasing in F. That is, the entrepreneur is more likely to choose the risky project when F increases.

Proof. Please see the Appendix.

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[4] In our model, selling shares will not create any agency cost. Therefore, the entrepreneur will prefer equity financing to debt financing. From our assumptions, the entrepreneur will also choose corporate bond financing rather than stock loan financing when he feels indifferent between the two. Therefore, $F > 0$ implies $a = a_0$ and $D = r$.

[5] It seems that we implicitly assume that $F < a_0 (1 - r)$. In fact, this result follows from assumption (2). If $F \geq a_0 (1 - r)$, then at date 1 the entrepreneur will always choose the risky project. From (2), in this case the entrepreneur should not invest at date 0. Therefore, F must be strictly smaller than $a_0 (1 - r)$ if the investment opportunity is undertaken at date 0.

Part (b) of Lemma 1 has important implications. It suggests that stock loan financing will distort the entrepreneur's incentive when he makes the project choice. The larger the F is, the more likely the entrepreneur will choose the risky project, and so the more serious the distortion will be. This result implies that a controlling shareholder will pursue more risks if he relies more heavily on stock loan financing.

Having investigated the entrepreneur's project choice, we next ask whether stock loan financing allows the entrepreneur to raise more money. The answer is yes.

Proposition 2. Suppose that $W < 1 - \overline{M}_0$ and that the entrepreneur invests at date 0.

(a) Given F, the amount of money the entrepreneur can raise is $E + B + X = M_1(F)$, where

$$M_1(F) \equiv r + \int_{p=0}^{p_1(F)} [(1-a_0)(1-r)+F]dG(p) + \int_{p=p_1(F)}^{1} p[(1-a_0)(R-r)+F]dG(p).$$

(7)

(b) $\left. \dfrac{dM_1(F)}{dF} \right|_{F=0} > 0$, which means that stock loan financing allows the entrepreneur to raise more money.

Proof. Please see the Appendix.

Proposition 2 implies that stock loan financing relaxes the entrepreneur's

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financial constraint, thus increasing the chance that the investment opportunity can be undertaken at date 0. Because the entrepreneur will undertake the investment opportunity only when its net present value is positive, this implies that stock loan financing has its merits. Although stock loan financing distorts the entrepreneur's ex post incentive in making the project choice, it improves the ex ante investment efficiency by allowing good investment opportunities to be taken.

Part (b) of Proposition 2 can be explained as follows. A change in F has two opposite effects on $M_1(F)$. First, when $p_1(F)$ is fixed, an increase in F increases the bank's payoff in case the cash flow is R, allowing the entrepreneur to raise more money at date 0. Second, from the fact that $p_1(0) = p^*$ and $p_1(F)$ is decreasing in F, an increase in F will reduce investment efficiency by giving the entrepreneur a stronger incentive to choose the risky project. This will lower the values of the firm's securities, and therefore reduce the amount of money that the entrepreneur can finance at date 0. Because these two effects work in different directions, in general an increase in F may either raise or reduce $M_1(F)$. However, when $F = 0$, the second effect is zero and the first effect is positive, so that $dM_1 / dF > 0$.

Given the decision at date 1, we can examine the entrepreneur's choice at date 0. The following lemma states the condition under which the investment will be made at date 0 and stock loan financing will be used in equilibrium. It also shows that the

degree to which the entrepreneur relies on stock loan financing is decreasing in the

entrepreneur's wealth.   The implication is that investment inefficiency will be more

of a problem for firms whose controlling shareholders face stricter wealth constraints.

Lemma 2.   Suppose that $W < 1 - \overline{M}_0$.

(a) The entrepreneur will invest at date 0 if there is at least one $F > 0$ that satisfies:

$\quad$ (i) $W + M_I(F) = 1$, and (ii) $\int_{p=0}^{p_1(F)} 1 dG(p) + \int_{p=p_1(F)}^{1} PV(p) dG(p) \geq 1.$

(b) Suppose that the entrepreneur invests at date 0.   The face value of the stock loan

is decreasing in W.

Proof.   Please see the Appendix.

2.3. Empirical Implications

$\quad$ The simple model presented in this section can generate two sets of testable

hypotheses. The first set of hypotheses concerns the determinant of stock loan

financing. Our model suggests that the entrepreneur will use stock loans to finance

investment projects, but only after he has exhausted all other alternatives.   The

intuition behind this result can be explained as follows.   In our model, the

entrepreneur prefers equity financing to stock loan financing, because the former does

not create any agency cost.   Riskless corporate bond is preferred to stock loan

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financing, because the latter will make the entrepreneur vulnerable to stock price volatility.   Therefore, among various outside financing alternatives, stock loan financing is not the entrepreneur's first choice.

Although it is not the first priority, the entrepreneur will use stock loan financing once other financing channels become either infeasible or too costly.   The need to keep enough shares to control the firm will put a constraint on the entrepreneur's ability to issue new shares.   Issuing corporate bonds beyond a certain point can also be very costly.   The cost of corporate bonds can come from the probability of bankruptcy.   The cost can also be due to the constraints put on corporate decisions imposed by bond covenants.   Another cost is from the higher interest rate charged by financial institutions to compensate for the lack of liquidity in the collateral.   In contrast, the interest rate charged on the stock loan will be lower, because the stock is much more liquid.

The first set of testable hypotheses is about the determinant of stock loan financing.   The demand for stock loan financing is strong if the total demand for financing is large and if the supply for other financing is low.   When there is a good investment opportunity, the demand for financing will be high as well as the demand for stock loan financing.   When a firm has high earnings, the supply of internal funds will be high and the demand for stock loan financing will be low.

The second set of testable hypotheses is on the relationship between stock loan financing and firm performance. The model shows that stock loan financing allows a firm to pursue good investment projects. Therefore, a firm whose controlling shareholders use more stock loan financing is likely to show a better performance. The model also shows that stock loan financing will generate an incentive for the entrepreneur to pursue risky projects, while corporate bond financing will not. Therefore, a firm that uses more stock loan financing will have a higher risk.

The relationship between stock loan financing and firm performance can be shown to be time varying. When the economy is in a good condition, there should be more investment opportunities, and the positive effect from stock loan financing on performance should be stronger. When the economy is strong, the incentive to pursue risk should be weaker, and the positive effect from stock loan financing on risk should be smaller.

We can also observe a time-varying relationship between stock loan financing and firm performance due to differences in risk. A firm that uses more stock loan financing will have a higher risk, enjoying a better performance during good times and suffering more during bad times. This claim will hold if returns on investment projects are positively correlated across firms. To see this, suppose that there are many firms in the market, and let p_i denote the date 1 probability that the realized cash

flow of firm i's project will be **R**.   Moreover, assume that

$$p_i = hq_i^H + (1-h)q_i^L.\qquad\qquad\textbf{(8)}$$

In (8), **h** is the probability that the economy will be prosperous at date 2, while

1-h is the probability that the economy will be in a recession.   In addition, q_i^H is the

probability that the realized cash flow of firm i's project will be **R**, given a prosperous

economy; q_i^L is the probability that the realized cash flow of firm i's project will be **R**,

given a recession.

One simple way to model a positive return correlation is to assume that $q_i^H = 1$

for all $p_i > h$, such that firms differ only in q_i^L.   Under this assumption, firms

investing in risky projects will enjoy high returns when the economy is prosperous,

and will suffer lower returns during bad times.   In our model, an entrepreneur has

more incentive to pursue a risky project when the stock loan leverage ratio becomes

higher.   From these results, firms with a higher stock loan leverage ratio should have

higher returns during good times and have lower returns during bad times.

3.   Sample and data description

To test our hypotheses, we use a sample of listed companies in Taiwan.   It is an

ideal sample, because these companies are dominated by controlling shareholders.

Claessens, Djankov, and Lang (2000) find that, in their sample of 92 companies in

Taiwan, the median percentage of voting rights controlled by the largest shareholder is

21%.

Our sample period is from 1996 to 2000.   The choice of the sample period is constrained by the availability of stock loan data.   We have obtained monthly data on stock loans from November 1996 to August 2000.   There are two sources for this data. Starting from October 1998, all listed and over-the-counter companies have to report to the SEC the number of shares that is owned by their directors, but which is put as collateral for loans.[6]   Prior to October 1998, Taiwan Securities Central Depository Company reported directors' stock loans if the stock was put in its deposit. Because we choose a two-year period to observe company performance and risk, we use the stock loan data at the end of November 1996, October 1998, and August 2000 to match up with accounting returns.

We use a period of two years to calculate annual company performance.   The measures for performance include return on asset (ROA), return on equity (ROE), and stock return (RET).   The annual stock return is the annualized average stock return. To match up with the stock loan data, the stock return is calculated for three periods: 1995:1 - 1996:11, 1996:12 - 1998:10, and 1998:11 - 2000:8.

The annual accounting return is the annualized average quarterly return.   The quarterly return on assets is quarterly earnings before interest expense and taxes

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[6]   The Taiwan Economic Journal collects the reported data.

(EBIT) divided by the book value of assets at the end of last quarter.   The quarterly

return on equity is quarterly earnings divided by the book value of equity at the end of

last quarter.   Because the accounting data is only available at the quarterly level, we

cannot exactly match the accounting return with the stock loan data.   We choose to

calculate the accounting return for the following three periods: 1994:IV - 1996:III,

1996:IV - 1998:III, and 1998:IV - 2000:III.

Aside from average performance, we also estimate the risk of accounting return

and stock return.   The risk of stock return is just the annualized standard deviation of

the monthly stock return.   The risk of accounting return is the standard deviation of

the seasonal-adjusted quarterly accounting return within three two-year periods.   To

adjust for any seasonal effect, we run a regression including dummy variables that

represent three types of characteristics: company, quarter, and year.   The regression

is estimated for each industry separately and includes all companies within the same

industry from 1994:IV to 2000:III.

We use both accounting return and stock return, because neither is the perfect

measure.   The accounting return only measures the performance within the period; it

does not cover all the expected future cash flows.   The stock return, on the other

hand, only reflects unexpected changes of firm performance in an efficient market.

If investors do not expect new investment, then stock returns will be a better measure

of the return from new investment.   Nevertheless, if investors can foresee the impact

from stock loans on performance, then stock loans will not be correlated to future

stock returns, but will be correlated to future accounting returns.

The initial sample includes all listed and over-the-counter companies that have

performance, ownership, and stock loan data for at least one period.   Over the

sample period, performance measures have large variations, especially for return on

equity.   To reduce the impact from extreme observations, we delete those

observations that have the highest and lowest 1% observations for performance

variables.   Table 1 lists simple statistics for these variables.

During the sample period, the average percentage of shares owned by all

directors is 18.8%.   Out of the total shares held by directors, an average 31% is

secured as collateral for loans (stock loans).   The variation of stock loans across

firms is large; its standard deviation is 31%.   Figure 1 shows its histogram.   Almost

18% of the sample observations do not use stock loans at all. At the other extreme,

directors of three firms use all their shares as collateral for loans.   Relative to

directors' personal leverage, firm leverage is higher on average (42%), but has a

smaller variation (15%).

Our sample includes three periods.   Table 2 lists summary statistics separately

for each period.   The average stock loan percentage starts from 26% for November

1996 (the end of period 1) and increases to 34% in October 1998 (the end of period 2). The change is significantly different from 0 at a 0.01 level. Incidentally, the risk is much higher in the 3rd than in the 2nd period. The average standard deviation of ROA is 4.2% in period 3 and is 3.4% at the 2nd period - a 24% increase. The positive correlation between stock loans and future risk is consistent with the hypothesis that a greater personal loan secured by stock will increase the risk that directors are willing to take.

The higher risk taken by directors is not compensated by a higher return. On the contrary, the performance significantly deteriorates following an increase in stock loans. The average ROA is 7.2% during the 2nd period and is 2.9% during the 3rd period - a 60% drop of performance.

The accounting return combines both expected and unexpected components, and we do not know whether investors can foresee the effect from stock loan financing. However, a similar pattern also exists when we examine stock returns. The average standard deviation of stock return increases from 44% during period 2 to 54% during the 3rd period. The average stock return is –34% during the 3rd period. These numbers suggest that the impact from stock loans is not entirely expected by investors during the sample period.

Since there are only two observations over the time dimension, its correlation is

only suggestive.   The correlation can also be driven by other factors.   For example, the percentage of shares owned by directors reduces significantly from 21% to 19% during the same time.   Given that a lower amount of ownership can reduce the incentive to work, it can also result in a bad performance.   To control for ownership and other factors in a larger sample, we need to use cross-sectional observations. This is what we now turn to.

4.   Empirical results

4.1.   The determinant of stock loan financing

Before examining the impact of stock loans on corporate performance, we first examine the determinant of stock loan financing.   Our model argues that, due to the personal wealth constraint, a better investment opportunity will increase controlling shareholders' stock loans.   Stock loan financing will be less important and its percentage should be smaller if a firm can internally generate a higher cash flow. The controlling shareholder of a larger firm is more likely to face the wealth constraint and should rely more on stock loans.   In addition, our model assumes that controlling shareholders are subject to the risk of falling stock prices when they use stock loan financing.   Therefore, controlling shareholders will use a smaller amount of stock loan financing when the expected stock volatility becomes higher.

To examine these hypotheses, we estimate the following regression model:

$$LOAN_{it} = \ + \ _1 \ Q_{it} + \ _2 CASH_{it} + \ _3 \quad (RET_{it}) + \ _4 \quad ASSET_{it} + \ _{it}. \quad (9)$$

The term $LOAN_{it}$ is the percentage of shares held by directors that are secured for

personal loans, Q is the Tobin's Q that proxies for the investment opportunity, CASH

is the firm's operating cash flow, (RET) is the stock volatility, and ASSET is the

firm's book value of assets. One should notice that variables used are measured at

different times. For example, $LOAN_t$, Q_t, and $ASSET_t$ are measured at the end of

period t; while CASH and (RET $_{it}$) are measured during period t.

The regression model (9) is expressed in the difference. Using the difference

rather than the level helps us to eliminate the unobserved personal wealth component.

The wealth constraint here plays an important role in our model and controlling

shareholders will use less stock loan financing when they are wealthier. If personal

wealth does not change over time, then we can ignore the impact of personal wealth

by examining the difference in stock loan percentage. The only variable in equation

(9) that is not expressed in the difference is cash flow, because it is a flow variable by

definition.

Table 3 reports regression results, which are consistent with our hypothesis that

controlling shareholders use personal loans to finance a firm's investment. The

coefficient on Tobin's Q is significantly positive. This is consistent with our

hypothesis that, when a firm has a better investment opportunity and requires outside

financing, controlling shareholders are willing to take personal loans secured by stock. The demand for outside financing will be weaker if a firm can internally generate a larger cash flow.   Consistent with the financing hypothesis, we find the coefficient on the cash flow variable to be significantly negative.

The personal wealth constraint story also predicts a positive relation between the book value of assets and stock loan percentage.   Our evidence on this is weak.   The coefficient on the book value of assets is consistently positive, but it is only significantly positive at a 0.1 level in one specification.

The last important variable to explain the stock loan percentage is stock volatility. In Table 3, we use either the change in stock volatility or the volatility itself as one of the independent variables.   The correct variable to be used in the regression should be the change in expected stock volatility.   If stock volatility is highly persistent, then the change in realized volatility should be a better proxy for the change in expected volatility.   If stock volatility is weakly autocorrelated, then the realized volatility will be a better proxy for the change in expected volatility.   It in fact turns out that it does not matter which proxy we use.   Stock volatility is negatively correlated with the stock loan percentage and the correlation is significant at a 0.05 level.   The negative correlation supports our assumption that holding stock loans is risky and controlling shareholders will choose a smaller stock loan when it becomes

riskier.

4.2. The effect of stock loan financing

Our model argues that stock loan financing will create an incentive for

controlling shareholders to pursue more risky projects.   The asset substitution will

also be more of a problem when economic conditions are bad.   The number in Table

2 suggests that the 3rd period was a bad time in Taiwan as far as corporate

performance is concerned.   Therefore, we will run regressions separately for the 2nd

and 3rd period.

To examine the effect of stock loan financing on firm risk, we use the following

regression:

$$(R_{it})= \quad + \quad _1 \quad (R_{i,t-1})+ \quad _2 LOAN_{i,t-1} + \quad _3 D/A_{i,t-1} + \quad _4 SHARE_{i,t-1}+ \quad _{it}. \quad (10)$$

The variable (R_{it}) is the volatility during period t, and volatility can be measured

from accounting returns (ROA or ROE) or stock returns.   The variable $LOAN_{it}$ is the

stock loan percentage, $D/A_{i,t-1}$ is the company's debt-to-asset ratio, and $SHARE_{i,t-1}$ is

the percentage of shares owned by directors at the end of period t-1.

Table 5 reports the volatility regression. The most significant variable in these

regressions are the lagged volatility.   Volatility here is positively autocorrelated.

Consistent with our asset substitution hypothesis, the stock loan percentage is

significantly and negatively correlated with the future risk of firm performance.   The

correlation is more negative in the 3rd period than in the 2nd sample period.   The

difference between periods is significant for stock volatility regression, suggesting

that the incentive for asset substitution is stronger when economic conditions are bad.

For all regressions except stock volatility in the 3rd period, we cannot use firm

leverage to predict future volatility.   This is not consistent with predictions in the

literature that corporate debt creates an asset substitution incentive.   Nevertheless, it

is consistent with our prediction that personal leverage is more important than firm

leverage in explaining the firm's investment choice.

We also find a negative relation between the shareholding percentage and future

stock volatility during the 3rd period.   One possible explanation is that directors are

risk averse and they will choose to hold a smaller percentage of shares when they

expect a higher future volatility.

Aside from its risk implication, the model also generates predictions on the

relationship between stock loan percentage and future performance.   To examine

theses predictions, we use a similar regression:

$$R_{it} = \ + \ _1 R_{i, t-1} + \ _2 LOAN_{i, t-1} + \ _3 D/A_{i, t-1} + \ _4 SHARE_{i, t-1} + \ _{it}. \tag{11}$$

Panel A of Table 6 reports regression results.   Here, the stock loan percentage is

positively correlated to performance in the 2nd period, but the correlation is negative

in the 3rd period.   Recalling that the economic condition in the 2nd period is good, but

is bad in the 3rd period, the different sign of the coefficient over the two periods may therefore only reflect a different risk profile. A higher risk firm will perform better during good times, but worse during bad times. To control for the risk, we also report in panel B results for regressions including the volatility measure.

Consistent with the risk explanation, we find that risk is positively correlated to performance in the 2nd period and is negatively correlated in the 3rd period. We also find that the coefficients on LOAN become smaller, especially in the 3rd period, when volatility is included in the regression. Therefore, risk does explain part of the relationship between stock loan and performance. Risk, however, is not the only story, because including risk does not eliminate the correlation between stock loan percentage and performance.

We argue in the model that stock loan financing can be good, because it allows controlling shareholders to invest in good projects without sacrificing their ownership. During good economic times, good projects should be more available and their benefit should also be more visible. Therefore, the positive correlation between stock loan and firm performance in the 2nd period is consistent with our hypotheses.

Our model does not predict the relation between stock loan financing and firm performance during economic downturns. One possible explanation is that controlling shareholders transfer wealth from the company to themselves and that

hurts company performance.   Controlling shareholders with stock loan financing are under immense pressure during bad times - when economic conditions are bad, stock prices tend to be low. When the price of stock, which is put as collateral for personal loans, falls below or is near the face value of the loan, financial institutions are likely to liquidate the collateral for self-protection.   Without stocks, controlling shareholders are likely to lose control of the company.   Therefore, controlling shareholders have a strong incentive to get themselves out of trouble by tunnelling.

Another important variable in predicting firm performance is the shareholding percentage.   The higher the percentage is of shares owned by the board, the better is the future performance.   The positive correlation can come from self-selection or from an incentive effect.   If the board expects a good performance, then they are more willing to hold a larger ownership.   On the other hand, when the board holds a larger ownership, it will have a stronger incentive to make the right decisions and improve firm performance.

5.   Conclusion

This paper studies the personal loans of controlling shareholders.   Our model suggests that controlling shareholders' personal financing is closely related to firm characteristics and performances.   Using a sample from listed companies in Taiwan, we find that the evidence is consistent with our predictions.

A direct policy implication of this study is that we should pay more attention to the disclosure of personal financing of those who hold the decision rights in a company. In most countries (for example, the U.S.), it is not required that such information be disclosed. Given that such financing can affect firm performance, investors might be better off if they are informed.

The result in this paper suggests that the wealth constraint is an important consideration for controlling shareholders. Using personal loans is only one way to relax the wealth constraint. Controlling shareholders can also use a pyramid structure or cross-shareholding to relax the wealth constraint. Future research examining the circumstances under which one is preferred to the other is indeed warranted.

References

Bebchuk, Lucian, Reinier Kraakman, and George Triantis, 1998, Stock pyramids, cross-ownership, and dual class equity: The creation and agency costs of separating control from cash flow rights, National Bureau of Economic Research working paper.

Berle, Adolf, and Gardiner Means, 1932, The Modern Corporation and Private Property, MacMillan, New York, N.Y.

Claessens, Stijn, Simeon Djankov, Joseph Fan, and Larry H.P. Lang, 1999, Expropriation of Minority Shareholders in East Asia, World Bank Working Paper 2088.

Claessens, Stijn, Simeon Djankov, and Larry H.P. Lang, 2000, The Separation of Ownership and Control in East Asian Corporations, *Journal of Financial Economics 58*, 81-112.

Faccio, Mara, and Larry H.P. Lang, 2000, The Separation of Ownership and Control: An Analysis of Ultimate Ownership in Western European Corporations, working paper.

Jensen, Michael C., and William Meckling, 1976, Theory of the firm: Managerial behavior, agency costs, and capital structure, Journal of Financial Economics 3, 305-360.

La Porta, R., F. Lopez-de-Silanes, and A. Shleifer, 1999, Corporate ownership around the world, Journal of Finance 54, 471-517.

Appendix

Proof of Proposition 1. Using the condition that securities are fairly priced, we have

$$E = (1-\mathbf{a})[\int_{p=0}^{p^*} 1 dG(p) + \int_{p=p^*}^{1} PV(p)dG(p) - D]$$

and $\mathbf{B} = \mathbf{D}$. The amount of money that the entrepreneur can raise from selling equity and corporate debt is $\mathbf{E} + \mathbf{B}$, which is equal to (4). This proves part (a). As to part (b), from (4), the sum of $\mathbf{E}$ and $\mathbf{B}$ is decreasing in $\mathbf{a}$ and is increasing in $\mathbf{D}$. Since $\mathbf{a}^3\mathbf{a_0}$ and $\mathbf{D} \leq \mathbf{r}$, the largest amount of money the entrepreneur can raise from the capital market without stock loan financing is $\overline{M}_0$. **Q.E.D.**

Proof of Lemma 1. When $F > 0$, using the facts that $\mathbf{a} = \mathbf{a_0}$ and $D = r$, the entrepreneur chooses the risky project if and only if $\mathbf{a_0}$ $(1 - r) - F < p$ $[\mathbf{a_0}$ $(R - r) - F]$, which is equivalent to (6). Part (b) of the lemma follows from (6). **Q.E.D.**

Proof of Proposition 2. Using the condition that securities are fairly priced, we have

$$E = \int_{p=0}^{p_1(F)} (1-\mathbf{a}_0)(1-r)dG(p) + \int_{p=p_1(F)}^{1} p(1-\mathbf{a}_0)(R-r)dG(p),$$

$$X = F\left(\int_{p=0}^{p_1(F)} dG(p) + \int_{p=p_1(F)}^{1} p\,dG(p) \right),$$

and $\mathbf{B} = \mathbf{r}$. From the fact that $M_1(F) = E + B + X$, we can get (7). This completes the proof of part (a). As to part (b), note that

$$\frac{dM_1}{dF} = (1-\mathbf{a}_0)\left[(1-r)-p_1(F)(R-r)\right]g(p_1(F)) + \left(\int_{p=0}^{p_1(F)} dG(p) + \int_{p=p_1(F)}^{1} p\,dG(p) \right)$$

The second term of the above expression is always positive. Moreover, when $F = 0$, the first term is equal to 0, because $p_1(0) = p^*$. Therefore, $\left.\dfrac{dM_1(F)}{dF}\right|_{F=0} > 0.$

Q.E.D.

Proof of Lemma 2. From the model, since all securities are fairly priced, the entrepreneur will obviously put all his wealth in the company. Therefore, the entrepreneur has to finance $1 - W$, which implies that the project can be financed if there exists an F that satisfies $W + M_1(F) = 1$. In addition, the entrepreneur will finance the project only when its net present value is non-negative at date 0. This requirement is equivalent to $\int_{p=0}^{p_1(F)} 1 dG(p) + \int_{p=p_1(F)}^{1} PV(p)dG(p) \geq 1$. This completes

the proof of part (a).   As to part (b), let F^* denote the optimal face value of the stock loan.   Suppose that $W_2 < W_1$, $F^* = F_1$ when $W = W_1$, $F^* = F_2$ when $W = W_2$, and $F_2 < F_1$.   The entrepreneur with $W = W_1$ can increase his payoff by reducing F from F_1 to F_2, because doing so allows him to pay less at date 2 and raise more money at date 1.   This contradict the assumption that $F^* = F_1$ when $W = W_1$.   **Q.E.D.**

Table 1.   Summary statistics of basic variables

The number reported in this table is calculated for a sample of 560 observations.   We exclude observations that have the largest 1% and smallest 1% values for variables ROA, ROE, RET,   (ROA),   (ROE), and   (RET).   Variable SHARE is the percentage of shares owned by the board of directors; LOAN is the percentage of shares that is owned by directors and is put as collateral for personal loans; D/A is the debt-to-asset ratio in a percentage measured in book values; Q is the Tobin' s Q measured as the market value of assets divided by its book value.   The variables SHARE, LOAN, D/A, and Q are measured at the end of November 1996, October 1998, and August 2000.   The annual stock return (RET) is the annualized average stock return and it is calculated for three periods: 1995:1 - 1996:11, 1996:12 - 1998:10, and 1998:11 - 2000:8.   The annual accounting return (ROA or ROE) is the annualized average quarterly return.   For accounting returns, the 1st period is from 1994:IV to 1996:III, the 2nd period is from 1996:IV to 1998:III, and the 3rd period is from 1998:IV to 2000:III.   Term   (RET) is the annualized standard deviation of monthly stock return, while   (ROA) and   (ROE) are the standard deviation of seasonal-adjusted quarterly accounting return within three periods.

Panel A. Firm characteristics

| | Summary statistics | | | | | Correlation | | |
	Mean	Standard deviation	Skewness	Kurtosis	$_1$	LOAN	D/A	Q
SHARE	18.81	11.17	1.19	1.30	0.86	-0.229	-0.114	0.143
LOAN	30.95	30.58	0.77	-0.67	0.73		0.308	-0.127
D/A	41.91	15.44	0.24	-0.07	0.72			-0.199
Q	1.33	0.72	2.07	5.84	0.57			

Panel B. Firm performance

| | Summary statistics | | | | | Correlation | | | | |
	Mean	Standard deviation	Skewness	Kurtosis	$_1$	ROE	RET	(ROA)	(ROE)	(RET)
ROA	4.72	7.98	-0.12	2.60	0.45	0.883	0.674	-0.163	-0.123	-0.267
ROE	3.35	15.81	-2.01	12.88	0.13		0.644	-0.245	-0.184	-0.330
RET	-16.91	40.56	-0.43	0.25	-0.05			-0.086	-0.178	-0.299
(ROA)	3.82	2.98	2.44	8.27	0.30				0.225	0.377
(ROE)	24.33	34.04	1.89	2.26	0.32					0.069
(RET)	49.84	16.51	1.12	2.15	0.28					

Table 2.   Summary statistics of basic variables over subperiods

The term SHARE is the percentage of shares owned by the board of directors; LOAN is the percentage of shares that is owned by directors and is put up as collateral for personal loans; D/A is the debt-to-asset ratio in a percentage measured in book values; Q is the Tobins' Q measured as the market value of assets divided by its book value. The terms SHARE, LOAN, D/A, and Q are measured at the end of November 1996 (1st), October 1998 (2nd), and August 2000 (3rd).   The annual stock return (RET) is the annualized average stock return and it is calculated for three periods: 1995:1 - 1996:11 (1st), 1996:12 - 1998:10 (2nd), and 1998:11 - 2000:8 (3rd).   The annual accounting return (ROA or ROE) is the annualized average quarterly return.   For accounting returns, the 1st period is from 1994:IV to 1996:III, the 2nd period is from 1996:IV to 1998:III, and the 3rd period is from 1998:IV to 2000:III.   The term (RET) is the annualized standard deviation of monthly stock return, while   (ROA) and   (ROE) are the standard deviation of seasonal-adjusted quarterly accounting return within three periods. The number of observations is 239, 239, and 321 for the 1st, 2nd, and 3rd period, respectively.   The symbol * denotes significance at a 0.05 level.

	Mean					Median				
Period	1st	2nd	3rd	1 vs. 2	3 vs. 2	1st	2nd	3rd	1 vs. 2	3 vs. 2
Firm characteristics at the end of the period										
SHARE	21.32	19.05	18.63	<0.01*	0.03*	17.53	16.11	15.79	<0.01*	<0.01*
LOAN	26.48	34.51	28.30	<0.01*	0.13	15.18	23.68	18.58	<0.01*	0.39
D/A	39.56	39.82	43.47	0.73	<0.01*	38.61	39.73	43.22	0.58	<0.01*
Q	1.74	1.65	1.09	0.02*	<0.01*	1.61	1.44	0.89	<0.01*	<0.01*
Firm performance during the period										
ROA	7.48	7.23	2.86	0.60	<0.01*	6.46	6.22	3.10	1.00	<0.01*
ROE	12.07	8.19	-0.26	0.31	<0.01*	7.50	7.09	2.79	0.29	<0.01*
RET	-7.88	6.16	-34.09	<0.01*	<0.01*	-9.09	2.10	-35.88	<0.01*	<0.01*
(ROA)	3.36	3.36	4.17	0.89	<0.01*	2.75	2.60	3.07	0.60	<0.01*
(ROE)	29.05	17.56	29.37	0.04*	<0.01*	6.84	6.39	10.00	0.21	<0.01*
(RET)	35.41	44.20	54.04	<0.01*	<0.01*	34.01	41.91	50.57	<0.01*	<0.01*

Table 3.   Determinants of stock loan percentage

This table reports OLS results for the following regression,

$$LOAN_{it} = \alpha + \beta_1 Q_{it} + \beta_2 CASH_{it} + \beta_3 \sigma(RET_{it}) + \beta_4 ASSET_{it} + \varepsilon_{it}.$$

The sample has 560 observations.   We exclude observations that have the largest 1% and smallest 1% values for variables ROA, ROE, RET, Δ(ROA), Δ(ROE), and Δ(RET). The term LOAN is the percentage of shares that is owned by directors and is put up as collateral for personal loans; Q is the Tobins' Q measured as the market value of assets divided by its book value; ASSET is the book value of assets; LOAN, Q, and ASSET are measured at the end of November 1996, October 1998, and August 2000; σ(RET) is the annualized standard deviation of monthly stock return; Δ(RET) is calculated for three periods: 1995:1 - 1996:11, 1996:12 - 1998:10, and 1998:11 - 2000:8; CASH is the annualized operating cash flow divided by the book value of assets. For the CASH variable, the 1st period is from 1994:IV to 1996:III, the 2nd period is from 1996:IV to 1998:III, and the 3rd period is from 1998:IV to 2000:III. The numbers in parentheses are standard deviations, ** denotes significance at a 0.05 level, and * denotes significance at a 0.1 level.

$LOAN_{t-1}$			-0.271**	-0.259**
			(0.030)	(0.029)
Q_t	2.631*	1.934	3.027**	2.589*
	(1.510)	(1.447)	(1.416)	(1.361)
$CASH_t$	-24.885**	-29.778**	-46.722**	-50.163**
	(11.361)	(11.097)	(10.923)	(10.674)
$\sigma(RET_t)$	-0.179**		-0.117**	
	(0.051)		(0.048)	
$\Delta(RET_t)$		-0.359**		-0.302**
		(0.054)		(0.051)
$ASSET_t$	4.922*	3.284	2.041	0.411
	(2.910)	(2.828)	(2.746)	(2.676)
R^2	0.048	0.097	0.165	0.205

Table 4.   The determinant of firm risk

This table reports OLS results for the following regression,

$$\sigma(R_{it}) = \alpha + \beta_1 \sigma(R_{i,t-1}) + \beta_2 LOAN_{i,t-1} + \beta_3 D/A_{i,t-1} + \beta_4 SHARE_{i,t-1} + \varepsilon_{it}.$$

The term LOAN is the percentage of shares that is owned by directors and is put up as collateral for personal loans; D/A is the debt-to-asset ratio in percentage measured in book values; SHARE is the percentage of shares owned by the board of directors; LOAN, D/A, and SHARE are measured at the end of November 1996, October 1998, and August 2000.   The annual stock return (RET) is the annualized average stock return and it is calculated for three periods: 1995:1 - 1996:11, 1996:12 - 1998:10, and 1998:11 - 2000:8. The annual accounting return (ROA or ROE) is the annualized average quarterly return.   For accounting returns, the 1st period is from 1994:IV to 1996:III, the 2nd period is from 1996:IV to 1998:III, and the 3rd period is from 1998:IV to 2000:III; σ(RET) is the annualized standard deviation of monthly stock return; σ(ROA) and σ(ROE) are the standard deviation of seasonal-adjusted quarterly accounting return within three periods.   The number of observations is 239 and 321 for the 2nd and 3rd period, respectively.   We exclude observations that have the largest 1% and smallest 1% values for variables ROA, ROE, RET, σ(ROA), σ(ROE), and σ(RET). The numbers in parentheses are standard deviations. ** denotes significance at a 0.05 level, and * denotes significance at a 0.1 level.

| | Dependent variable | | | | | |
| | 2nd period | | | 3rd period | | |
	σ(ROA)	σ(ROE)	σ(RET)	σ(ROA)	σ(ROE)	σ(RET)
$\sigma(R_{t-1})$	0.215*	0.054*	0.380*	0.467*	1.498*	0.165*
	(0.051)	(0.016)	(0.089)	(0.070)	(0.039)	(0.058)
$LOAN_{t-1}$	0.015*	0.097	-0.017	0.018*	0.011	0.110*
	(0.005)	(0.050)	(0.031)	(0.006)	(0.033)	(0.033)
D/A_{t-1}	-0.001	0.003	0.044	-0.009	0.066	0.138*
	(0.011)	(0.102)	(0.062)	(0.012)	(0.064)	(0.063)
$SHARE_{t-1}$	-0.003	0.056	0.102	-0.019	-0.010	-0.189*
	(0.012)	(0.110)	(0.067)	(0.015)	(0.083)	(0.082)
R^2	0.103	0.066	0.086	0.158	0.831	0.111

Table 5.   The determinant of firm performance

This table reports OLS results for the following regression,

$$R_{it} = \ + \ _1 R_{i, t-1} + \ _2 LOAN_{i, t-1} + \ _3 D/A_{i, t-1} + \ _4 SHARE_{i, t-1} + \ _{it}.$$

The term LOAN is the percentage of shares that is owned by directors and is put up as collateral for personal loans; D/A is the debt-to-asset ratio in percentage measured in book values; SHARE is the percentage of shares owned by the board of directors; LOAN, D/A, and SHARE are measured at the end of November 1996, October 1998, and August 2000.   The annual stock return (RET) is the annualized average stock return and it is calculated for three periods: 1995:1 - 1996:11, 1996:12 - 1998:10, and 1998:11 - 2000:8.   The annual accounting return (ROA or ROE) is the annualized average quarterly return.   For accounting returns, the 1st period is from 1994:IV to 1996:III, the 2nd period is from 1996:IV to 1998:III, and the 3rd period is from 1998:IV to 2000:III;   (RET) is the annualized standard deviation of monthly stock return;   (ROA) and   (ROE) are the standard deviation of seasonal-adjusted quarterly accounting return within three periods.   The number of observations is 239 and 321 for the 2nd and 3rd period, respectively.   We exclude observations that have the largest 1% and smallest 1% values for variables ROA, ROE, RET,   (ROA), (ROE), and   (RET). The numbers in parentheses are standard deviations, ** denotes significance at a 0.05 level, and * denotes significance at a 0.1 level.

Panel A.

	Dependent variable					
	2nd period			3rd period		
	ROA	ROE	RET	ROA	ROE	RET
R_{t-1}	0.466*	0.022	0.308*	0.481*	0.427*	0.163
	(0.058)	(0.013)	(0.078)	(0.061)	(0.078)	(0.090)
$LOAN_{t-1}$	0.030*	0.052	0.161*	-0.049*	-0.088*	-0.420*
	(0.014)	(0.028)	(0.051)	(0.014)	(0.031)	(0.080)
D/A_{t-1}	0.010	-0.046	-0.019	0.042	-0.120	0.067
	(0.030)	(0.056)	(0.101)	(0.029)	(0.063)	(0.155)
$SHARE_{t-1}$	0.065*	0.186*	0.263*	0.096*	0.179*	0.216
	(0.032)	(0.060)	(0.112)	(0.035)	(0.078)	(0.200)
R^2	0.259	0.056	0.111	0.257	0.197	0.110

Table 5.　The determinant of firm performance (continued)

Panel B.

	2nd period			3rd period		
	Dependent variable					
	ROA	ROE	RET	ROA	ROE	RET
R_{t-1}	0.457*	0.022	0.244*	0.484*	0.406*	0.226*
	(0.057)	(0.013)	(0.074)	(0.059)	(0.079)	(0.085)
$LOAN_{t-1}$	0.023	0.057*	0.165*	-0.039*	-0.085*	-0.339*
	(0.015)	(0.028)	(0.048)	(0.014)	(0.031)	(0.076)
D/A_{t-1}	0.006	-0.042	-0.066	0.041	-0.112	0.210
	(0.030)	(0.055)	(0.095)	(0.028)	(0.063)	(0.148)
$SHARE_{t-1}$	0.064*	0.190*	0.222*	0.080*	0.187*	0.048
	(0.032)	(0.060)	(0.105)	(0.034)	(0.078)	(0.191)
(R_t)	0.429*	-0.056	0.579*	-0.546*	-0.037	-0.814*
	(0.171)	(0.035)	(0.099)	(0.117)	(0.022)	(0.130)
R^2	0.278	0.066	0.226	0.305	0.204	0.209

Figure 1.　Histogram of the stock loan percentage (LOAN)

The term LOAN is the percentage of shares that is owned by directors and is put up as collateral for personal loans and it is measured at the end of October 1998 and August 2000.