February 11, 2003

Propping and Tunnelling[1]

Eric Friedman, Simon Johnson, and Todd Mitton

Corresponding author: Simon Johnson, E52-562, 50 Memorial Drive, Sloan School of Management, MIT, Cambridge, MA 02142, phone (617)253-8412, fax (617)253-2660, e-mail: sjohnson@mit.edu.

Friedman: School of Operations Research and Industrial Engineering, Cornell University, Ithaca, NY 14853.
Johnson: Sloan School of Management, MIT, Cambridge, MA 02142.
Mitton: Marriott School, Brigham Young University, Provo, UT 84602.

Running Head: Propping and Tunnelling

Propping and Tunnelling

Abstract

In countries with weak legal systems there is a great deal of "tunnelling" by the entrepreneurs who control publicly traded firms. However, there is considerable evidence that under some conditions entrepreneurs "prop" up their firms, i.e., use their private funds to benefit minority shareholders. We provide evidence and a model that explains propping. In particular, we suggest that issuing debt can credibly commit an entrepreneur to prop, even though creditors can never take possession of any underlying collateral. This helps to explain both why emerging markets with weak institutions sometimes grow rapidly and why they are subject to frequent economic and financial crises.

JEL classification numbers: G33, P12, K12

1. **Introduction**

In countries with weak legal protection for investors, there is now strong evidence that entrepreneurs often "tunnel" resources out of firms, i.e., expropriate funds that rightfully belong to minority shareholders**.** The anecdotal evidence, however, also suggests that sometimes entrepreneurs in these countries transfer private resources *into* firms that have minority shareholders. This "propping" is often clandestine, but several examples came to light in the aftermath of the Asian financial crisis. Lee Kun Hee, chairman of Samsung Electronics and head of the family that controls Samsung Group, donated some of his personal wealth to pay off the debts of Samsung Motors Inc, a subsidiary that was on the verge of bankruptcy in summer 1999 (Wall Street Journal, July 1, 1999, p. A19).[2] The controlling shareholders in CP Group sold assets in Thailand and China apparently in order to inject cash into publicly listed Thai companies (Far Eastern Economic Review 1998a.)[3] The Salim group sold privately held assets in the Netherlands in order to bail out publicly listed operations in both the Philippines and Indonesia (Far Eastern Economic Review 1998b), and also injected funds from a publicly-listed Hong Kong company into a publicly-listed Indonesian company (Asian Wall Street Journal 1999).[4] In many countries, the evidence suggests controlling shareholders use private funds to provide temporary support to a firm that is in trouble.[5] Why would entrepreneurs engage in this kind of propping?

This paper suggests that propping may be an important part of how firms operate in countries with weak legal environments. In particular, it helps to explain why many firms in these countries rely heavily on debt finance. A weak legal system would seem to make debt unappealing because creditors can never effectively take control of collateral.[6]

For example, most collapses of banks and firms in Russia after the devaluation of August 1998 were associated with complete "looting" – creditors and minority shareholders got nothing and the firms went out of business (Troika Dialog 1999).[7] The experience of creditors in Hong Kong who lent to firms doing business in Mainland China is similar.[8] Bankruptcy in Thailand typically takes up to 10 years and the anecdotal evidence is that creditors ultimately receive very little through either court settlement (Foley 1999) or private debt renegotiations.[9] This paper suggests that the possibility of propping is part of what makes issuing debt attractive, to entrepreneurs and investors, when the courts cannot enforce contracts.

In effect, our interpretation of the data suggests that large business groups contain a form of "soft budget constraint." This kind of softness is usually associated with government-backed enterprises or bank-supported firms (Dewatripont and Maskin 1995). Because the funding source cannot commit not to bail out firms, it is tempted to bail them out ex post and this induces inefficient behavior (Roland 2001, p.215). In constrast, we are suggesting that budget constraints are soft for large conglomerates in developing countries because the legal and regulatory environment is weak. In this context, debt is in part a commitment to bailout by the entrepreneur to bailout a firm when there is a moderately bad shock. However, this debt also creates a major potential cost – it makes it more likely that the entrepreneur will abandon the firm (or "take the money and run") when there is a very bad shock.

Our analysis has three parts. First, we establish that firms in developing countries with weaker corporate governance also have a higher ratio of debt to total assets. Firm-

level corporate governance and debt appear to be substitutes. This relationship is most robust for Asian "emerging market" countries.

Second, we develop a simple model that explains this fact by allowing propping. Entrepreneurs choose how much to expropriate, as in Jensen and Meckling (1976), but they can also inject private cash today in order to preserve their options to expropriate and to obtain a legitimate share of profits tomorrow.[10] Both expropriation and "propping" cannot be monitored, prevented, or punished in countries with weak legal protection of investors.[11] If the legal system is weak, creditors cannot take possession of collateral but a firm that defaults on existing debts will not generally be able to borrow further. In this framework, the direct effect of debt is to increase the potential for propping and make it more likely that outside investors will participate in financing the firm.[12]

If our view is correct, debt commits the entrepreneur to bailing out a project and effectively establishes a credible "soft-budget constraint" (usually associated with government bailouts, as in Kornai 1979). The soft-budget constraints of socialist countries and state owned enterprises often destroy incentives for good performance (see Roland 2000). However, in our model the commitment to bailout a project may actually increase its value, because it reduces the incentive of an entrepreneur to expropriate investors when returns are temporarily low. The debt-induced softening of a particular firm's budget constraint may actually make it easier to attract outside investors.

La Porta, Lopez-de-Silanes, and Shleifer (1999) show that groups of connected firms are much more usual than stand-alone firms in most countries. These groups typically control at least one company that is publicly traded or otherwise used to raise

funds from outside investors, and a number of other companies that are privately held without any outside investors. Some valuable assets are usually kept private. This type of organization is particularly common in "emerging markets" where the legal protection of minority shareholder rights and creditors is weaker (LLSV 1998 and 1999b). This paper explores some empirical and theoretical aspects of relationships within such groups of firms.

Third, the empirical evidence suggests there is a higher propensity to tunnel for groups of interconnected firms, particularly if organized in pyramids. We assume that the propensity to tunnel is correlated with the propensity to prop, i.e., that transfers in and out of firms are symmetric. Using this assumption we propose a test for the presence of propping and find that a higher propensity to prop is associated with (1) more debt, and (2) less adverse effects of debt on stock price when there is an adverse macroeconomic shock.

We model tunnelling along the lines of LLSV (1999b), Johnson, Boone, Breach and Friedman (2000), and Shleifer and Wolfenzon (2000), and introduces the possibility of propping (i.e., negative tunnelling). More generally, the model builds on the findings of La Porta, Lopez-de-Silanes, Shleifer and Vishny (LLSV 1997, 1998, 2000, and 2002) who show that many countries do not protect investors adequately. Specifically, in countries with weak investor protection, entrepreneurs can "tunnel" resources out of their firms in ways that cannot be prevented by outside investors (Johnson, La Porta, Lopez-de-Silanes, and Shleifer 2000).

Faccio, Lang, and Young (2001) show that firms in Asia that are lower down a pyramid, i.e., have a greater divergence between cash-flow and control rights, tend to

have more leverage, but the same is not true for Europe. These authors use different variables for the risk of expropriation and offer a different interpretation of the phenomenon.

Section 2 establishes the correlation between corporate governance and debt in emerging markets. Section 3 presents a simple dynamic model for an entrepreneur who has issued debt in a firm with minority shareholders. Section 4 examines evidence from the Asian financial crisis as a test of our theory. Section 5 concludes.

2. Evidence on Debt and Corporate Governance

Do firms with stronger corporate governance issue more or less debt? Theoretically, the relationship could go either way. For example, firms with better corporate governance might also find it easier to issue debt, or firms with better investment prospects may improve their corporate governance at the same time as issuing more debt. Alternatively, firms may use the issue of debt as a substitute for improving corporate governance. In this section we seek to establish some basic robust facts for developing countries.

We report firm-level regressions intended to measure the relationship between corporate governance and levels of debt. Specifically, we estimate the following model:

$$\textit{Debt ratio} = a + b_1(\textit{Corporate Governance}) + b_2(\textit{Size}) + b_3(\textit{Profitability}) + b_4(\textit{Growth}) + b_5(\textit{Industry Dummies}) + b_6(\textit{Country Dummies}) + e, \quad (1)$$

where the inclusion of size, profitability, and growth follows the lead of Lee, Lee, and Lee (2000).

Note that this specification effectively assumes that corporate governance at the firm level is an exogenous variable, e.g., given by the tastes of the entrepreneur. This is consistent with much of the firm-level literature and precisely the idea we develop in the model below. Ideally, of course, we would instrument for corporate governance but no suitable instrument is currently available. As a result, these regressions may suffer from the usual endogeneity, omitted variables, and measurement error problems. The basic correlations are suggestive but much more work is needed before we are confident that these regressions are properly identified.

{Insert Table 1 here}

Our primary data source is the Worldscope database. Table 1 presents summary statistics on the firms in our sample. In subsequent tables we match our primary data with other data sources, thus the number of firms and countries covered varies in each table. Table 1 also provides a list of variable definitions. Unless otherwise noted, the data used in our analysis is from the September 1997 Worldscope disk. We chose this month because it appeared to be the version that would give the most recent updates but that would also have no updates based on post-June 97 data (i.e., the data are all pre-Asian crisis). The data could be based on financial statements as late as June 1997, but since the most popular fiscal year-end is December, the majority of these data is from the end of 1996.

{Insert Table 2 here}

Table 2 reports coefficient estimates from regressions of debt ratios on corporate governance ratings for 441 firms that are actively traded by international investors. This is a useful group of firms to consider as their stock is held in part by investors who are

not controlling shareholders. It is therefore reasonable to believe that these firms are actually raising capital from outside investors.

Credit Lyonnais Securities Asia (CLSA) compiles the ratings we use in Table 2 for companies in 23 emerging markets, i.e., the set of developing countries that are open to capital flows.[13] There is clearly a selection bias but it is an interesting one – CLSA covers firms that it thinks are of interest to international investors. CLSA rates firms on 57 issues in seven areas of corporate governance. As our measure, we take the simple average of CLSA's ratings in the areas of transparency, independence, accountability, responsibility, and fairness. We omit two of CLSA's ratings: the social-awareness rating because it does not relate directly to minority shareholder protection, and the discipline rating because limiting the use of debt is one of the factors in its calculation. The ratings are from 1 to 100, with a higher score indicating better corporate governance.[14] These ratings are for 2001, so we match this with Worldscope data from the same year.

The debt ratio is defined here as the book value of debt divided by the book value of total assets. Firm size is defined as annual sales in $U.S., profitability is defined as return on sales, and firm growth is defined as the one-year growth rate in total assets. We include dummy variables for 12 of 13 industries, where industries are defined broadly, similar to the definitions in Campbell (1996), and correspond with the firm's primary SIC code. The number of observations declines when we control for firm growth due to missing data.

We control for basic determinants of debt from the corporate finance literature: firm size, profitability, and growth. We begin Table 2 with nonfinancial firms as differences in financial reporting may make it misleading to compare nonfinancial and

financial firms. We find some evidence that larger firms in this sample have higher debt ratios, as predicted by Titman and Wessels (1988), and little evidence that more-profitable firms have lower debt ratios, as would be suggested by Myers (1977).

Table 2, column (1) shows a strong negative relationship between corporate governance ratings and debt ratios. This relationship is hardly affected when we include controls for size and profitability in column (2), industry dummies in column (3), industry and country dummies in column (4), and firm growth in column (5). The results are similar when we include financial firms in columns (6) and (7). In results not reported, we find that firms in Asia primarily drive these results – this is one reason we focus our empirical analysis in section 4 on Asia. The magnitude of the coefficient on the CLSA rating (taking the –0.232 from column 5) indicates that a 10-point improvement in a firm's corporate governance score is associated with a lower debt ratio of 2.3 percentage points.

{Insert Table 3 here}

Table 3 reports similar results from a much broader set of firms, using the Worldscope database and additional sources on cross-listings. Again in this table our focus is on nonfinancial firms. For this set of firms we have a variety of indicators of corporate governance (following Mitton 2002). "Cross-listed" is an indicator set to one if the firm is listed on a major U.S. exchange either directly or in depository receipt form; listing on such an exchange is considered to represent better corporate governance. "Big Six auditor" is an indicator set to one if a Big Six accounting firm audits the firm; having such an auditor is considered to represent better corporate governance (we have not yet checked for an Arthur Andersen effect). "Diversified" is an indicator set to one if the

firm operates in more than one two-digit SIC industry; a more diversified firm is considered to have weaker corporate governance. "Ownership concentration" is the percentage of shares held by the largest shareholder; higher concentration is considered to represent stronger corporate governance.

We conduct the analysis separately for three distinct regions. Our data sources have over 3,000 firms for Asia (including Japan) and Western Europe but only about 300 firms for Latin America. Table 3 reports coefficient estimates from regressions of debt ratios on variables related to corporate governance. In our Asian subsample, columns (1) through (3), weaker corporate governance is correlated with higher levels of debt. The number of observations declines due to missing data as we add additional variables, but the coefficients remain fairly consistent across specifications. (The one exception is cross-listed, which greatly increases in magnitude when size is added as a control.)

In Table 3, column (2) being cross-listed is associated with an 8 percentage point lower debt ratio, having a Big Six auditor is associated with a 3.4 percentage point lower debt ratio, and being diversified is associated with a 2.5 percentage point higher debt ratio. In column (3) an increase in ownership concentration of 10 percentage points is associated with a 1.4 percentage point lower debt ratio. The results for Asia are similar if we exclude Japan from the sample (columns 4 through 6). The coefficients are very similar if we include each corporate governance variable separately (not reported). The results are qualitatively unchanged if country and industry dummies are omitted, with the exception that the coefficient on the “diversified” dummy loses statistical significance (but retains its sign).

The correlation between governance and debt is much weaker for the Latin American subsample (columns 7 through 9), although this is probably because we have fewer firms. It is also strikingly weaker for the West European subsample (columns 10 through 12). In Western Europe, being cross-listed is actually associated with having more debt. The only result that is similar to Asia is for ownership concentration, although the coefficient is much smaller.

We turn now to a simple model that can incorporate the fact that debt is attractive when corporate governance is weak (either because the legal system is weak or because the firm chooses not to protect minority shareholders.) The goal of the model in section 3 is to sharpen our intuition about the nature of propping, and to suggest some simple empirical tests (for section 4).

3. **A Simple Dynamic Model of Propping**[15]

Consider an entrepreneur who controls one publicly traded firm. The entrepreneur can steal any amount from this firm, including looting everything.[16] But he can also prop up the firm's performance using privately controlled funds.

This firm is controlled by the entrepreneur but has separate legal status. The entrepreneur owns share α of the firm and outsiders own share $\beta=1-\alpha$. Retained earnings are denoted I. Here we assume the capital structure is already in place and the firm is operating. In separate work, available from the authors, we have looked at how the firm can start up and what are the feasible choices for the capital structure.

In period t, the entrepreneur steals S_t of retained earnings from the firm and obtains utility of S_t. The cost of stealing is $(S_t^2/2k)$. The parameter k represents the

strength of the legal system – a higher value of k means that stealing is less costly. We assume that $k \leq I$.

Stealing is wasteful in the sense that it reduces the amount invested (i.e., there is an opportunity cost to diverting resources out of this firm). The entrepreneur invests what he does not steal in a project that earns a gross rate of return R_t in period t, and from which it obtains share α. We assume that the entrepreneur can steal as much as he wants from the firm before investment takes place, but it cannot steal the proceeds of this investment (at least not until the next period.) This is intended to represent the fact that investors cannot observe investment and never know the per unit return, R, but they can see the level of physical activity of the firm (e.g., quantity produced or number of customers) and they can obtain a reasonable estimate of revenues.[17]

Again, to simplify the analysis, we assume that the support of R_t is contained on $[0,1/\alpha]$.[18] Also, we assume that the stochastic variable R_t is persistent: i.e., $[R_{t+1}|R_t]$ first order stochastically dominates $[R_{t+1}|R_t']$ when $R_t > R_t'$. We assume that the entrepreneur observes R_t before choosing S_t. Outside investors never observe R_t.

The publicly traded firm needs to make a debt payment, D, each period.[19] In our simple model this payment does not vary over time and it cannot be renegotiated.[20] It can be considered as the regular payment due on a long-term bond. The firm's profit in period t is therefore:

$$F(S_t,R_t)=R_t(I-S_t)-D.$$

We assume that if in any period the firm's profit (including debt payment) is negative then bankruptcy is declared and the firm ceases to operate. This means that there are no future profits or debt payments or opportunities to steal these assets.

Intuitively, the entrepreneur equates the marginal cost and marginal benefit of stealing. Because the entrepreneur owns α of the firm, he often has an incentive to invest at least some of the firm's assets rather than to steal them all. As α rises, the amount of stealing in equilibrium falls. As k rises, the amount of stealing in equilibrium rises.

We now solve for the entrepreneur's optimal behavior by solving the stochastic dynamic program given below.[21]

The entrepreneur's expected payoff in any period is:

$$\pi_g(S_t,R_t) = \alpha \max[0,F(S_t,R_t)] + S_t - S_t^2/2k,$$

which can be written as

$$\pi_g(S_t,R_t) = \alpha F(S_t,R_t)* H(F(S_t,R_t)) + S_t - S_t^2/2k,$$

where $H(x) = 0$ if $x<0$, and $H(x)=1$ otherwise. Let δ denote the discount factor. The Bellman equation for the entrepreneur's value function (expected discounted present and future earnings) can be written as:

$$V(R_t) = \max_S \{\pi_m(S_t,R_t) + \delta*E[V(R_t') \mid R] * H(F(S_t,R_t)) \}$$

and thus the entrepreneur's expected payoff is $V(R_0)$.

It is easy to see that the value function $V(R_t)$ is strictly positive and non-decreasing in R as is its conditional expectation,

$$W(R_t)=E[V(R_t') \mid R_t],$$

by persistence. Let

$$S_u(R_t) = \text{argmax}_S \alpha F(S_t,R_t)+S_t-S_t^2/2k.$$

Solving the first-order condition gives:

$$S_u(R_t) = k(1 - \alpha R_t)$$

which would be the solution for a static model without debt (see Johnson, Boone, Breach, and Friedman 2000.)

First we consider the case when $\delta=0$ and future payoffs do not matter. Then the entrepreneur's optimization problem deals only with a single-period:

$$S^*(R_t)=\text{argmax}_S\ \alpha\ \max[0,F(S_t,R_t)] + S_t - S_t^2/2k.$$

Note that the function to be maximized is continuous with (at most) 2 local maxima. Thus we can show that the optimal policy is $S^*(R_t)=S_u(R_t)$ for $R_t \geq R_m$ and $S^*(R_t)=k$ for $R_t<R_m$, where R_m satisfies the equation:

$$F(S_u(R_m), R_+)+\delta w+ S_u(R_m) - S_u(R_m)^2/2k = k/2. \qquad (1)$$

Note that when D=0, then $R_m=0$ and we get the same result as in the model without debt in Johnson, Boone, Breach and Friedman (2000), but when D>0, $R_m>0$. In fact, R_m is strictly increasing in D. Thus, for $R_t<R_m$ the presence of debt causes the entrepreneur to "loot" when rates of return are too low, due to the impending bankruptcy. This "looting" effect of debt is similar to the intuition behind the debt overhang results in Myers (1977).

Now we return to the case where $\delta>0$ but for simplicity assume that R(t) is distributed i.i.d., in which case $W(R_t)>0$ is independent of R. Denote this value by w. In this case, the entrepreneur's optimization problem is:

$$S^*(R_t)=\text{argmax}_{St}\ \alpha\ [F(S_t,R_t)+\delta w]^* H(F(S_t,R_t)) + S_t - S_t^2/2k. \qquad (2)$$

Here, the function to be maximized has 2 local maxima and a single downward discontinuity at $S_d(R_t)=I-D/R_t$. Again if D=0, then the firm never goes bankrupt and $S^*(R_t)=S_u(R_t)$.

However, in general the optimal decision policy, $S^*(R_t)$ can take on 2 forms depending on the relationship between R_m (which was defined in equation 1) and R_+,

where R_+ satisfies $R_+*(I-S_u(R_+))=D$, i.e., R_+ is the rate of return at which the firm can just make its debt payment given the amount that the entrepreneur wants to steal. If $R_+<R_m$ then the optimal policy is the same as for the case above when $\delta=0$. However, if $R_+>R_m$, the optimal policy function becomes more interesting as there are 3 regions of behavior.

In the first region, $R_t \geq R_+$, $S^*(R_t)=S_u(R_t)$. In this case the presence of debt does not alter the entrepreneur's behavior. In the second region, $S^*(R_t)= k$ for $R_t \leq R_-$, where R_- satisfies

$$F(S_d(R_-), R_-)+\delta w+ S_u(R_-) - S_u(R_-)^2/2k = k/2.$$

In this case the entrepreneur steals as much as possible (k) from the firm, and we see the "looting" effect of debt.

Interestingly, in the intermediate region, $R_- \leq R \leq R_+$, $S^*(R_t)=S_d(R_t)$. Note that $S_d(R_t)$ is increasing in R_t. In this region, $S_d(R_t)<S_u(R_t)$ and thus the presence of debt actually reduces stealing, as the entrepreneur is trying to protect his future earnings. We call this the "propping" effect of debt because the debt induces better performance by the entrepreneur (from the perspective of shareholders), as argued by Grossman and Hart (1982) and Jensen (1986).

{insert Figure 1 here}

These three regions are illustrated in Figure 1 where stealing S(t) is on the y-axis and R_t is on the x-axis. The dark line is $S^*(R_t)$, the optimal amount of stealing given the value of R_t. The straight line from (0,k) to $(1/\alpha,0)$ is $S_u(R_t)$ which would be the optimal policy for D=0. As mentioned above, the presence of debt may reduce stealing by the entrepreneur in the intermediate region, $R_+>R_t>R_-$, in which the entrepreneur may steal less in order for the firm to remain solvent. In this region debt strengthens the

entrepreneur's incentives to act in the interest of shareholders, as suggested by Grossman and Hart (1982), Jensen and Meckling (1976), and Jensen (1986).

In this intermediate region, the entrepreneur may even steal less than 0, i.e., the entrepreneur puts his own money into the firm to prevent bankruptcy. The explanation is that earnings in the future (both from profit sharing and stealing) are valuable and the entrepreneur wants to keep the firm in business in order to have that opportunity.

There is also a region, when R_t is small, in which the presence of debt increases the amount of stealing by the entrepreneur since the firm is going bankrupt and thus there is no gain to be had from firm profits. In this region there can be a "debt overhang" that causes entrepreneurs to steal more and thus, as in Myers (1977), hurt the interest of outside shareholders and bondholders.

It is straightforward to show that the qualitative aspects of this analysis are not changed in the general model, where R_t is persistent but not necessarily i.i.d. In this case equation (2) is changed by replacing w with $W(R_t)$. Since this function is nondecreasing, the solution still breaks into three types of regions: normal, in which there is no effect of debt; looting, where the debt increases stealing; and "propping," where debt causes the entrepreneur to steal less, to protect the firm from bankruptcy. The major difference is simply that the points at which the transition between regions occurs now have to be derived by solving the complete stochastic dynamic program.

Assessment

In this simple model, the presence of debt may induce the entrepreneur to either steal less or even to prop up the company with his own money. Issuing debt is therefore

a commitment, under some conditions, to prop. We have not dealt here with the optimal amount of debt and equity for a firm in a weak legal environment, but in separate work (available from the authors) we have shown that in general it is desirable for both the entrepreneur and the outside investors if there is some equity and some debt. Under reasonable assumptions, when the legal environment is weaker – in the sense that all contracts are more difficult to enforce – firms will issue more debt.

4. **Testing for Propping**

Criteria for a Test

The anecdotal evidence, discussed in the introduction, suggests that propping occurs in some emerging markets. Tables 2 and 3 offer some systematic evidence that is consistent with the presence of propping. However, we need more direct evidence of propping. Of course, it is difficult to observe propping directly because it is relatively easy to hide transfers in and out of firms when investor protection is weak. Also, in contrast to tunnelling, minority shareholders and debt holders do not protest when there is propping, so there are no scandals and not much public information. However, if we think that investors can see through what entrepreneurs are doing, or if there is sufficient trading based on inside information, examining stock price performance in some situations should be helpful.

In particular, according to our theory, propping occurs when there is a negative shock to the macroeconomy. This shock needs to be large enough to induce propping but not too large – otherwise "looting" occurs. If such shocks are rare, it will be hard to find evidence of propping if we look at performance over long periods. These considerations

suggest we should construct a test around stock price performance at a time of intense but short-lived economic crisis. The Asian Financial Crisis of 1997-98 offers a quasi-natural experiment that allows us to test the effect of debt and corporate governance on firm-level performance. This crisis was undoubtedly an unexpected shock to Asian firms, and most of them could not adjust either their corporate governance or their debt levels immediately. At the same time, relatively few firms collapsed or were looted outright. We are therefore given an indication into how the stock market views different corporate finance arrangements at times of economic crisis, i.e., when, according to our theory, the incentive to prop should be strongest.

In effect, we are looking for a difference-in-difference effect: within the set of publicly traded Asian firms, all of which experienced a stock price fall due to the adverse macroeconomic shock, was there more or less fall for firms that could be expected to prop? This requires that we look for a particular interaction effect: a propping propensity that is only relevant when there is a shock. In other words, was there better or worse stock price performance for firms where outsiders could reasonably expect more propping?

Obviously the key to this analysis is a measure for the propensity to prop. Here we are guided by the literature on tunnelling. Tunnelling appears to be more likely when a firm is part of a family group of firms. In particular, when firms are organized in "pyramids" – in which one firm is controlled by another firm, which may in turn be controlled by another firm – this is generally thought to facilitate tunnelling (La Porta, Lopez-de-Silanes, and Shleifer 1999, Bertrand, Mullainathan, and Mehta 2002). Our

theory suggests that tunneling and propping are basically symmetric – so pyramids should also make propping easier. [22]

Asian Pyramids

Table 4 reports coefficient estimates from regressions of debt ratios on a pyramidal ownership indicator. Pyramid firms are those in which one firm is controlled by another firm, which may in turn be controlled by another firm. These kinds of structures are generally thought to facilitate tunnelling (La Porta, Lopez-de-Silanes, and Shleifer 1999, Bertrand, Mullainathan, and Mehta 2002). Firms with pyramid ownership structures may reasonably be considered to have a greater ability to prop.

The data come from nine Asian countries (Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, Thailand) and are compiled from the Worldscope database combined with ownership data assembled by Claessens, Djankov, and Lang (2000). "Pyramid" is an indicator set equal to one if the firm is controlled through a pyramid structure as defined by Claessens, Djankov, and Lang (2000). "Group affiliation" is an indicator set to one if the firm is associated with a family business group as defined by Claessens, Djankov, and Lang (2000). We control for group affiliation in this context because pyramidal firms may have differential access to capital by virtue of being associated with a family group.

Table 4 demonstrates a positive relationship between pyramidal control and debt ratios. This relationship holds after controlling for size, profitability, and growth (column 2), and for group affiliation (column 3). It also holds when financial firms are included in

the sample (columns 4 through 6). The magnitude of the coefficients indicates that pyramid-controlled firms have higher debt ratios of 2 percentage points on average.

Tables 2, 3 and 4 taken together demonstrate that, at least for Asian companies, weaker corporate governance is correlated with higher levels of debt. In some cases, alternative interpretations of the results are possible. For example, diversified firms may have higher levels of debt because their revenues are less volatile, not because their governance is weaker. But considered as a whole, these tables confirm the relationship between governance and debt using a broad sample of firms and a variety of variables associated with corporate governance. This relationship appears to be particularly strong in Asia. The results are consistent with the findings of Faccio, Lang, and Young (2001), who find higher levels of debt among Asian corporations that are more vulnerable to expropriation (as measured by group affiliation and divergence between cash-flow and control rights).

Evidence from the Asian Financial Crisis

Table 5 reports coefficient estimates from regressions of crisis-period stock returns on debt ratios. These data are from the five Asian countries that were most affected by the crisis (Indonesia, Korea, Malaysia, the Philippines, and Thailand) and are compiled from the Worldscope database combined with data on ownership structure of firms assembled by Claessens, Djankov, and Lang (2000). The "crisis-period" stock return is defined as the stock return in local currency over the period of July 1997 to August 1998 (for more discussion see Johnson, Boone, Breach, and Friedman 2000 and Mitton 2002). The key independent variable is the debt ratio, defined as the book value

of total debt over the book value of total capital. Financial firms and firms not included in the IFC global index are excluded, to ensure that the data are comparable and that stock prices are informative.

In Table 5 the dependent variable is stock price performance during the crisis. Firms with more debt suffered larger falls in stock price. This is not surprising. Leverage naturally increases a firm's covariation with the market, and highly levered firms could also be hurt by exchange rate movements if their debt is dollar-denominated. More interesting is the fact that this effect is considerably stronger among "non-pyramid" firms.

If we pool all firms in Table 5 and include debt, a dummy for pyramid, and a pyramid times debt interaction term, then the coefficient on the interaction term is positive (0.22; a little less than half the magnitude of the -0.46 on debt) and significant (t-stat 1.99). The coefficients on debt and pyramid are both negative and significant. Alternatively, if we split the sample into pyramid and non-pyramid firms, the coefficient on the debt ratio is less than half the magnitude and only marginally significant in column (6). The results are similar if we omit industry and/or country dummies, although the divergence between pyramid/non-pyramid is largest when we include both sets of controls.

These results suggest one way to think about business groups as an organizational form. If groups develop, they may be an effective way to prop up firms, but they can probably also tunnel more effectively. Both group and non-group firms can likely loot in the same way. The comparison of group and stand-alone firms therefore depends on the relative importance of tunnelling compared with propping. Group firms have an

advantage when propping is relatively valuable to investors. Under such conditions, group firms can raise capital more cheaply or undertake more projects than stand-alone firms.[23]

5. Conclusions

In countries with weak legal protection for investors, it is relatively easy for entrepreneurs to expropriate outside investors through tunnelling and even looting companies completely. It is also, however, easy for them to transfer private funds into companies with outside investors. When legal institutions are weak, a shock to expected future earnings could result in complete expropriation of outside investors. However, entrepreneurs may also rationally prop up firms that have moderate problems today and good prospects tomorrow.

Entrepreneurs generally obtain a mix of debt and equity from outside investors. Having more debt and less equity means the moral hazard problem that leads to routine tunnelling is less and propping is encouraged, but it also means that looting and bankruptcy are more likely. Entrepreneurs in countries with weak investor protection may find it advantageous to establish groups within which some firms involve outside investors and others do not. Such arrangements, which are typical in emerging markets, can allow fast growth and a cushion against moderate adverse shocks. But these financing arrangements are subject to sudden and potentially complete collapse.

References

Akerlof, George A and Paul M. Romer, "Looting: The Economic Underworld of Bankruptcy for Profit." *Brookings Papers on Economic Activity*, (2), 1-60, 1993.

Asian Wall Street Journal, "First Pacific to Buy 40% Of Indofood for $650 Million." June 23, 1999.

Bae, Kee-Hong, Jun-Koo Kang, and Jin-Mo Kim, "Tunnelling or Value Addition? Evidence from Mergers by Korean Business Groups," *Journal of Finance*, 57, 6:2695-2740, December 2002.

Bertrand, Marianne, Paras Mehta, and Sendhil Mullainathan, "Ferreting Out Tunnelling: An Application to Indian Business Groups," *Quarterly Journal of Economics*, CXVII, 1:121-148, February 2002.

Bolton, Patrick and David S. Scharfstein, "Optimal Debt Structure and the Number of Creditors," *Journal of Political Economy*, CIV, 1-25, 1996

Bulow, Jeremy and Kenneth Rogoff, "A Constant Recontracting Model of Sovereign Debt." *Journal of Political Economy*, Volume 97, Issue 1, February, 155-178, 1989.

Burkhart, Mike, Denis Gromb, and Fausto Panunzi, "Why higher takeover premia protect minority shareholders," *Journal of Political Economy* 106, 172-204, 1998.

Choi, Buhmsoo, "Lessons of Crisis Management from the Korean Experience," paper presented at An International Forum on The Korean Financial Crisis, Harvard University, November 18-19, 1999.

Claessens, Stijn, Simeon Djankov, and Larry H.P. Lang, The Separation of Ownership and Control in East Asian Corporations," *Journal of Financial Economics*, 58, 1-2:81-112, October/November 2000.

Dewatripont, Mathias and Eric Maskin, "Credit and Efficiency in Centralized and Decentralized Economies," *Review of Economic Studies*, 62:541-555, 1995.

Durnev, Art and E. Han Kim, "The Interplay of Firm-specific factors and Legal Regimes in Corporate Governance and Firm Valuation," manuscript, University of Michigan, July, 2002.

Faccio, Mara, Larry H.P. Lang, and Leslie Young, "Debt and corporate governance," Working paper, Notre Dame and The Chinese University of Hong Kong, 2001.

Far Eastern Economic Review, "Blue Chip Ambitions." December 17, 1998a.

Far Eastern Economic Review, "Back to Basics: Thai leaders focus on what they know best." December 31, 1998b.

Far Eastern Economic Review, "Indonesian business. A survival guide." January 30, 1999.

Foley, C. Fritz, "The Legal Protection of Creditors, Financial Distress, and Business Groups: Lessons from Bankruptcy Law Reform in Thailand," Mimeo, Harvard Business School, May 1999.

Friedman, Eric and Simon Johnson, "Propping, Looting and Tunnelling: some aspects of debt in weak legal environments," Manuscript, Rutgers and MIT, March 2000.

Glaeser, Edward, Simon Johnson, Andrei Shleifer, "Coase versus The Coasians," *Quarterly Journal of Economics*, CXVI, 3, 853-900, August 2001.

Grossman, Sanford and Oliver Hart, "Corporate financial structure and managerial incentives," in J.J.McCall Ed.: *The Economics of Information and Uncertainty*, University of Chicago Press, Chicago, 123-155, 1982.

Hart, Oliver and John Moore, "Default and Renegotiation: A Dynamic Model of Debt," *Quarterly Journal of Economics*, 113, 1: 1-41, February 1998.

Hoshi, Takeo, Anil Kashyap, and David Scharfstein, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups." *Quarterly Journal of Economics*, 106, 33-60, 1991.

Jensen, Michael C, "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers," *American Economic Review*, 76, 323-29, May 1986.

Jensen, Michael C. and William H. Meckling, "Theory of the Firm: Entrepreneurial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, 3, 305-360, 1976.

Johnson, Simon, Peter Boone, Alasdair Breach, and Eric Friedman, "Corporate Governance in the Asian Financial Crisis." *Journal of Financial Economics*, Volume 58, Nos. 1-2, 141-186, October/November 2000.

Johnson, Simon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, "Tunnelling," *American Economic Review (Papers and Proceedings)*, May, Vol. 90, No.2, 22-27, 2000.

Khanna, Tarun and Krishna G. Palepu, "Why Focused Strategies May be Wrong for Emerging Markets," *Harvard Business Review*, July 1997.

Khanna, Tarun, Joseph Kogan, and Krishna G. Palepu, "Globalization and Corporate Governance Convergence? A Cross-Country Analysis," manuscript, Harvard Business School, 2002.

Kim, Se-Jik and Mark R. Stone, "Corporate Leverage, Bankruptcy, and Output Adjustment in Post-Crisis East Asia," IMF Working paper WP/99/143, October 1999.

Klapper, Leora F. and Inessa Love, "Corporate Governance, Investor Protection, and Performance in Emerging Markets," manuscript, The World Bank, 2002.

Kornai, Janos, "Resource-Constrained vs. Demand-Constrained Systems," *Econometrica*, 47: 801-819, 1979.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, "Corporate Ownership Around the World," *Journal of Finance,* Vol.LIV, No.2, 471-517, April 1999.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, "Legal determinants of external finance," *Journal of Finance* 52, 1131-1150, 1997.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, "Law and Finance," *Journal of Political Economy*, December, 106, 6, 1113-1155, 1998.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny, "The Quality of Government." *The Journal of Law, Economics, and Organization*, 15, 1: 222-279, 1999.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny, "Investor Protection and Corporate Valuation," *Journal of Finance*, 57, 1147-1170, 2002.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny, "Investor Protection and Corporate Governance," *Journal of Financial Economics*, Volume 58, 1-2: 3-28, October/November, 2000.

Lee, Jong-Wha, Lee, Young Soo, and Lee, Byung-Sun, "The Determination of Corporate Debt in Korea," *Asian Economic Journal*, 14, 4: 333-356, 2000.

Levine, Ross and Sara Zervos, "Stock Markets, Banks, and Economic Growth." *American Economic Review*, 88, 537-58, 1998.

Mauro, Paolo, "Corruption and Growth," *Quarterly Journal of Economics*, 110, 681-712, 1995.

McMillan, John and Christopher Woodruff, "Interfirm Relationships and Informal Credit in Vietnam." *Quarterly Journal of Economics*, 114, 1285-1320, 1999.

Mitton, Todd, "A Cross-Firm Analysis of the Impact of Corporate Governance on the East Asian Financial Crisis." *Journal of Financial Economics*, 64, 2: 215-241, May 2002.

Myers, Stewart C., "Determinants of Corporate Borrowing." *Journal of Financial Economics*, 5, 147-175, 1977.

Rajan, Raghuram and Luigi Zingales, "Financial dependence and growth," *American Economic Review*, 88, 559-586, 1998.

Roland, Gerard, *Transition and Economics: Politics, Markets, and Firms*, MIT Press, Cambridge, 2000.

Scharfstein, David S, 1997, "The Dark Side of Internal Capital Markets II: Evidence from Diversified Conglomerates," Manuscript, MIT.

Scharfstein, David S., and Jeremy C. Stein, "The Dark Side of Internal Capital Markets: Divisional Rent-Seeking and Inefficient Investment," *Journal of Finance*, 55, 2537-2564, December 2000.

Shleifer, Andrei and Robert W. Vishny, "A Survey of Corporate Governance," *Journal of Finance*, 52, 737-783, 1997.

Shleifer, Andrei and Daniel Wolfenzon, "Investor Protection and Equity Markets," *Journal of Financial Economics*, 66, 3-27, 2002.

Titman, Sheridan, and Wessels, Roberto, The determinants of capital structure choice. *Journal of Finance* 43, 1: 1-19, 1988.

Topkis, Donald M., "Minimizing a Submodular Function on a Lattice," *Operations Research*, 26, 305-321, 1978.

Troika Dialog, "Corporate Governance in Russia." Moscow, May 1999.

Wall Street Journal, "Baht and Sold: Did Mr Saxena Kill a Bank and Trigger the Asian Contagion?" May 7, p.A1, 1999.

Wolfenzon, Daniel, "A theory of pyramidal ownership," mimeo, Harvard University, 1998.

Zwiebel, Jeffrey, "Dynamic Capital Structure under Managerial Entrenchment."

American Economic Review, Vol. 86(5), pp.1197-1215, December 1996.

[1] For helpful comments on earlier versions we thank Daron Acemoglu, Bin Zhou, Douglas Diamond, Simeon Djankov, Toan Do, Frank Graves, Stewart Myers, Andrei Shleifer, and Luigi Zingales. Simon Johnson thanks the MIT Entrepreneurship Center for support. Eric Friedman thanks Caltech for its hospitality during much of this work.

[2] Mitton (2000) finds evidence of propping in diversified firms in Indonesia, the Philippines, Korea, Malaysia, and Thailand during the "Asian crisis" of 1997-98. His results suggest that the misallocation of investment in diversified conglomerates may become worse when an economy runs into crisis.

[3] CP Group is a large complicated conglomerate and the precise nature of transactions involving privately held affiliates is hard to know. In China, "CP has sold its stakes in Shanghai-Ek Chor Motorcycle and a brewery it set up with Heineken NV of the Netherlands… In Thailand, the group has sold its entire stake in Sunny Supermarkets, a 24-hour grocery store chain; 75% of Lotus Distribution, which runs a discount-store chain; and a small stake in CP 7-Eleven, which runs a 24-hour convenience store franchise" (Asian Wall Street Journal, March 3, 1998). At the same time, it is doing all it can to support its three companies that are listed on the Stock Exchange of Thailand: TelecomAsia, Charoen Pokphand Feedmill PCL, and Charoen Pokphand Northeastern PCL (Asian Wall Street Journal, March 3, 1998 and June 10, 1999).

[4] Some minority shareholders in the Hong Kong company have expressed concern that this transaction amounts to expropriating them in order to prop up the Indonesian company.

[5] The strongest evidence of systematic propping is for Japan, where Hoshi, Kashyap and Scharfstein (1991) found evidence that banks provided capital to firms experiencing a liquidity shortfall, providing those firms belonged to the same industrial group. In Japan the transfers are not from the private pocket of an entrepreneur to a public company, but rather between linked

companies (both of which may be public.) There is also evidence of tunnelling and propping in India (Bertrand, Mullainathan, and Mehta 2001) and Korea (Bae, Kang and Kim 2002).

[6] This violates a basic assumption of Hart and Moore (1998), who model environments in which a debtor "typically promises a creditor a noncontingent payment stream, provides the creditor with the right to foreclose on the debtor's assets in a default state, and gives the credit priority in bankruptcy" (p.1). In the environments that we are considering, a creditor cannot foreclose or otherwise take control of assets in bankruptcy.

[7] Asset stripping in bankruptcy happens in many countries. Akerlof and Romer (1993), for example, analyze a related form of looting that they argue happens in the US. In their model the entrepreneur always intends to abscond and shift his debt onto the government.

[8] One informed observer reports, "I have yet to hear of a single case where Hong Kong liquidators have gone to China and succeeded in recovering assets" (Wall Street Journal, August 25, 1999, p.A14.) More generally, very few debt defaults from the Asian crisis of 1997-98 have resulted in investors receiving any liquidation value. *The Economist* reports "Despite the creation last year of a bankruptcy law in Indonesia where there had been none before, it is still virtually impossible to force a defaulted debtor into liquidation (the few creditors that have tried are still tangled up in legal appeals)" (30 January 1999).

[9] For example, in November 1999, Thailand Petrochemical Industries had still not reached a rescheduling agreement with its creditors more than two years after it suspended debt repayments (Financial Times, November 18, 1999.) Korean private sector debt renegotiations were proceeding so slowly that in summer 1999 the Financial Supervisory Commission created an alternative procedure for debt rescheduling and put pressure on banks to reach agreements with debtors (Choi 1999).

[10] Jensen (1986) suggests that high levels of debt can induce greater effort from managers. In our terminology, he is proposing the existence of propping, although of a non-cash variety.

[11] In contrast, in a country such as the United States it is illegal to provide financial support to a publicly traded firm unless this is fully disclosed. For example, it would not be allowed for a controlling shareholder secretly to make a loan or to buy product at inflated prices through another company he controls. More generally, it is illegal to "manage earnings" so that a firm's financial performance looks better than it actually is.

[12] In addition, there is an indirect and less obvious effect of debt. For a given level of desired funding, increased use of debt reduces reliance on outside equity, thus allowing the entrepreneur to retain more ownership. This reduces the moral hazard problem of the entrepreneur, potentially increasing the value of the firm. In separate work we have focused on clarifying the direct and indirect effects of debt.

[13] CLSA ranked firms in 25 countries. Of these, 21 of them had matches with Worldscope and are in our sample. They are identified in Table 1, in the next-to-last column. The other 4 countries that had no matches with Worldscope are the Czech Republic, Peru, Russia, and Venezuela. See Durnev and Kim (2002) for more about the CLSA rankings.

[14] These CLSA measures are of course imperfect but have some plausibility. Khanna, Kogan and Palepu (2002) report that Indian firms with a lower CLSA score are more likely to experience corporate governance scandals. Durnev and Kim (2002) and Klapper and Love (2002) have shown that firms with a better CLSA measure of corporate governance have higher valuations.

[15] We use the basic structure of the entrepreneur's decision from LLSV (1999b) and Shleifer and Wolfenzon (2000), although in their models stealing takes place after the investment has been made. A static version of this problem was presented in Johnson, Friedman, Boone and Breach (2000). The intuition of the basic agency problem is close to that in Jensen and Meckling (1976).

[16] To avoid confusion, we divide expropriation into two parts. The first is routine stealing, which can take place every period without the firm going out of business. The second is looting, which entails the entrepreneur grabbing all the available assets and an end to the firm. None of the

terms we use are intended to convey a normative judgment or to imply that a particular behavior is actually illegal.

[17] Essentially, we are assuming that if investors observe stealing, they will withdraw their support. The entrepreneur steals before investing either because this can be concealed easily or, in the case of looting, because returns are so low that it is not worth investing.

[18] No stealing occurs if αR is sufficiently high. Given that α is often high in emerging markets, an economic boom may make it optimal for the entrepreneur not to steal anything.

[19] We model the case where the firm has debt, but it could be equity with some debt-like characteristics (e.g., the firm is punished if it has below market "expectations" for earnings.) There just needs to be some incentive to smooth performance.

[20] As long as both the entrepreneur and investors lose something when the firm "goes bankrupt," the intuition behind our results holds.

[21] Note that as there are no "infinitely long lived" securities, no pathologies such as bubbles can arise in our model.

[22] Wolfenzon (1999) develops a model in which entrepreneurial expropriation is consistent with the development of pyramidal ownership. Our approach can be seen as complementary to his.

[23] This may explain why groups seem to have an advantage in countries with weak legal environments (Khanna and Palepu 1997), while acknowledging that groups may themselves steal or loot.

Table 1
Summary statistics by country

The table reports summary statistics for firms in the Worldscope database. Nonfinancial firms are those whose primary SIC codes is not in 6000-6999. The "Claessens sample" refers to those firms matched with ownership data assembled by Claessens, Djankov, and Lang (2000). "CLSA-rated" means that the firms was given a corporate governance ranking by Credit Lyonnais Securities Asia.

	Worldscope firms	Nonfinancial firms	Average debt ratio %	Average sales ($bil)	Median profitability %	Median ownshp. conc. %	% Cross-listed	% Big 6	% Diversified	Firms in Claessens sample	% Group-affiliated	% Pyramid-controlled	CLSA-rated firms	Average CLSA rating
ARGENTINA	31	29	24.99	0.770	10.66	54.8	13.8	41.4	58.6	0	NA	NA	1	66.7
AUSTRALIA	255	190	22.50	1.001	4.87	19.2	4.7	87.4	63.7	0	NA	NA	0	NA
AUSTRIA	81	62	26.50	0.708	3.31	51.0	0.0	43.5	77.4	0	NA	NA	0	NA
BELGIUM	137	83	25.52	1.619	2.59	50.1	0.0	39.8	94.0	0	NA	NA	0	NA
BRAZIL	152	133	22.57	1.176	2.99	36.5	1.5	85.0	47.4	0	NA	NA	29	61.6
CANADA	438	376	27.30	0.977	4.28	50.2	11.4	90.7	55.9	0	NA	NA	0	NA
CHILE	77	62	22.37	0.357	11.35	43.4	14.5	80.6	64.5	0	NA	NA	13	65.9
CHINA	98	90	25.33	0.175	9.04	56.7	2.2	26.7	35.6	0	NA	NA	21	47.9
COLOMBIA	30	21	16.15	0.236	3.55	NA	0.0	33.3	38.1	0	NA	NA	1	52.7
CZECH REPUBLIC	17	17	18.89	0.239	6.31	20.4	0.0	64.7	94.1	0	NA	NA	0	NA
DENMARK	179	127	27.07	0.519	3.69	5.0	0.8	90.6	75.6	0	NA	NA	0	NA
FINLAND	104	85	31.63	1.390	3.53	25.1	2.4	68.2	74.1	0	NA	NA	0	NA
FRANCE	646	475	22.53	2.233	2.37	52.6	1.3	24.2	90.9	0	NA	NA	0	NA
GERMANY	582	479	17.85	2.926	1.56	59.4	0.6	41.1	83.3	0	NA	NA	0	NA
GREECE	125	97	25.93	0.102	5.83	50.1	0.0	4.1	76.3	0	NA	NA	2	59.5
HONG KONG	363	268	23.60	0.437	6.14	46.2	0.4	84.7	88.8	318	45.6	23.6	37	64.9
HUNGARY	13	12	14.47	0.091	5.26	45.9	0.0	83.3	66.7	0	NA	NA	2	54.9
INDIA	314	305	34.51	0.239	8.23	51.0	0.0	6.2	64.6	0	NA	NA	73	52.8
INDONESIA	127	100	31.94	0.295	9.96	50.5	2.0	2.0	62.0	106	67.9	58.5	17	38.9
IRELAND	64	52	22.79	0.524	6.26	16.1	9.6	88.5	63.5	0	NA	NA	0	NA
ISRAEL	42	32	21.03	0.442	5.32	50.0	15.6	6.3	65.6	0	NA	NA	0	NA
ITALY	228	149	24.93	2.655	2.21	56.0	4.0	93.3	93.3	0	NA	NA	0	NA
JAPAN	2,315	2,086	30.00	2.233	1.25	13.8	1.1	0.5	76.6	1,007	61.2	64.3	0	NA
KOREA (SOUTH)	258	210	48.03	1.976	1.13	13.5	1.4	0.0	60.0	236	50.8	33.1	22	46.6
LIECHTENSTEIN	4	1	21.66	1.650	9.23	NA	0.0	100.0	0.0	0	NA	NA	0	NA
LUXEMBOURG	16	6	23.12	1.540	4.52	48.4	0.0	50.0	66.7	0	NA	NA	0	NA
MALAYSIA	398	316	25.08	0.265	8.10	28.6	0.0	70.6	87.7	209	43.1	38.3	42	58.0
MEXICO	93	83	30.54	0.857	6.98	51.6	20.5	49.4	63.9	0	NA	NA	8	62.0
NETHERLANDS	196	164	23.16	2.438	3.09	18.7	5.5	93.3	81.1	0	NA	NA	0	NA
NEW ZEALAND	58	51	28.16	0.715	6.83	42.5	5.9	92.2	68.6	0	NA	NA	0	NA
NORWAY	107	87	32.02	0.845	5.30	30.0	4.6	90.8	66.7	0	NA	NA	0	NA
PAKISTAN	82	75	35.76	0.080	3.92	60.0	0.0	1.3	41.3	0	NA	NA	11	29.2
PERU	36	29	23.77	0.117	7.78	73.0	6.9	24.1	41.4	0	NA	NA	0	NA
PHILIPPINES	101	68	22.23	0.241	10.05	NA	1.5	7.4	48.5	98	65.3	30.6	20	39.9
POLAND	46	36	10.21	0.121	5.61	30.9	0.0	33.3	63.9	0	NA	NA	2	40.5
PORTUGAL	78	58	26.36	0.323	2.50	47.7	1.7	34.5	51.7	0	NA	NA	0	NA
SINGAPORE	216	172	22.33	0.279	5.35	35.1	0.6	87.8	86.0	193	18.1	65.8	39	67.9
SOUTH AFRICA	194	147	12.22	0.802	5.51	50.5	2.0	92.5	72.8	0	NA	NA	34	68.1
SPAIN	161	116	18.61	1.193	3.26	50.5	1.7	87.1	65.5	0	NA	NA	0	NA
SRI LANKA	18	12	22.46	0.036	4.63	38.9	0.0	83.3	50.0	0	NA	NA	0	NA
SWEDEN	175	141	23.01	1.543	4.08	26.9	2.8	78.0	77.3	0	NA	NA	0	NA
SWITZERLAND	175	132	30.26	1.935	3.16	38.1	1.5	70.5	77.3	0	NA	NA	0	NA
TAIWAN	218	193	23.68	0.340	7.58	8.5	0.5	54.4	48.2	101	15.8	48.5	41	52.6
THAILAND	261	195	41.53	0.187	5.87	30.4	0.0	36.4	40.5	129	44.2	10.9	20	57.6
TURKEY	54	40	13.06	0.590	8.94	37.7	0.0	0.0	27.5	0	NA	NA	12	38.3
UNITED KINGDOM	1,640	1,252	20.82	1.022	4.40	16.0	2.2	78.9	72.0	0	NA	NA	0	NA
UNITED STATES	3,565	2,862	25.33	1.882	4.49	13.3	NA	95.6	49.3	0	NA	NA	0	NA
VENEZUELA	15	12	22.24	2.782	9.45	NA	8.3	8.3	75.0	0	NA	NA	0	NA
ZIMBABWE	4	3	4.87	0.042	18.26	63.0	0.0	100.0	66.7	0	NA	NA	0	NA
Total	14,591	11,795								2,397			447	

Table 1 (Continued)
Summary statistics by country

Definitions of data items used in all tables. Where not stated otherwise, data come from the Worldscope database and is based on the most recent financial statements from June 1997 or earlier (usually year-end 1996.) Any exceptions to these definitions (for example, in robustness checks) are noted where used.

Big 6	A dummy variable set to 1 if the firm's financial statements are audited by one of the Big 6 international accounting firms. (Six major firms still existed until late 1997.)
CLSA rating	A corporate governance score assigned by Credit Lyonnais Securities Asia. The composite rating used here combines the areas of transparency, independence, accountability, responsibility, and fairness. Ratings not included are social awareness (because it does not deal with protection of minority shareholders) and discipline (because the rating includes a question about limiting the use of debt). Rating is on the scale of 0 to 100, with higher numbers indicating stronger governance.
Cross-listed	A dummy variable set to 1 if the firm is listed on a major U.S. stock exchange, either directly or in depository receipt form. (Data from the Bank of New York, the NYSE, and Nasdaq.)
Debt ratio	The ratio of the book value of total debt to the book value of total assets.
Diversified	A dummy variable set to 1 if the firm operates in more than one industry, where industry is defined at the 2-digit SIC
Group affiliated	A dummy variable set to 1 if the firm is contolled by a family business group (from data used in Claessens, et al, 2000).
Growth	The one-year growth rate in the book value of total assets.
Nonfinancial firm	A firm that does not have its primary industry in SIC code range 6000-6999.
Ownership concentration	The percentage shareholdings of the largest shareholder in the firm.
Profitability	Return on sales; i.e., the ratio of net income to net sales.
Pyramid controlled	A dummy variable set to 1 if the firm is part of a pyramid ownership structure (from data used in Claessens, et al, 2000).
Sales	Net sales (in billions of $U.S.)

Table 2
Debt ratios and firm-level corporate governance ratings

The table reports coefficient estimates from regressions of debt ratios on corporate governance ratings. Ratings are compiled by Credit Lyonnais Securities for companies in 23 emerging markets. Ratings are a composite ranking based on 42 corporate governance issues in the areas of transparency, independence, accountability, responsibility, and fairness. Also estimated but not reported is a constant term, industry dummy variables, and country dummy variables. The debt ratio is defined as the book value of total debt over the book value of total assets. Firm size is defined as annual sales in billions of $U.S., profitability is defined as return on sales, firm growth is defined as the one-year growth rate in total assets. The number of observations declines in some specifications due to missing data on firm growth. Numbers in brackets are heteroskedasticity-robust t-statistics. Asterisks denote levels of significance: *** means significant at the 1% level, ** is the 5% level, and * is the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Nonfinancial firms					All firms	
	Dependent variable is debt ratio						
Corporate governance rating	-0.302 ***	-0.283 ***	-0.301 ***	-0.242 ***	-0.232 ***	-0.240 ***	-0.148 *
	[-4.07]	[-3.69]	[-4.41]	[-2.86]	[-2.75]	[-4.20]	[-1.93]
Firm size		0.655 ***	0.485 **	0.315	0.214	0.378 ***	0.267 **
		[3.69]	[2.51]	[1.39]	[0.77]	[2.87]	[1.98]
Profitability		-0.028	-0.054	-0.032	-0.032	-0.057	-0.029
		[-0.58]	[-1.14]	[-0.74]	[-0.72]	[-1.33]	[-0.70]
Firm growth					0.013		0.004
					[0.61]		[0.44]
Industry dummies	No	No	Yes	Yes	Yes	Yes	Yes
Country dummies	No	No	No	Yes	Yes	No	Yes
Number of observations	372	370	370	370	356	447	416
R-squared	0.055	0.067	0.232	0.319	0.319	0.242	0.296

Table 3
Debt ratios and corporate-governance-related variables

The table reports coefficient estimates from regressions of debt ratios on variables related to corporate governance. Data are compiled from the Worldscope database combined with additional sources on cross-listings. Financial firms are excluded. "Cross-listed" is an indicator set to one if the firm is listed on a major U.S. exchange. "Big 6 auditor" is an indicator set to one if the firm is audited by a Big 6 accounting firm. "Diversified" is an indicator set to one if the firm operates in more than one two-digit SIC industry. "Ownership concentration" is the percentage of shares held by the largest shareholder. The debt ratio is defined as the book value of total debt over the book value of total assets. Firm size is annual sales in billions of $U.S., profitability is return on sales, and firm growth is the one-year growth rate in total assets. Also estimated but not reported is a constant term, industry dummy variables, and country dummy variables. Numbers in brackets are heteroskedasticity-robust t-statistics. Asterisks denote levels of significance: *** means significant at the 1% level, ** is the 5% level, and * is the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Asia			Asia (Japan excluded)			Latin America			Western Europe		
	Dependent variable is debt ratio											
Cross-listed	-0.707	-7.913 **	-9.540 **	-0.289	-2.349	-7.688	3.491	3.283	0.506	4.767 *	5.980 **	8.566 **
	[-0.22]	[-2.32]	[-2.13]	[-0.05]	[-0.34]	[-1.10]	[1.24]	[1.12]	[0.11]	[1.85]	[2.18]	[2.10]
Big 6 auditor	-3.332 ***	-3.353 **	-5.212 ***	-2.945 ***	-3.069 **	-4.924 ***	4.262 **	4.081 *	-5.221 *	-1.169	-0.829	-1.126
	[-3.03]	[-2.57]	[-3.04]	[-2.63]	[-2.26]	[-2.74]	[2.06]	[1.72]	[-1.67]	[-1.07]	[-0.83]	[-0.96]
Diversified	3.137 ***	2.493 ***	2.289 **	4.008 ***	3.140 **	4.366 **	2.479	1.366	1.485	0.239	0.603	0.572
	[4.09]	[3.03]	[2.29]	[3.74]	[2.53]	[2.55]	[1.39]	[0.70]	[0.48]	[0.22]	[0.62]	[0.51]
Ownership concentration			-0.141 ***			-0.123 ***			-0.138 **			-0.049 ***
			[-6.12]			[-3.58]			[-2.44]			[-3.11]
Firm size		0.313 ***	0.359 ***		0.260	0.119		-0.229	-0.363		-0.094 *	-0.140 *
		[6.73]	[3.44]		[1.26]	[0.45]		[-0.74]	[-0.59]		[-1.69]	[-1.89]
Profitability		-0.002	-0.001		-0.001	-0.001		-0.021 *	-0.178 ***		0.000	0.000
		[-0.79]	[-0.42]		[-0.62]	[-0.38]		[-1.88]	[-3.22]		[1.10]	[1.31]
Firm growth		0.022 *	0.036 ***		0.040 **	0.058 ***		-0.002 ***	-0.011 *		0.001	0.000
		[1.71]	[2.69]		[2.54]	[3.80]		[-4.89]	[-1.75]		[1.03]	[0.00]
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3698	3319	2509	1612	1238	861	369	324	94	3469	3430	2706
R-squared	0.111	0.128	0.135	0.238	0.278	0.300	0.106	0.127	0.592	0.045	0.053	0.054

Table 4
Debt ratios and pyramidal ownership structures

The table reports coefficient estimates from regressions of debt ratios on a pyramidal ownership indicator. Data come from nine Asian countries (Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, Thailand) and are compiled from the Worldscope database combined with ownership data assembled by Claessens, et al (2000). "Pyramid" is an indicator set to one if the firm is controlled through a pyramid structure as defined by Claessens, et al (2000). "Group affiliation" is an indicator set to one if the firm is associated with a family business group as defined by Claessens, et al (2000). The debt ratio is defined as the book value of total debt over the book value of total assets. Firm size is defined as annual sales in billions of $U.S.; profitability is return on sales; firm growth is the one-year growth rate in total assets. Also estimated but not reported is a constant term, industry dummy variables, and country dummy variables. Numbers in brackets are heteroskedasticity-robust t-statistics. Asterisks denote levels of significance: *** means significant at the 1% level, ** is the 5% level, and * is the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Nonfinancial firms			All firms		
	Dependent variable is debt ratio					
Pyramid	1.876 **	2.209 **	1.832 *	1.876 **	2.036 **	2.203 **
	[2.16]	[2.25]	[1.80]	[2.16]	[2.23]	[2.35]
Firm size		0.298 ***	0.295 ***		0.291 **	0.293 **
		[6.30]	[6.28]		[6.42]	[6.43]
Profitability		-0.087 ***	-0.086 ***		-0.034	-0.034
		[-2.66]	[-2.65]		[-1.64]	[-1.65]
Firm growth		0.040 **	0.040 **		0.045 ***	0.045 ***
		[2.16]	[2.18]		[2.91]	[2.88]
Group affiliation			0.950			-0.448
			[0.91]			[-0.48]
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1935	1737	1737	2397	2144	2144
R-squared	0.134	0.179	0.180	0.131	0.171	0.171

Table 5
Crisis outcomes, pyramid structures, and debt

The table reports coefficient estimates from regressions of crisis-period stock returns on debt ratios. Data come from five Asian countries and are compiled from the Worldscope database combined with pyramid structure data assembled by Claessens, et al (2000). Financial firms and firms not included in the IFC global index are excluded. The "crisis period" is defined as July 1997 to August 1998. The crisis-period stock return is the stock return in local currency. The debt ratio is defined as the book value of total debt over the book value of total capital. Firm size is defined as the log of book value of total assets. Also estimated but not reported is a constant term, industry dummy variables, and country dummy variables. Numbers in brackets are heteroskedasticity-robust t-statistics. Asterisks denote levels of significance: *** means significant at the 1% level, ** is the 5% level, and * is the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Nonfinancial firms		Non-pyramid firms only		Pyramid-controlled firms only	
	Dependent variable is crisis-period stock return					
Debt ratio	-0.346 ***	-0.414 ***	-0.371 ***	-0.440 ***	-0.172	-0.188 *
	[-4.98]	[-5.79]	[-4.50]	[-4.88]	[-1.49]	[-1.72]
Firm size		0.096 ***		0.068 *		0.170 ***
		[3.12]		[1.86]		[2.75]
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	305	305	184	184	121	121
R-squared	0.196	0.223	0.308	0.320	0.163	0.248

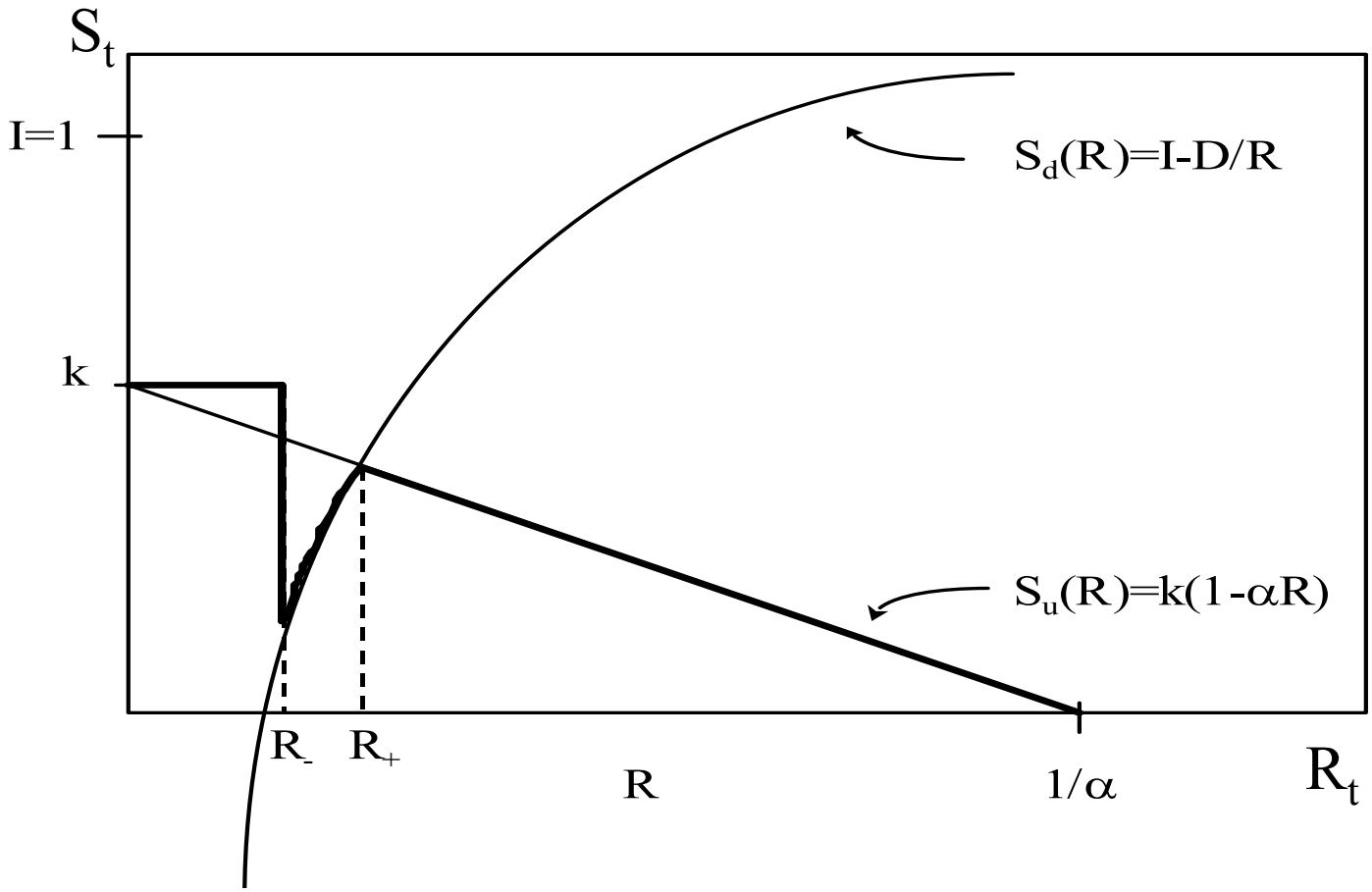

Figure 1