FELLOWS PROGRAM | KORET MILKEN INSTITUTE

JANUARY 2012
NO. 50

EXECUTIVE SOCIAL NETWORKS, INSIDER TRADING, AND TUNNELING IN ISRAEL

WORKING PAPER

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KORET FOUNDATION

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Acknowledgments

Special thanks to the members of the Economics Department of the Israel Securities Authority: Itzik Shurkey, Rita Yankelovich, Liza Teper, Rachel Wind, Liran Katsov, Aharon Cohen Mohlivar, Yoni Fenning, and Avner Langut; the Koret-Milken Institute fellows at the ISA: Dennis Varshavsky, Michael Gurkov, and Beeri Har-Tuv; and to the Koret-Milken Institute Fellows Program: Glenn Yago, Carl Kaplan, Alma Gadot-Perez, Orly Movshovitz-Landskroner, and Alice Benattar for their invaluable support and advice.

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Executive Summary

A director at a non-financial firm may also be a major stakeholder (CEO, director, large shareholder, etc.) at a financial firm. These financially connected directors are incentivized to exploit inside information by transferring it to the financial firm, in what is essentially a form of insider trading.

Insider trading regulation is a contentious issue. Pro-regulation scholars argue that it is a form of managerial theft that creates mistrust in the market and therefore chills overall market valuations. Anti-regulation scholars argue that insider trading brings information into the market more quickly and that information ownership questions can be solved through private contracting between shareholders and management.

Insider trading makes it riskier to trade in a security, particularly to post limit orders, since informed trades contain information that should move prices against the standing order (Stoll 1989). Recent research suggests this problem can be observed through financially connected directors: Cai et al. (2011) observe increases in the bid-ask spread for firms with financial directors. Greater price efficiency, however, should have the opposite effect on spreads, since traders will be more inclined to post limit orders when they are more confident in the price of the security.
We find that in Israel, the price efficiency effect appears to dominate the market microstructure effect; controlling for confounding variables, the presence of financially connected directors predicts an economically and statistically significant decrease in the bid-ask spread (see figure 10, later in this paper).

Most insider trading discussion focuses on U.S. firms, where managers are "strong" and owners are "weak." Israel, by contrast, has many publicly traded firms where a single or small, tightly knit group of shareholders holds a controlling interest in the company through a business group. In these "group firms," the primary corporate governance problem is the risk of minority shareholder expropriation through *tunneling*, or transferring assets out of the firm and to the controller. The risk of tunneling essentially implies a large information asymmetry problem between the controller and the world of outside investors, who can no longer reliably assess the value of the firm. We hypothesize that in these cases, the presence of insider trading serves to *add* information into the market, thereby reducing information asymmetry, while in other cases, the behavior should more closely mirror that of "dispersed-shareholder" regimes like the U.S.

We find that both in absolute terms and relative to non-group firms, the presence of financially connected directors in group firms dramatically reduces spreads, while in the non-group firms, the effect is negligible. This suggests that for business group firms, but not for other firms, the information effect dominates the market microstructure effect. Spreads drop by approximately one-third in group firms (an effect of 56bps on a group firm average inside spread of 152bps; see figure 10, model wlm3c) while increasing slightly in non-group firms. This is evidence of a large information asymmetry problem in business group firms – plausibly due to tunneling – and a large risk of informed trading in business group financial firms.

1. Introduction

A growing body of literature examines the role that executive social networks play in corporate governance. A large subset of this literature examines executive compensation and/or firm performance, with an eye towards determining whether interconnected networks of executives and directors are a benign or problematic force in the corporate world. Kirchmaier and Stathopoulos (2008), for instance, find that size of CEO networks negatively affects firm performance.

Another set of research suggests that executive and director social networks play an important role in the flow of inside information. Cohen, Frazzini, and Malloy (2008) find evidence that analysts with school ties to firm directors perform better on recommendations regarding those firms. Employing a market microstructure model, Cai et al. (2011) find evidence that liquidity providers anticipate the marginal increase in inside information flows from directors with connections to financial institutions and respond by widening bid-ask spreads, since these flows should give rise to an increase in trading on non-public information and this can be harmful to market makers.

Both lines of analysis are broadly concerned with the effect that managers' social networks have on the classic agency problem between managers and shareholders. In the former case, managers leverage social networks to enhance their power to extract "rent," for instance, through overcompensation or retaining their position in spite of poor performance. In the latter cases, managers exploit their social connections to misappropriate information owned by shareholders for private gain.

By contrast, the agency problem in Israel is not between managers and shareholders but rather between majority shareholders and minority shareholders. In Israel approximately half of firms (by market capitalization) are run by majority shareholders who exert control through a system of business group ownership. These controllers are in general capable of observing managers and preventing them from expropriation; in fact they are incentivized to do so. This ownership model is in fact prevalent throughout much of the world (Morck 2009). The principal corporate governance problem here is instead between the controller and the minority shareholders. Controllers may own large business pyramids in which they maintain a controlling interest in firm A, which in turn holds a controlling interest in firm B, giving the controller effective control over firm B, but a lower cash flow stake therein. (For a description of the corporate governance issues and the mechanisms by which controllers separate control and cash flow rights, see Bebchuk et al. 1999.) They are then incentivized to shift assets from firms with low cash flow rights to firms with high cash flow rights in a process called tunneling that effectively expropriates from minority shareholders.

Non-controller corporate insiders should have advance and richer knowledge about tunneling than minority shareholders. To the extent they are capable of avoiding surveillance by the controller, insiders are incentivized to exploit the information for profit through insider trading or information transfers. Scholars have long argued that insider trading brings information to the market more quickly and thereby improves price efficiency (the argument was first put forward in Manne 1966). Other commentators state that although the price effect of a given insider trade is likely to be insignificant, the ability of other market participants to suss out insider trades and react appropriately has the same overall effect (Bainbridge 2001). In a recent theoretical analysis, Macey (2007) contends that insider trading can be especially effective in revealing instances of fraud. This is particularly pertinent to our analysis, since tunneling is fraud-like in nature.

The presence of financially connected directors should give rise to increased insider trading, and the effects of this insider trader should be observable in bid-ask spreads. Stoll (1989) posits that liquidity providers will be less willing to post quotes, since informed trades carry price information that will move the market against the quotes. Cai et al. (2011) find some evidence for this hypothesis in examining financially connected directors of non-financial U.S. firms. However, increased price efficiency should have the opposite effect on bid-ask spreads, since traders are more willing to post quotes when they are more confident in the price of the security.

If the information asymmetry problem is sufficiently large, we expect the price efficiency effect to dominate the market microstructure effect. We hypothesize that in business group firms that are at risk for tunneling, the price efficiency effect should dominate because the information asymmetry is very large. In these cases, insider trading should also have a chilling effect on some specific tunneling schemes. For instance, if controllers seek to tunnel by purchasing overpriced assets from a related firm, they are limited in their ability to finance the transaction by the value of the firm. If the firm's value decreases before the controller can acquire financing, then the total scope of the tunneling will decrease.

We find that the presence of financially connected directors predicts a significant decrease in bid-ask spread (see figure 10, wlm0c, later in this paper), indicating that the price efficiency effect appears to dominate the market microstructure effect in publicly traded Israeli companies as a whole. Consistent with our hypothesis, this result comes from the business group firms. The presence of financially connected directors in group firms dramatically reduces spreads. Spreads drop by approximately one-third in group firms (an effect of 56bps on a group firm average of 152bps; see figure 10, wlm3c), while slightly increasing for non-group firms. The difference between the effect of financial directors in group and non-group firms is significant at the 5 percent level using robust standard errors clustered at the firm level. In our analysis, we control for likely confounding variables including market capitalization and industry sector.

We also examine several additional hypotheses. We expect the marginal effects of financial directors who are directors in firms under multiple controllers or firms without a controller to be stronger than financial directors who only work for one owner. In these cases, we believe it's more likely that the financial director will not also be a member of the controlling block of the non-financial firm; therefore there will be a lower possibility of erroneously concluding that a financial connection implies a conflict of interest. We also expect a similar marginal effect when the financial director is a major shareholder in the financial firm, since he/she should have a larger incentive than a mere stakeholder. We find that there is indeed a stronger effect in both cases, but variation is too high to establish significance.

2 Ownership Structure and Corporate Governance Problems

Recent scholarship divides corporate ownership structure into two models: the business group model and the dispersed shareholder model (La Porta et al. [LLSV] 1999a). In the former, a family or small group of investors owns a controlling interest in a large group of public and private firms through corporate cross-holdings. In the dispersed shareholder model, a single corporation is widely held and, aside from joint ventures, typically wholly owns any subsidiaries. The business group model is predominant outside of America, Britain, Germany, and Japan (Morck 2009).

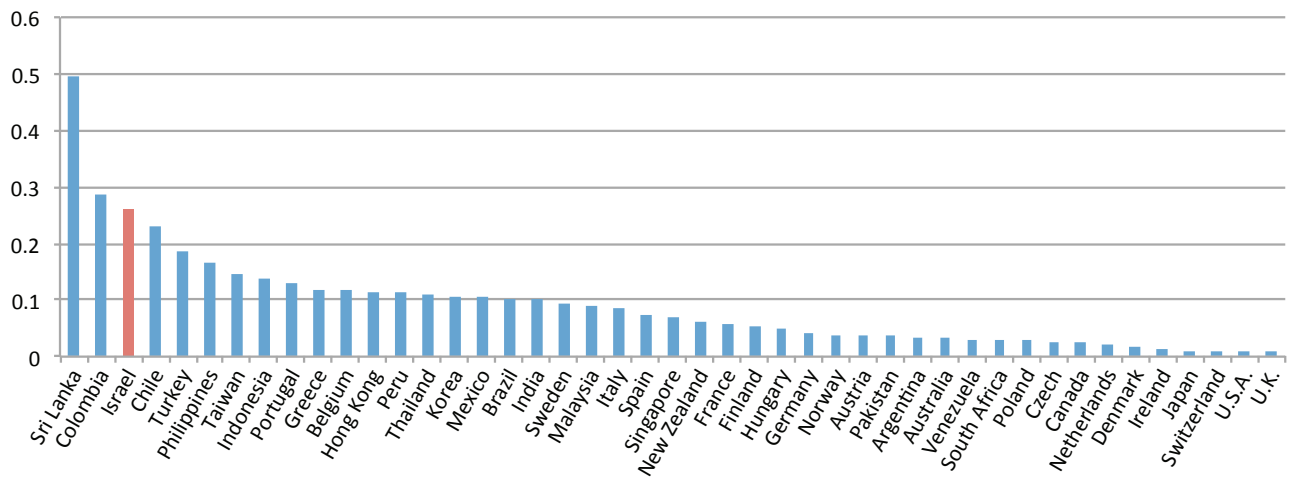
Business groups and corporate ownership structures in general give rise to a host of issues, including conflicts between labor and ownership, political rent-seeking and lobbying, anti-trust concerns, systemic risk, and conflicts of interest between different classes of firm owners. LLSV (1999a, 1999b) released a pair of research papers asserting that high corporate ownership concentration is associated with smaller capital markets and less capital access, indicating that dispersed ownership may be a preferable model. Theorists also posit that business groups may stifle growth and innovation in some developing economies (Almeida and Wolfenzon 2006).

Business groups allow a family or small group of investors to exercise control over a vast network of corporations both public and private (Bebchuk et al 1999). They can do so through the use of corporate pyramids, cross-ownership of firms in the same group, and dual-class shares. In corporate pyramids, the controller owns a controlling interest in firm A, and firm A in turn holds a controlling interest in firm B, giving the controller effective control over firm B. In a cross-holdings structure, firms at the same level own shares in each other, allowing a controller to magnify her ownership stake in each firm by voting also with the other firms' shares. Bebchuk et al. cite the Chareon Pokphand Group in Thailand as a typical case of cross-holdings (1999). Dual-class shares allow a controller to maintain control through shares that have greater voting rights than the shares owned by other investors.

Pyramidal business groups are prevalent in Israel. A recent cross-country study indicates that business groups represent 40 percent of Israeli listed firms and 23 percent of listed market capitalization (Masulis et al. 2011). Pyramidal business groups in Israel also have many layers of ownership. Masulis et al. find that Israeli firms on average have 1.27 pyramid layers separating the group firm from the ultimate owner. In a sample of 45 countries, this figure is surpassed only by Colombia and New Zealand. In our hand-collected data set, we identify 24 major business groups that collectively control 125 of 561 companies. These companies represented approximately half of the entire market capitalization of publicly listed firms in Israel as of September 2010 (BG= 348,824 million NIS, NONBG=321,543 million NIS). [1]

1. Studying Israel exclusively and using a unique data set, Kosenko (2007) identifies 20 major business groups that control slightly more than two-fifths of the market capitalization of Israeli firms during his sample period (Kosenko says half excluding the dispersed ownership firm TEVA, which is itself about 20 percent of TASE market capitalization).

Figure 1. Percent of firms held by pyramids



Source: Masulis et al., 2011.

Scholarship of the business group model tends to emphasize the conflict of interest between the majority shareholder, also called the controller, and minority shareholders. (See Bertrand et al. 2000, Claessens et al. 1999, and Bebchuk et al. 1999. See also Khanna and Yafeh 2005 for a literature review and a more agnostic stance toward business groups in general.) This literature focuses on the effects when controllers decouple their ownership rights from their cash-flow rights in the corporations they control. This leads to "tunneling," the process of shifting revenues from low-cash-flow rights firms to high-cash-flow rights firms, a form of minority shareholder expropriation. Typical methods of minority expropriation include unfairly priced contracts with related firms and excessive compensation of employees who are also major shareholders.

Scholarship of the dispersed shareholder model, by contrast, tends to emphasize the conflict of interest between managers and shareholders (see Roe 1994 as well as Bebchuk and Spaaman 2010). While managers are obligated to put the interests of shareholders first, there is considerable theory and evidence that managers find ways to both legally and illegally extract funds to the detriment of shareholders–through excessive executive compensation (Bebchuk and Fried 2003), options backdating (Thomsen 2006), and insider trading. However, insider trading, though generally associated with the dispersed shareholder model, may also have implications for business group model economies, insofar as insider trading is a means of information transfer.

3 Insider Trading and Price Efficiency

Regulators in securities markets focus heavily on insider trading. In the United States, the Securities and Exchange Commission (SEC) is currently vigorously pursuing insider trading cases, and has recently scored a large victory in the Galleon case.[2] In one recent 10-day span (May 11–21, 2011), there were no fewer than 15 new articles about insider trading on the New York Times website.

Nevertheless, academic scholarship about insider trading remains very mixed, with many commentators arguing for a partial or complete lifting of regulatory bans on the practice (for useful background, see Manne 1966 and Bainbridge 2001). There are two general arguments for deregulation: 1) insider trading allows for more efficient price revelation; and 2) insider trading can be an efficient compensation scheme (Bainbridge 2001). We contend that the price revelation argument, if valid, creates a useful way to examine minority shareholder expropriation in business groups.

The price revelation argument starts with the premise that the value of an asset reflects all current and future information available about the asset. Insider trading is by definition trading on information that is not presently available to all market participants. Such trading should move the price to reflect the new information, thereby incorporating the information into the asset price more quickly than if it had been exposed through disclosure by the firm. Bainbridge (2001) argues that such transactions are likely to be too small to have a significant impact, raising the possibility that other traders correctly identify and respond to insider trades, again with the ultimate effect of more efficient absorption of information.

Macey (2008) focuses on instances of insider trading in which the insider has knowledge of fraudulent activity within the firm. He notes that in instances of fraud, both insider sales and whistle-blowing help to reveal information and raise the suspicions of other market participants.

As stated above, in the business group model, the principle corporate governance problem is conflict between the controller and minority shareholders. The controller commits acts of "tunneling"—such as company asset sales (or purchases) at deflated (or inflated) prices to related parties, excessive compensation to related executives, etc.—that are similar to fraud. The controller prefers that these activities, or at least their hidden motivations, remain unknown to the minority shareholders. Unlike the situation in a widely held firm, a controller also has enough equity ownership to be incentivized to monitor a large number of insiders that may trade based on private knowledge of future tunneling events. The controller will be successful at curtailing significant insider trading if the likelihood of detection is sufficiently high and the punishment (probably firing at a minimum) is sufficiently large relative to the payoff of the trade. However, for directors affiliated with financial firms, the payoff for "trading"—in this case, passing the information to the financial affiliate—can be magnitudes larger than for the individual trader. Further, the punishment may be weaker, given that the relative bargaining position of a financially affiliated director is probably stronger than that of the average "in-the-know" employee. This suggests a controller should reasonably expect a higher likelihood that a financially affiliated director will trade on inside information, particularly information about future tunneling events.

Outside investors know that tunneling can occur and respond with lower firm valuation; however, they still know very little about when it will occur and how bad it will be. Insider trading on tunneling provides the market with increased information about the timing of tunneling events, decreasing price uncertainty.

2. See http://dealbook.nytimes.com/2011/05/11/rajaratnam-found-guilty/ and www.nytimes.com/2010/11/21/business/21rtade.html.

4 Director Networks and Information Transfer

We posit that financially connected directors disseminate private information through a network of interlocking directorates—that is, taking information from one firm's board and passing it to another. While it is intuitively plausible that such information transfer occurs, it is by no means necessarily the case. In many jurisdictions it is illegal to trade on information so obtained, making the decision to trade on such information non-trivial. There is, however, a growing body of evidence that suggests that directors do pass information, in spite of legal rules to the contrary.

Cai et al. (2011) contend that financially connected directors have a strong incentive to pass information to their financial firms, and that the firm in turn will cause that information to be traded upon, either through direct transactions or recommendations to clients. Other investors, in turn, will be less willing to post limit orders for fear of informed trading and wider spreads. They find strong evidence for their hypothesis: estimates that, pre-Sarbanes-Oxley, an additional financially connected director increases annual trade costs by approximately US$1 million per year (post-Sarbanes-Oxley, they show a significant, albeit considerably smaller, effect). They also show that marginal information leakage before an earnings announcement is positively affected by the number of financially connected directors, again reinforcing the hypothesis that these directors are passing information.

Cohen, Frazzini, and Malloy (2010) also find evidence of top executives transmitting information out of companies. They show that sell-side equity analysts appear to give more accurate recommendations about companies if they attended school with a senior officer, suggesting that they are receiving private information from this channel. Interestingly, they find that after the SEC promulgated Regulation FD, the analysts' advantage appeared to have greatly diminished. (Regulation FD, adopted in 2000, stipulates that when any issuer discloses material information to a party that may trade on that information, the issuer must make the disclosure public.) This further reinforces the information flow hypothesis by suggesting that it was indeed information flows from company executives that gave these analysts an edge.

Ng et al. (2010) show that directors sitting on the boards of two or more firms anticipate the information flow from one firm to the next when earnings announcements are staggered. They show that these directors profitably trade in one firm based on private information about the second firm.

In each of these analyses, the effect of non-public information flow is considered to be pernicious. By contrast, we take the view that the information flow is not necessarily harmful, and under certain conditions can even be beneficial. Specifically, when the principal corporate governance problem is between minority and majority shareholders, the threat of information flows from financially connected directors (and the flows themselves) can actually serve to help outside investors by increasing price efficiency in the market.

5 Data and Univariate Analysis

5.1 Directors and Business Groups

Public companies in Israel are required to periodically disclose the names of certain company officers, including directors and senior management.[3] We use these reports to identify both directors that sat on multiple firms and financially connected directors.

Financially connected directors sit on the boards of non-financial firms and are also major stakeholders of a financial firm. (Major stakeholders may be directors, senior management, or large shareholders.) We employ a wide definition of a "financial connection," since persons in any of these positions may be inclined to help the financial firm at the expense of the non-financial firm. It seems plausible that shareholders and CEOs of financial firms will be more inclined to exploit inside information than other stakeholders in the non-financial firms since they have more to gain. However, these persons may also face increased scrutiny and stronger penalties for malfeasance, so the relative effect may be ambiguous. We separately examine these classes of financial connections and fail to show that they produce an added effect in either business or non-business group firms.

In order to determine whether a firm is a business group member or not, we hand-collected ultimate control ownership information from the public company ownership reports. Since 2008, public companies in Israel have been required to identify a "controller," who exercises substantial power over the firm. We used this information along with the reported ownership data, family names, and news reports of family relationships to create ownership chains. We verified our methodology by spot-checking our proposed pyramids against a commercially available ownership database.

We performed analysis on September 26, 2010, the date for which we have the full business group ownership information mapped out. We identified 125 business group member firms and 436 non-business group member firms. There were 3,265 board seats divided among 2,566 directors. Business group firms had larger boards and more connected directors.

FIGURE 2. BOARD SIZE SUMMARY STATISTICS

Board size

	Min	Q1	Median	Mean	Q3	Max
Non - BG	1	4	5	4.972	6	17
BG	2	5	6	6.616	8	14

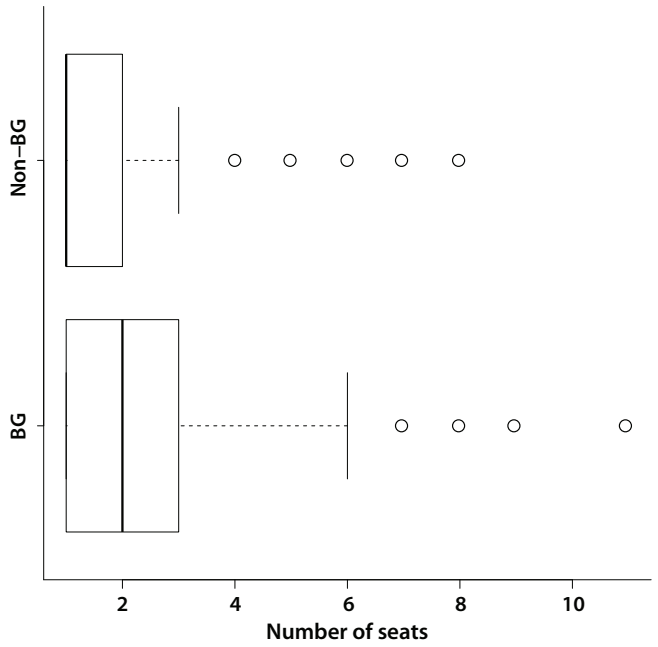
Board size, including outside directors

	Min	Q1	Median	Mean	Q3	Max
Non - BG	1	6	7	6.972	8	19
BG	4	6	8	8.284	10	15

Fifty-eight percent of business group and 29 percent of non-business group directors held seats on multiple boards. This disparity may seem to indicate that many business group–affiliated directors held more board seats than non-business group directors. However, only 27 percent of business group directors sat on the boards of multiple business groups' firms or a non-group firm, indicating that where ultimate ownership is concerned, directors who sat on business group firm boards did not serve substantially more distinct owners than exclusively non-business group firm directors.

3. These reports are publicly available and are called 'ת77' in Israel.

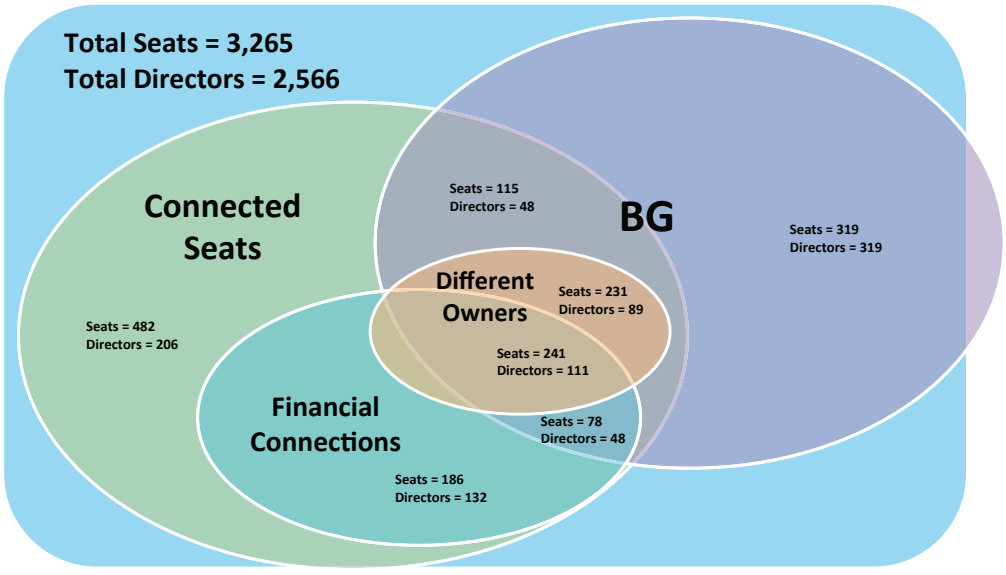
Figure 3. Seats held by director



Note: Distribution of seats held by director. Dark lines indicate median. Box edges indicate 25th and 75th percentiles. Whiskers indicate last observation within 1.5 stand deviations of the median.

Business group firms were more likely to have directors with connections to financial firms. Twenty-eight percent of business group directors (and 11 percent of non-business group directors) had connections to a financial firm. Even considering only connected directors, the business group directors were more likely to be connected, albeit the discrepancy is considerable smaller: 48 percent of business-group (and 38 percent of non-business-group) *–connected* directors had at least one connection to a financial firm. Surprisingly, of the business group directors with financial connections, 56 percent of these connections were to non-affiliated financial firms. While we expect a director's incentives to shift with any financial connection, we expect that effect to be strongest when the financial firm lies outside the business group because the directors of business group financial firms may also be a part of a tunneling scheme. The figure below gives a detailed graphical breakdown of financial director and business group membership.

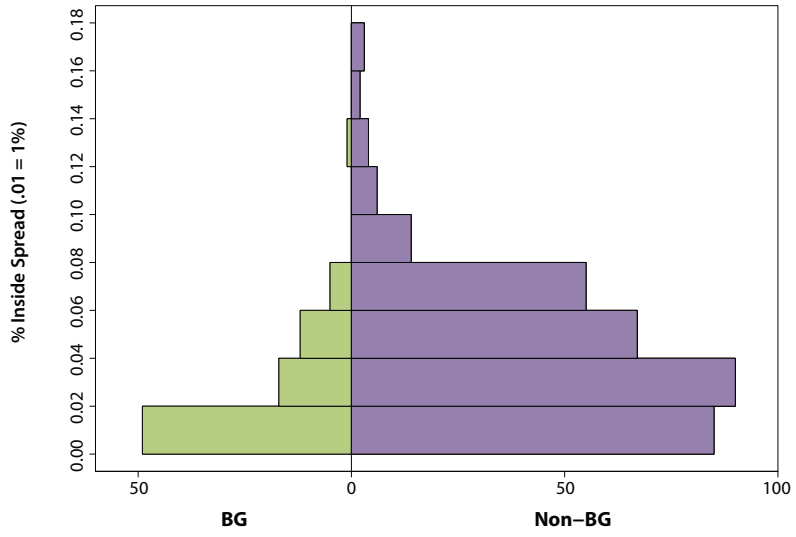
Figure 4. Directors and director seats, including external directors of non-financial firms



5.2 Liquidity

We took snapshots of the inside spread at half-hour intervals for all firms. We removed periods when at least one side of the book was empty or the spread was very large (greater than 20 percent of the mid-price). This has the effect of making low-liquidity firms appear slightly more liquid than they actually are, but does not change the rank of the spreads by firm. We average these figures together by firm for the month preceding our analysis date, which was September 26, 2010.

FIGURE 5. INSIDE SPREAD, BG AND NON-BG FIRMS



The inside spread is heavily skewed to the right. The sample median was 3.31 percent and the mean was 3.89 percent. Business group firms had considerably lower spreads than non-business group firms; the median business group firm spread was less than half of the median non-business group firm.

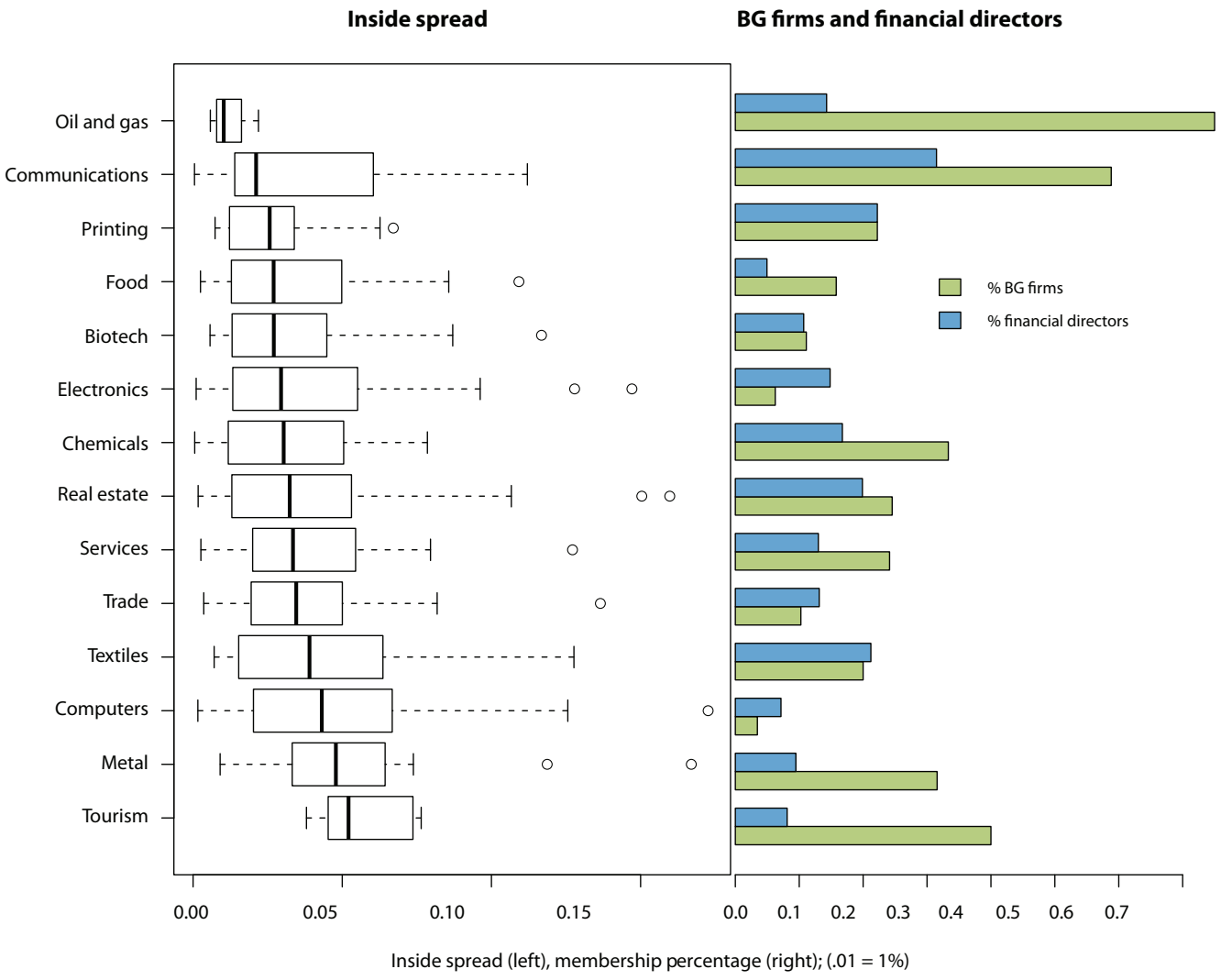
FIGURE 6. INSIDE SPREAD SUMMARY STATISTICS

BG and Non-BG, as %

	Min	Q1	Median	Mean	Q3	Max
Non-BG	0.05	1.88	3.63	4.27	6.13	17.30
BG	0.05	0.74	1.52	2.43	3.68	12.80

Spreads also varied considerably by industry. Among non-financials, oil and gas exploration firms had by far the lowest spreads, with communication and media coming in second. These two industries have the highest concentration of business group firms in our sample. Since this constitutes a potential lurking variable, we control by adding industry dummies in regression analysis.

Figure 7. Inside spread by industry



Note: Dark lines indicate median. Box edges indicate 25th and 75th percentiles. Whiskers indicate last observation within 1.5 standard deviations of the median.

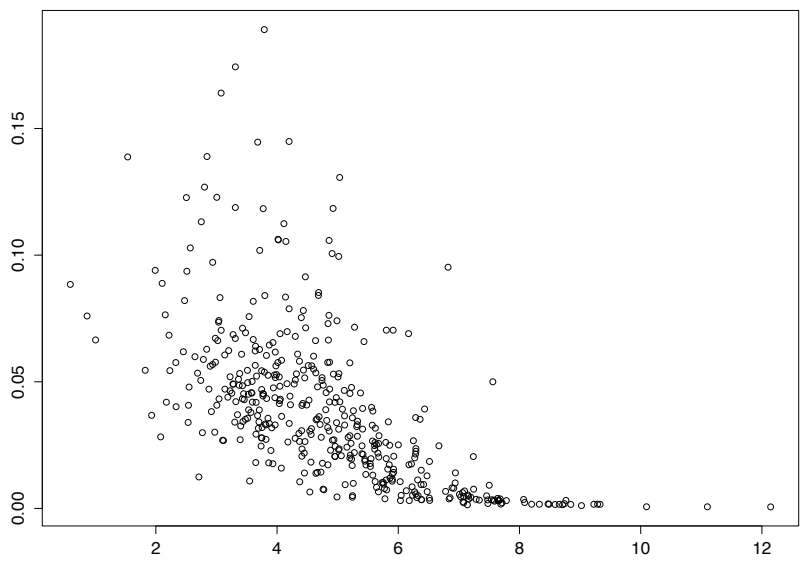
In our sample, inside spreads are closely related to market capitalization, with higher market capitalization correlated to lower spreads. The business group firms also tend to have larger market capitalization than non-business group firms (despite the fact that the largest firm by market capitalization, TEVA, is non-business group). We control for market capitalization in our analysis.

Figure 8. Market capitalization summary statistics

BG and Non-BG, in millions NS

	Min	Q1	Median	Mean	Q3	Max
Non-BG	1.80	37.47	88.95	806.40	213.70	188,100.00
BG	8.63	141.10	523.80	2,511.001	863.0066	200.00
All	1.80	40.88	114.70	1,145.00	330.80	188,100.00

Figure 9. Inside spread by market cap



6 Findings

6.1 General Findings

We find that the presence of financially connected directors in Israel predicts a significant negative effect on spreads. Controlling for market cap and industry sector, the presence of a financially connected director in a firm predicts a 61 basis point decrease in bid-ask spreads (significant at the 1 percent level). This finding suggests that price efficiency is dominating the market micro-structure effect.

The decrease comes from business group firms. We find the presence of a financial director at a business group firm predicts a 56 basis point spread decrease (see model wlm3c in figure 10), whereas the presence of a financial director at a non-business group firm predicts a 1.7 basis point spread *increase*. The difference, 58.37 basis points, is significant at the 5% level). This is in spite of the already lower business group firm spreads: after the relevant controls, being a business group member predicts a spread decrease of 196.53 basis points (se 12.36 basis points).[4] Average business group spreads are 152 basis points so a decrease of 0.56% represents a substantial decrease in the overall expected spread. We take this as a strong indication that investors posting quotes in business group firms respond substantially more generously to the presence of a financially connected director in a business group firm as opposed to in a non group firm, indicating an increase in the marginal level of information flow and therefore overall price efficiency of those securities. As a reality check, we note that market capitalization is strongly related to inside spread while stock price is completely unrelated to inside spread.

6.2 Financial Directors with Multiple Affiliations

Forty-eight of the financial directors within business group firms are only associated with financial firms that are members of the same business group. The other 111 financial directors within business group firms are associated with at least one financial firm in a different business group or one that is not business group affiliated. Financial directors affiliated with multiple owners are likely to show a stronger effect than other financial directors, since they should have stronger conflicts of interest with the business group controller. We find that while financial directors with multiple affiliations in business groups do predict a decrease relative to other directors with multiple affiliations in business groups, the decrease is small (1 bp; see model 6 in figure 10) and not statistically significant. This does not support our hypothesis, but doesn't refute it either. Directors may still have a conflict of interest that induces insider trading. Controllers may also choose to perform less tunneling of firms where such a connection exists, and the empirical analysis is sensitive to these choices.

4. All figures presented control for industry type and market capitalization.

Figure 10. Director-Level Regressions of liquidity on firm and director characteristics

Director level regressions of liquidity (percentage inside spread) on firm and director characteristics. Spread is taken at half hour intervals and averaged over the month prior to our analysis period. Regressions are at the director level so firm level information is repeated. To compensate we report standard errors clustered at the firm level and report significance based on these errors. Regressions are WLS - weight is log ten day market cap.
(*** = p<.001, ** = p<.01, * = p<.05)

	wlm0c	wlm1c	wlm2c	wlm3c	wlm5c	wlm6c
(Intercept)	0.03501*** (0.00466)	0.03629*** (0.00181)	0.03711*** (0.00176)	0.03841*** (0.00381)	0.03850*** (0.00382)	0.03847*** (0.00381)
isbg24		−0.01976*** (0.00272)	−0.01945*** (0.00273)	−0.01965*** (0.00274)	−0.02068*** (0.00267)	−0.02008*** (0.00278)
isfinancialholder	−0.00615* (0.00188)	−0.00052 (0.00220)	−0.00045 (0.00218)	0.00018 (0.00219)	−0.00068 (0.00214)	−0.00126 (0.00280)
isbg24 x isfinancialholder		−0.00568* (0.00277)	−0.00533 (0.00273)	−0.00584* (0.00273)		−0.00615 (0.00394)
hasmultiplebg					−0.00005 (0.00158)	−0.00260 (0.00276)
isfinancialholder x hasmultiplebg					−0.00315 (0.00279)	−0.00057 (0.00489)
isbg24 x hasmultiplebg						−0.00389 (0.00316)
isbg24 x isfinancialholder x hasmultiplebg						−0.00143 (0.00576)
market cap	−0.00000*** (0.00000)	−0.00000*** (0.00000)	−0.00000*** (0.00000)	−0.00000*** (0.00000)	−0.00000*** (0.00000)	−0.00000*** (0.00000)
mid quote	−0.00000*** (0.00000)	−0.00000*** (0.00000)	−0.00000*** (0.00000)	−0.00000*** (0.00000)	−0.00000*** (0.00000)	−0.00000*** (0.00000)
industry dummies	true	false	false	true	true	true
R-squared	0.11464	0.11462	0.14094	0.20468	0.20386	0.20526
adj. R-squared	0.11015	0.11378	0.13958	0.20014	0.19906	0.19971
sigma	0.06133	0.06121	0.06031	0.05815	0.05819	0.05817
F	25.53199	136.70718	103.88533	45.08048	42.47806	36.96865
P	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
N	3172	3172	3172	3172	3172	3172

6.3 External Directors

We also test to see if connected external directors have an effect on firm liquidity. External directors are a special class of directors explicitly appointed to represent public shareholders. They are forbidden by regulation from having ties to the majority shareholder and must be voted to the board by a majority of the non-controlling shareholder votes. Publicly traded firms are required to have two external directors. We expect that for external directors, we should see a stronger disparity of effects between business and non-business group firms. This is because director connectivity is an incomplete proxy for a director's incentives; financially connected directors may still be part of a business group controller. External directors who are financially connected form a cleaner proxy since we are, to the extent the regulation is enforceable, assured of less ambiguity in their incentives. In our sample there is some variability from the two external directors per firm, probably owing to occasional lags in the hiring process.

Interestingly, we fail to find evidence that external directors predict significantly different liquidity between business and non-business group firms relative to other directors. External directors do predict lower spreads in business groups, and external financial directors in business groups predict lower spreads than other financial directors in business groups, but the effects are not significant. In fact, even after pulling out the effect of external financial directors in business groups, the coefficient for other business group financial holders remains significant. These results suggest that for financially connected directors in business groups, the conflict of incentives between their non-financial and financial firms is in aggregate far more important than a possible conflict between majority and minority shareholders. This may be because these directors are by and large not related to the majority shareholder or because, in spite of being related to the majority shareholder, their interest in the financial firm skews incentives away from tunneling in the non-financial firm and towards enhanced revenues of the financial firm.

6.4 CEOs, Major Shareholders, and Outside Directors

We are principally concerned with conflicts of incentives that give directors reason to misuse the inside information of non-financial firms. Accordingly, we define "financially connected" as any affiliation with a financial firm that requires public disclosures, forming the implicit assumption that the magnitude of the conflict of incentives is homogenous among all "financially connected" directors. This assumption is problematic: We expect that CEOs and major shareholders face greater benefits for outstanding performance and greater punishment for poor performance than do other major stakeholders and are therefore more inclined to exploit information to benefit their firms. If, as suggested above, the principal corporate risk is tunneling, we would expect the surveillance effect of CEO and major shareholder financial connections to exceed the effect that occurs when the director serves in some other capacity with the financial firm.

Figure 11. Analysis of external directors

Director level regressions of liquidity (percentage inside spread) on firm and director characteristics. Spread is taken at half hour intervals and averaged over the month prior to our analysis period. Regressions are at the director level so firm level information is repeated. To compensate we report standard errors clustered at the firm level and report significance based on these errors. Regressions are WLS - weight is log ten day market cap.
(*** = p<.001, ** = p<.01, * = p<.05)

	wlm1extc	**wlm2extc**	**wlm3extc**
(Intercept)	0.03531*** (0.00185)	0.03613*** (0.00179)	0.03741*** (0.00381)
isbg24	–0.01945*** (0.00279)	–0.01932*** (0.00266)	–0.01922*** (0.00270)
isexternal	0.00389*** (0.00101)	0.00358*** (0.00099)	0.00379*** (0.00091)
isbg24 x isexternal	–0.00119 (0.00174)	–0.00093 (0.00167)	–0.00157 (0.00147)
isfinancialholder	0.00037 (0.00257)	0.00077 (0.00253)	0.00125 (0.00254)
isbg24 x isfinancialholder	–0.00556 (0.00321)	–0.00545 (0.00315)	–0.00592 (0.00306)
isexternal x isfinancialholder	–0.00362 (0.00404)	–0.00442 (0.00397)	–0.00412 (0.00391)
isbg24 x isexternal x isfinancialholder	–0.00111 (0.00511)	–0.00114 (0.00496)	–0.00083 (0.00473)
prev10marcapmilnis		–0.00000*** (0.00000)	–0.00000*** (0.00000)
industry dummies	false	false	true
R-squared	0.11714	0.14300	0.20702
adj. R-squared	0.11519	0.14083	0.20173
sigma	0.06116	0.06027	0.05809
F	59.97431	65.97182	39.15950
P	0.00000	0.00000	0.00000
N	3172	3172	3172

Though the difference is not statistically significant, CEO financial connections are associated on average with considerably smaller decreases in bid-ask spread for business group firms as opposed to non-group firms. When all financial connections are lumped together, the marginal difference between group and non-group firms is a 58-basis-point decrease, but in cases with directors serving as CEOs, the decrease is only 25 basis points. For major shareholders the effect is indistinguishable from financial connections on average.

While these results appear slightly damaging to our hypothesis, they are problematic in several regards. First, of the 38 business group financial director seats occupied by CEOs, 26 are the held by CEOs of financial firms within the same business group. As group firm CEOs, these directors are very likely to be a member of the group controller, therefore lacking any incentive to trade on tunneling. In contrast, the same can be said for only 19 of the 57 major shareholder business group financial connections. Second, the variances of the estimates of the marginal effects are very high, with p values of 49 percent and 75 percent for CEOs and major shareholders, respectively. Second, the business group firms with CEO-financial connections are among the largest and most liquid publicly traded business group firms. The median inside spread for business group firms with a CEO-financial connection in our sample was 49 basis points, whereas for business group firms without a CEO -financial connection, it was 101 basis points. In contrast, the spreads for non-group firms with and without CEO-financial connections in our sample are similar: 390 basis points with to 356 basis points without. We expect big, liquid business group firms to be less exposed to tunneling, dampening the possible benefit of surveillance and/or whistle-blowing trades by the financial connection.

Figure 12. Breakdown by financial director types

Director level regressions of liquidity (percentage inside spread) on firm and director characteristics. Spread is taken at half hour intervals and averaged over the month prior to our analysis period. Regressions are at the director level so firm level information is repeated. To compensate we report standard errors clustered at the firm level and report significance based on these errors. Regressions are WLS - weight is log ten day market cap.
(*** = p<.001, ** = p<.01, * = p<.05)

	wlm3ceoc	**wlm3majc**	**wlm3outsiderc**
(Intercept)	0.03837*** (0.00382)	0.03842*** (0.00382)	0.03843*** (0.00382)
isbg24	–0.01966*** (0.00269)	–0.01966*** (0.00269)	–0.01964*** (0.00269)
isfinancialholder	–0.00019 (0.00221)	–0.00059 (0.00241)	–0.00121 (0.00264)
isbg24 x isfinancialholder	–0.00668* (0.00275)	–0.00622* (0.00300)	–0.00646* (0.00314)
isceofinancialholder	–0.00011 (0.00524)		
isbg24 x isceofinancialholder	–0.00429 (0.00594)		
ismajfinancialholder		–0.00169 (0.00349)	
isbg24 x ismajfinancialholder		–0.00157 (0.00405)	
isoutsiderfinancialholder			–0.00333 (0.00326)
isbg24 x isoutsiderfinancialholder			0.00036 (0.00409)
prev10marcapmilnis	–0.00000*** (0.00000)	–0.00000*** (0.00000)	–0.00000*** (0.00000)
industry dummies	true	true	true
R-squared	0.20494	0.20474	0.20503
adj. R-squared	0.20015	0.19994	0.20024
sigma	0.05815	0.05816	0.05815
F	42.76298	42.70858	42.78623
P	0.00000	0.00000	0.00000
N	3172	3172	3172

Conclusion

We find strong evidence that the possibility of insider trading by financially connected directors in business group firms serves to reduce price uncertainty in those firms. Proxying for price uncertainty with bid-ask spreads and controlling for relevant confounding factors, we find a marginal difference in effect of financially connected directors in group and non-group firms to be negative 58 basis points and a total effect for group firms of negative 56 basis points. These spreads represent a substantial portion of average bid-ask spreads in these firms, leading us to conclude that they indicate a substantial reduction in price uncertainty. Since the increased risk of insider trading should have a market microstructure effect that increases spreads, we determine that the information effect is dominating the market microstructure effect.

In widely held firms, insider trading arises from a conflict of interest between management and ownership and a tragedy of the commons surveillance problem among the shareholders. In Israeli group firms, the principal conflict of interest is between the controller and the minority shareholders. This conflict of interest manifests itself in minority shareholder expropriation called tunneling, which essentially encompasses fraud-like activities. In these cases, the propensity for high-level executives to make insider trades and pass information to financial affiliates has the effect of bringing information to the market more quickly and reducing the information uncertainty surrounding tunneling events.

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