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Shareholder Wealth Consequences of Insider Pledging of Company Stock as Collateral for Personal Loans

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Abstract

We study a wide-spread yet unexplored corporate governance phenomenon: the pledging of company stock by insiders as collateral for personal bank loans. Utilizing a regulatory change that exogenously decreases pledging, we document a negative causal impact of pledging on shareholder wealth. We study two channels that could explain this effect. First, we find that margin calls triggered by severe price falls exacerbate the crash risk of pledging firms. Second, since margin calls may cause insiders to suffer personal liquidity shocks or to forego private benefits of control, we hypothesize and find that pledging is associated with reduced firm risk-taking.

Keywords: Pledging, Managerial incentive, Crash risk, Risk-taking

JEL Classifications: G31, G34, G35

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Shareholder Wealth Consequences of Insider Pledging of Company Stock as Collateral for Personal Loans*

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Abstract

We study a wide-spread yet unexplored corporate governance phenomenon: the pledging of company stock by insiders as collateral for personal bank loans. Utilizing a regulatory change that exogenously decreases pledging, we document a negative causal impact of pledging on shareholder wealth. We study two channels that could explain this effect. First, we find that margin calls triggered by severe price falls exacerbate the crash risk of pledging firms. Second, since margin calls may cause insiders to suffer personal liquidity shocks or to forego private benefits of control, we hypothesize and find that pledging is associated with reduced firm risk-taking.

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In many markets across the globe, corporate insiders frequently pledge their holdings of company stock as collateral for personal bank loans (henceforth pledging).[1] Pledging is valuable to corporate insiders because it relaxes their personal liquidity constraints that arise when a large fraction of their total wealth is tied up in company stock, but without jeopardizing their control rights in the firm. Funds accessed through pledged loans are typically used for two purposes. First, insiders can use loan proceeds to fund more personal consumption or to provide financing for investments in other assets.[2] Second, pledging can be used to finance the purchase of additional company shares. This allows insiders to increase their control rights in the firm, while also levering up their firm-specific risk exposure.

While pledging has clear benefits for firm insiders, in this study we investigate its resulting wealth effects for outside shareholders. In recent years, pledging has emerged as a significant corporate governance concern among regulators, proxy advisers and institutional investors.[3,4] Most notably, during the 2016 U.S. proxy season, pledging became the 5th most common reason that Institutional Shareholder Services (ISS) advised against the re-election of a director.[5] Much of the concern over insider pledging has arisen because of the central role it has often played in precipitating corporate scandals around the world.[6] Yet, despite such concerns and the prevalence of insider pledging activity internationally, there is a lack of empirical evidence on its aggregate causal impact on outside shareholder wealth.

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[1] Survey evidence indicates that around 20% of public firms in the U.S. allow insider pledging (Larcker and Tayan, 2010). In markets such as India, China and Taiwan, 35% to 50% of publicly listed firms have insiders who pledge. Pledging is also observed in Australia, Honk Kong, Singapore and the U.K.

[2] Larcker and Tayan (2010) report that conversations with private wealth managers indicate that pledged loan proceeds are typically used to pay for college tuition, remodel homes, pay down personal debts, invest in new businesses or diversify personal investments into public stocks, private equity or hedge funds.

[3] Concerns over pledging led the U.K.'s Financial Services Authority (FSA) and the U.S. Securities and Exchange Commission (SEC) to implement pledging disclosure requirements in 2009 and 2006 respectively.

[4] In 2013, the ISS responded to institutional investor concerns over pledging by including it as a new criterion in its governance rating system. See: https://www.issgovernance.com/file/2013-policies/2013ExecutiveSummary.pdf.

[5] This is based on annual meetings of Russell 3000 companies held from January 1, 2016 through June 10 2016.

[6] Appendix B provides details on pledging related corporate scandals from around the world. Some well-known examples include WorldCom (U.S.), Chesapeake Energy (U.S.), Sino-Environment Technology (Singapore), Satyam Computer (India), ABC Learning (Australia), Huishan Dairy (Hong Kong), and Shenzhen Comix Group (China).

Insider pledging can influence firm value through several channels. First, regardless of how insiders use the proceeds of a pledged loan, pledging raises a company's exposure to negative price shocks. Since pledging represents a margin loan secured by company stock, large price declines in the stock automatically trigger margin calls. Meeting these margin calls can be difficult for an insider since the initial motive for pledging is generally inadequate liquidity. If margin calls cannot be met, then a lender sells the pledged shares to close out the loan. However, a forced sale of insider shares by a lender increases sell orders in the secondary market in periods when the stock is already under significant selling pressure, which compounds the downward pressure on the stock price. This in turn can trigger further margin calls, thereby producing a cascading negative effect on the stock price. By exacerbating price declines in this way, pledging expands the left-tail of the stock's return distribution, thereby exposing firm shareholders to greater crash risk.[7] As shareholders are left tail-risk averse (Kelly and Jiang, 2014), pledging should drive down a stock's price and thereby, reduce firm value.[8] We refer to this effect as the *Crash Risk Hypothesis.*

Second, pledging can also affect outside shareholder wealth through its impact on insider risk-taking incentives. When insiders take out a full-recourse pledged loan (i.e. the lender holds a legal claim over the insider's personal assets upon default), defaulting on the loan in the face of a margin call becomes personally costly. The alternative of meeting the margin requirements is also costly because it forces insiders to relinquish the liquidity benefits they originally obtained from

[7] The business press has highlighted many cases where pledging is known to have triggered sharp downward share price spirals. U.S. media reports indicate that more than three dozen firms were hit with very large margin calls during the Dot Com crash and the Global Financial Crisis. For example, in 2008 the CEO and co-founder of Chesapeake Energy was forced to sell shares valued at $569 million to cover margin calls, which was associated with a 40% stock price drop. Appendix B provides further details on some of these cases as well as additional crash risk anecdotes from other markets around the world.

[8] In countries where pledging is prevalent, it can also pose significant market-wide risks. For example, during the Chinese stock market correction in January 2016, a Chinese fund manager is quoted as saying that "*Over half of all listed companies in China have their shares pledged, so if the market falls further, this issue could become a systemic risk"*. The article also points out that during the market correction period, up to 12.6% of the entire market capitalization of the A share market was at risk of a fire sale. See http://www.reuters.com/article/china-stocks-margin-idUSL3N15C2AJ. Further, in 2018, during a 40% decline in the Shenzhen Stock Exchange Composite Index, at least 36 listed companies had shares pledged by their insiders liquidated by brokerage houses. This more recent episode has prompted government concerns over pledging. Appendix B provides more information.

the pledged loan. A margin call can be even more problematic for a controlling shareholder, because it can ultimately lead to a forced sale of their stock by the lender, which may threaten their private benefits of control. Therefore, insiders must rationally trade-off these costs against the benefits of pledging.

One way for pledging insiders to minimize these expected pledging costs is through limiting margin call risk ex-ante. Unlike external stock price shocks that typically trigger crash risk, insiders can influence the level of a firm's risk-taking and thus, the extent to which corporate policies expose the insider to crash risk and margin calls due to firm-specific risk. We hypothesize that to preserve the private benefits of pledging, insiders have incentives to have the firm "play it safe". This can lead firms to pass up risky, but positive net present value (NPV) projects and thus, reduce firm value. We refer to this as the *Insider Risk Aversion Hypothesis*. It is important to note that while the *Crash Risk Hypothesis* relates to the ex-post consequences of negative stock price shocks, the *Insider Risk Aversion Hypothesis* focuses on the ex-ante behavior of insiders when pledging contracts are in place.[9]

Finally, pledging can influence firm value via a signaling effect. When insiders pledge to finance a purchase of additional stock, they voluntarily expose themselves to greater idiosyncratic risk. Given that insiders are generally risk averse, this type of pledging can signal that an insider holds positive private information that the firm has higher than expected future cash flows or a lower level of risk, from which they could earn abnormal profits to offset their higher idiosyncratic risk exposure. On the other hand, insiders may use pledged loans to finance the purchase of additional shares to consolidate their control rights, and thus, enhance their ability to consume private benefits of control. This latter action would signal a very different economic outcome, which would have a negative or at least a less positive valuation effect since the consumption of

[9] The effect of pledging on risk-taking can change when pledging is facilitated through non-recourse loans. We consider how non-recourse loans affect pledging in Section 1.2. Our focus is on incentives that arise from with recourse pledging, as this is the contractual norm in our empirical setting.

private benefits generally comes at the expense of outside shareholder wealth.

We study the aggregate shareholder wealth effects of pledging by utilizing a rich and novel database of share pledging activity for all publicly listed firms in Taiwan over the 2003-2013 period. We choose to study pledging in this setting for several reasons. First, Taiwan possesses a superior pledging disclosure regime relative to many developed markets such as the U.S. or U.K.[10] Specifically, Taiwanese regulators require that if any insider initiates, alters or pays off a margin loan secured by company stock, then their company must make a public disclosure of the details underlying the pledging transaction within five business days. This allows us to identify the precise timing, size and identity of every pledged loan and the adjustments in these loans over our sample period. Second, the Taiwanese stock market experienced a swift and unexpected regulatory change during our sample period that exogenously reduced the pledging incentives of insiders for a large subsample of firms. This allows us to draw causal inferences regarding the impact of pledging on firm value. Finally, Taiwan experienced a severe stock market-wide downturn at the time of the Global Financial Crisis (GFC), providing another shock to enable us to assess whether pledging exacerbates the effect of an externally triggered stock price decline.

Our evidence shows that pledging by Taiwanese insiders is pervasive. Approximately half of our sample firms contain insiders that pledge shares at some point during the sample period. The data also allows us to detect instances when pledging is used by insiders to finance the purchase of additional firm stock. We document that approximately 12.4% of pledging transactions are associated with a subsequent increase in insider stock ownership. This indicates that the main motive for pledging for most of our sample is to access liquidity, rather than to raise an insider's ownership in the firm.

We begin our empirical analysis by exploiting the above-mentioned regulatory shock to

[10] In the UK and the US pledging disclosures were only made mandatory in 2009 and 2006 respectively. Further, disclosures in both of these markets only take place on an annual basis.

determine the aggregate causal impact of pledging on firm value. During 2011, the Taiwanese legislature introduced and somewhat unexpectedly passed a new statute that removed the voting rights of a portion of an insider's pledged shareholdings that exceeds 50% of their total beneficial ownership. We identify a set of treated firms in our sample whose pledging level is directly affected by this legislative shock. These are firms with insiders that pledge more than 50% of their shares prior to the legislative change and where a loss of voting rights on these shares would seriously threaten their control of the firm. Among these firms, we observe a 24 percentage point decline in insider ownership pledged as collateral for personal loans by the end of 2012. In contrast, untreated firms experience a negligible change in pledging over this same time period, supporting the economic relevance of the shock to treated firms.

We examine the stock price reactions to both the initial discussion and the final passage of this pledging legislation for the treated firms identified above, relative to a matched sample of otherwise similar control firms. Following the final passage of the legislation, we find that treated firms experience a 3-day cumulative abnormal return (CAR) that is up to 2.5 percentage points greater than that of a matched sample of control firms. Next, we analyze how the exogenous decline in pledging documented above affects the longer-term valuations of treated firms relative to the same set of control firms. We show that from the pre-shock period (2009 and 2010) to the post shock period (2011 and 2012) the Tobin's Q of treated firms rises by up to 9.6% relative to that of the control firms. This valuation gain following an exogenously induced pledging reduction supports a causal interpretation of the negative impact of insider pledging on firm value.

We next explore the specific economic mechanisms through which pledging can adversely affect firm value. To test the *Crash Risk Hypothesis*, we utilize the 2008 Global Financial Crisis (GFC) as an experimental setting that propagates a large negative price shock (a 30% average decline in stock price) across firms in the market that is exogenous to pledging activity and insider ownership. We use this extreme price shock to determine the extent to which insider pledging

exacerbates a firm's exposure to crash risk through the specific channels described earlier.

A key source of the heightened crash risk experienced by pledging firms is the forced or voluntary sale of stock by either lenders or insiders in response to margin calls. We conduct two empirical tests that shed light on this specific channel through which pledging can exacerbate crash risk. First, we gauge the extent to which stock owned by pledging insiders is sold during the crisis period, relative to non-pledging insiders. Second, during the crisis period, we test whether firms with pledging by insiders who then sell a substantial portion of firm stock, suffer greater stock price declines relative to a set of matched firms with non-pledging insiders.

We exploit within-firm variation in the pledging levels of insiders to show that on average, the ownership levels of insiders that pledged shares decline significantly more than that of other non-pledging insiders within the same firm during the crisis. This approach controls for all firm-specific reasons why insiders sold stock during the crisis. We next focus on a subsample of firms where pledging should cause a severe negative stock price response to the crisis shock. These are firms where insiders pledge a high proportion of their shares (such that there is a small buffer of unpledged shares available to meet margin calls), hold a large ownership block (greater than 5%), and whose insider ownership levels decline during the crisis period (presumably because they are unable to meet margin calls). We find that these firms suffer an additional 21.6 percentage point decline in stock returns relative to similar non-pledging firms.

Next, to test the *Insider Risk Aversion Hypothesis*, we examine how pledging is correlated with several measures of corporate risk-taking. Our results show that increased insider pledging is associated with both less R&D expenses and less capital expenditures overall, but with more corporate diversification activity. These effects are driven by firms with pledging controlling shareholders, which is consistent with the influence they exert over firm policies and their strong incentives to preserve their private benefits of control. These results suggest that insiders pass up risky projects to preserve both their private benefits of control and the liquidity benefits associated

with pledging.

Finally, we examine whether there are any positive signaling effects of pledging by analyzing abnormal price changes around pledging announcement dates. Our results show that on average, pledges are not interpreted as a positive signal. Instead, shareholders exhibit a significant negative reaction to news that a manager, board member, or a blockholder has added to her pledging level. Announcement returns are most negative when a sizeable pledge is undertaken by a controlling shareholder (-0.77% 3-day CAR), consistent with the negative effects of crash risk and controlling shareholder risk aversion documented earlier. We also find that when pledging is used by a controlling shareholder to purchase more shares, there is a particularly large negative stock price reaction (-0.97% 3-day CAR). This suggests that this type of pledging releases a negative signal about the firm's market value, since it is perceived as a control enhancement strategy that reduces the wealth of outside shareholders through an anticipated rise in insider consumption of private benefits.

Our study contributes to the decidedly limited literature on how the personal transactions of insiders can affect the nature of their incentives, altering managerial decisions and thus, firm outcomes. Existing studies in this area focus exclusively on insider hedging transactions, (Bettis, Bizjak and Lemmon, 2001; Jagolinzer, Matsunaga and Yeung, 2007, Larcker and Tayan, 2010). Our analysis differs from these studies because the distortions in incentives created by insider pledging, when facilitated by a recourse loan, differ fundamentally from those created by hedging transactions. Unlike hedging transactions, this form of pledging does not limit the upside benefits and it can magnify the downside risk exposure of an insider's stockholdings.

By utilizing a quasi-natural experiment, our study provides causal evidence of the negative impact of pledging on outside shareholder wealth. Larcker, McCall and Tayan (2013) point out that a lack of such evidence precludes the formulation of an effective policy response to pledging. Concurrent studies on pledging document some possible channels through which pledging can

destroy shareholder wealth, but they do not study its aggregate impact.[11] Anderson and Puleo (2015) find that pledging is associated with greater tail risk among a sample of U.S. firms, echoing our crash risk hypothesis. Chan, Chen, Hu and Liu (2015) examine the impact of pledging on stock repurchase decisions of Taiwanese firms. They find that firms with significant pledging engage in value reducing stock repurchases following price falls to protect insiders from margin calls. These results suggest one additional channel through which pledging can reduce firm value.

While the general policy implications of our evidence may be limited by our use of data from a single market, many features of our setting suggest that these findings are relevant to many other financial markets. First, the margin call features of pledging contracts that are responsible for inducing greater crash risk are virtually identical across markets. Second, pledging insiders in other markets also frequently hold and pledge large ownership stakes, creating significant negative price pressure if they are forced to sell their shares as a result of margin calls.[12] Finally, advocates of pledging in the U.S. have argued that rather than a blanket prohibition on pledging, permitting it through recourse loans can alleviate the adverse incentives it creates (Scott and Seelig, 2013). Since pledging in Taiwan typically takes place through *recourse* loans, our findings suggest that even when recourse loans are utilized, outside shareholders are negatively affected by pledging.

1. How does pledging affect firm value?

1.1. Pledging and ex-post crash risk

Corporate financial contracts whose payoffs are contingent on a firm's share price can have significant implications for firm value. For example, Hillion and Vermaelen (2004) test a *faulty contract design hypothesis* whereby certain features of some firms' convertible securities can create

[11] Singh (2017) examines Indian firms whose controlling shareholder pledges stock as collateral for corporate debt.
[12] Even in developed markets such as the U.S., insiders can hold (and pledge) large ownership stakes. Some notable examples include Elon Musk, who pledged 29% of his 27% ownership stake in Tesla Motors, Liang Zhang who pledged 100% of his 63% stake in Synutra Intnl, Bennet Dorrance who pledged 49% of his 15% stake in Campbell Soup, and Boone Pickens who pledged 79% of his 24% stake in Clean Energy Fuels. See http://www.auditanalytics.com/blog/the-problem-with-pledging-part-ii/ for additional examples.

"death spirals" in their stock prices, which reduces firm value when these financial contracts are outstanding. In a similar vein, the contract design underlying a pledged loan can create significant downside risk exposure for a firm's shareholders.

To understand how pledging can affect crash risk, we first outline the basic features of pledging contracts in Taiwan. Corporate insiders in Taiwan can borrow up to 60% of the market value of their shares (Chen and Kao, 2011). Margin loans are typically offered on a recourse basis, so that if the borrower defaults, then the lender has claims to the borrower's other personal assets if the pledged collateral is insufficient.[13] Once a loan is originated, the borrowed amount is subject to an over-collateralization requirement (usually 120% in Taiwan). With a 120% over-collateralization requirement, the stock price can fall approximately 28% (1 - (0.60 x 1.2)) below its face value on the date of loan origination, before a margin call is triggered. Since all loans are marked-to-market on a daily basis, margin calls occur if the daily closing stock price falls below the margin call trigger price.[14]

Since an insider's pledging decision is generally driven by a lack of liquid assets, meeting a margin call may be very costly, if not simply infeasible.[15] As a consequence, a pledger may need to sell substantial amounts of stock to pay off a portion of the loan to be able to meet the new margin requirement. If a pledger is unable to do this, then the lender is entitled to sell the pledged shares to close out the loan. The result of such a sale is the release of a large block of previously untraded shares onto the secondary market, which places further negative pressure on the stock price. This in turn, can affect other pledging shareholders by triggering margin calls on their loans, putting further downward pressure on the stock price. By exacerbating price declines in this way,

[13] We thank Professor Yehning Chen, a securities law expert at National Taiwan University for advice on this issue.
[14] We gather information on the institutional features of pledging in Taiwan from various online sources, which are available on request. While we describe the typical pledging agreement, details are ultimately determined by the lender's risk assessment. For example, over-collateralization requirements can sometimes be 140%.
[15] The Taiwan Companies Act states that the capital of the company shall not be lent to any shareholder, suggesting that loans to insiders to cover margin calls are not allowed under Taiwanese law. See http://www.bycpa.com/html/news/20132/1793.html.

pledging exposes a firm's shareholders to greater crash risk. Given that shareholders are left tail-risk averse, pledging should drive down a stock's price, thereby reducing firm value. Further, the stock price falls from pledging induced crashes are unlikely to be fully reversed, as they can cause investors to raise their assessments of the likelihood of a future stock price crash at the firm (see Payzan-LeNestour (2018)). In particular, the market may learn about the extent to which a firm is vulnerable to crash risk, because the selling indicates that an insider is unable to meet these margin calls due to limited liquidity.[16]

1.2. Pledging and ex-ante risk-taking incentives

When negative stock price shocks hit firms with insider pledging, there are significant adverse *ex-post* consequences for these pledging insiders. Margin calls require pledging insiders to either (i) put up more stock or cash (or sell stock to raise cash) and thereby relinquish the liquidity benefits of pledging, or (ii) default on the loan, allowing the lender to seize their ownership stake, which may threaten their private benefits of control. Rational insiders should anticipate these negative consequences of pledging, and as a result, they should take measures to reduce the likelihood of stock price crashes *ex-ante*. By minimizing the possibility of such negative consequences, insiders effectively raise the expected value of the liquidity benefits derived from pledging. Thus, we predict that insiders are likely to respond to these pledging risks by making corporate decisions that substantially reduce a firm's risk level, which helps lower the probability of margin calls and forced share sales, triggered by stock price crashes.[17]

The above risk reduction incentives can destroy shareholder value as they can create an under-investment problem whereby insiders cause the firm to forego risky, but profitable

[16] The effects of pledging induced selling can also cause a permanent negative change in long term firm value because of incentive misalignment due to insiders no longer owning enough stock (which is costly for the firm to correct). Further, as is evident from Appendix B, pledging can also have negative human capital consequences brought about by resignations of either the executives or board members, due to pledging related scandals.

[17] A recent theoretical model by Burkart, Radicevic and Yu (2015) shows that insiders minimize the probability of default to preserve private benefits, even when higher risk-taking creates value for outside shareholders.

investment projects in favor of more conservative investment policies.[18] Such distortions in incentives are complementary to those outlined by Anderson, Mansi and Reeb (2003) and John, Litov and Yeung (2008), whereby controlling shareholders attempt to reduce a firm's risk to ensure that it remains solvent, which enables them to continue to consume private benefits of control.

It is important to note that in different institutional settings, pledging can have an opposite effect on firm risk-taking. If default is costless (as in a non-recourse loan), then insiders can default and walk away from their loan obligations when the value of collateral (shares) falls, effectively limiting the downside risk of their stockholdings. Meanwhile, insiders can still participate in upside gains. Thus, under non-recourse loans, pledging can create a call option-like payoff that provides a clear incentive to expand firm risk-taking. Given pledging in Taiwan is made on a recourse basis and default can cause insiders to lose valuable voting rights, which in turn may threaten their private benefits of control, this makes it unlikely that insiders in Taiwan would choose to voluntarily default on a pledged loan, rendering this risk-taking channel less important in our setting.

1.3. Pledging and insider signaling

Beyond the impact of pledging on crash risk and firm risk-taking, pledging can be associated with changes in firm value due to a signaling effect. When pledging is used to finance the purchase of additional stock, insiders both lever up and raise their ownership stake in the firm, thereby exposing themselves to greater idiosyncratic risk. Since this strategy is costly to imitate for insiders who are not bullish about a firm's prospects, pledging can represent a credible signal about insider beliefs concerning a firm's undervaluation. An alternative motivation for this type of pledging is that it allows a controlling shareholder to increase their control rights by facilitating the purchase of more shares and thus, enhance their ability to capture private benefits of control at the

[18] This hypothesis is also related to research on manager incentives when they hold firm inside debt (e.g. pension benefits and deferred compensation). These studies find that the potential for insiders to lose these fixed claims results in heightened manager risk-aversion (Cassell, Huang, Sanchez and Stuart, 2012; Phan, 2014; Wang, Xie and Xin, 2013; Wei and Yermack, 2011).

expense of minority shareholders. For example, such a strategy may be employed to block a hostile takeover bid, and thus, eliminate a channel through which the market for corporate control can discipline entrenched managers.

The signaling effects of pledging may change when insiders use it primarily to access liquidity. Similar to the logic of Shleifer and Vishny (2003) regarding the use of stock as an acquisition currency, insider pledging may indicate that the stock is overvalued. While it is possible that this can produce a negative valuation signal, the strength of this signal is severely limited, since a pledger remains subject to a margin call if the overvaluation corrects itself. Given that our data enables us to identify the announcement date of each pledge, we can test the immediate market reaction to pledges, allowing us to determine whether these announcements release any positive information about the firm, that may outweigh the negative effects discussed earlier.

2. Data and sample selection

Data on total shares owned and percentages of shares pledged by individual insiders is taken from the Taiwan Economic Journal (TEJ) database in years 2003-2013. The data is obtained for all firm insiders, defined as firm executive officers, directors, supervisors (similar to independent directors), as well as other blockholders, who own 10% or more of shares outstanding. We obtain annual firm level financial data and daily stock price data from TEJ and Datastream respectively. After excluding financial, utility and over-the-counter firms, our final sample has 8,003 firm-year observations from 840 listed firms, representing virtually all non-financial public firms in the market.

The TEJ database provides pledging data in two forms, arising from two separate pledging disclosure requirements of Taiwanese firms. First, the details of any change in an insider's pledging level must be announced to the market within five business days. This requirement allows us to identify the date of every pledge and pledge change, its size and the identity of each pledger. Second, regulations require each firm to disclose both the pledging level and ownership stake of every firm

insider on a monthly basis, regardless of whether a change in shareholdings or pledging has taken place.

By combining pledging announcement data with the monthly ownership disclosures, we can observe when an insider's pledge is followed by a rise in share ownership. This allows us to distinguish cases when pledging is used to finance additional stock purchases, which we refer to as "pledging to buy" transactions, from cases where it is used to access liquidity. Specifically, following each pledge or pledge change, we calculate the change in the number of shares owned by a pledger from the prior month-end to the month-end following the initiation or change in the pledge. However, observing an increase in stock ownership following a pledge does not necessarily imply that the pledge proceeds are used to buy stock. Insider stock ownership can also rise due to stock options exercises and stock grants.[19] To account for this possibility, we obtain data on which firm-years in our sample are affected by either stock grants to insiders or potential option exercises. In total, about half of the "pledging to buy" transactions we initially identify are affected by one or both of these factors. We determine whether the increase in stock ownership for each insider after a pledge is greater than what could be explained by firm stock grants and option exercises using a procedure that we describe in the Internet Appendix. If after the above adjustments, an insider's shareholding still increases in the month following a pledge, then we assume that at least some of the pledge proceeds are used to finance additional share purchases.[20] To account for the possibility that a lag exists between the access to pledged funds and the purchase of shares, we also calculate the ownership difference based on a change in ownership at the end of two months following a pledge.

[19] An insider can also purchase shares on the open market with their own funds. However, if this occurs at the same time as a pledge, we assume that the pledge is used to buy stock, as an insider's available funds are fungible.

[20] For robustness we also implement an alternative approach of completely dropping firm-years in which insider pledging is followed by an ownership increase, *and* where the firm grants stock to insiders in the corresponding firm-year or grants options at any time during our sample period. The results remain consistent and are reported in the Internet Appendix.

Since some of our hypotheses are concerned with managerial decision making (e.g., risk-taking), we also identify the central decision maker in each firm. We define decision makers as the controlling shareholders of closely held firms and the senior managers of widely held firms. To identify whether a firm has a controlling shareholder, and is thus closely held, we follow a three-step procedure detailed in the Internet Appendix. This procedure ensures that all affiliated shareholders are aggregated together, which allows us to determine whether the firm is controlled and to determine the controlling shareholder's identity. We follow the standard procedure in the literature and classify a firm as closely held if the aggregate family holdings or a single large blockholder owns at least 20% of all outstanding shares and is the firm's largest shareholder (group), or the blockholder owns at least 10% of outstanding shares, is the firm's largest shareholder, and has some operational involvement in the firm (as CEO, board chair or board member). Overall, we find that about two thirds of firm-year observations in our sample have a controlling shareholder.[21] This proportion is comparable to other studies such as Claessens, Djankov, Fan and Lang (2002), Yeh, Lee and Woidtke (2001) and Yeh (2005).

Since some public firms in Taiwan are controlled through a business group structure, it is important to consider the potentially different nature of pledging under these kinds of ownership structures.[22] To ensure that business groups do not drive our results and thus, hinder the generalizability of our findings to stand alone firms, we exclude business group firms from our analysis, and observe qualitatively similar findings.

2.1. Descriptive statistics

Table 1 reports basic descriptive statistics for our sample firms. In Panel A, we summarize the extent of insider pledging in our full sample, as well as for two subsamples, namely firms with a controlling shareholder (hereafter termed closely held firms) and firms with no controlling

[21] Our results also hold if we establish control using the 5% threshold along with being the largest shareholder.
[22] For example, controlling shareholders of a group may have advantages in meeting margin calls (by drawing on a banking affiliate or access resources from the group). The Internet Appendix considers this issue in further detail.

shareholder (termed widely held firms). We distinguish between these two firm types because ownership structures can give rise to different incentives with respect to pledging. In particular, private benefits of control held by insiders in closely held firms are generally much more valuable because effective voting control entrenches their position and thereby facilitates long-term consumption of private benefits. On the other hand, corporate insiders in widely held firms generally hold operating control, but limited control rights as they can be terminated by the board of directors on short notice. Overall, pledging (by any manager, board member, controlling shareholder or blockholder) occurs in about half of all firm-year observations, and is more common in widely held firms (58.9%) than in closely held firms (46.4%).

In the majority of cases, pledging appears to be carried out in order to facilitate access to liquidity, rather than to purchase additional shares. Panel A of Table 1 shows that 6.3% of all firm-years in our sample have at least one "pledging to buy" transaction. When focusing only on pledging firm-years, insiders appear to buy stock with pledging proceeds in 12.4% of cases. Given the possibility that the effects of pledging depend on whether the pledger has a strong influence on the firm, we examine the proportion of firms in which corporate decision makers pledge their stock. According to Panel A, about 25.3% of closely held firms and 54.7% of widely held firms possess a pledging decision maker.

Next, we compute the aggregate number of shares pledged by all firm insiders as a proportion of the firm's total shares outstanding and the total number of shares pledged by each insider as a proportion of the total number of shares they own. Although the prior evidence indicates that pledging is less prevalent in closely held firms, Panel A of Table 1 suggests that conditional on its existence, the size of pledging is substantially higher in closely held firms.

Panel B of Table 1 reports summary statistics for our sample firm characteristics. The table also reports the results from basic univariate comparisons between firms with and without insider pledging. All financial variables are winsorized at the 1% and 99% level. The results suggest that

firms with insider pledging tend to be larger (measured by total assets), older, and have higher leverage and fewer liquid assets. Since more established firms tend to have more stable valuations, their stocks should represent safer collateral for lenders. Thus, insiders in larger, more established firms should find it easier to pledge shares. Unsurprisingly, firms with larger boards (a greater potential pool of pledgers) have more pledging activity. Lastly, firms with insider pledging have lower firm valuation, measured by Tobin's Q.

3. Empirical results

3.1. Quasi-natural experiment

We begin our empirical analysis by conducting a quasi-natural experiment made possible by an amendment to the Taiwan Corporations Act that occurred during our sample period. Exploiting this regulatory shock allows us to address the concern that firms could develop characteristics that cause lower valuations, but at the same time facilitate greater insider pledging (e.g. a deterioration of internal governance leading to lower Tobin's Q and higher pledging).

3.2. Background and experimental setting

In 2011, the Taiwanese legislature initiated a discussion on whether certain types of pledging should be restricted. The discussion was in response to several concerns over the impacts of pledging. In particular, it was feared that i) excessive pledging could exacerbate the effect of price falls (similar to our crash risk argument discussed below), ii) margin calls could cause stock to end up in the hands of lenders, leading to corporate governance problems, and iii) insiders could use pledging proceeds to manipulate stock prices. To address these concerns, a legislative amendment was proposed to discourage excessive pledging by insiders. Specifically, it was proposed that if the number of shares pledged by an insider exceeds 50% of his/her shareholdings recorded upon election, then those shares exceeding the 50% threshold would lose their voting

rights.[23] Two key dates characterize the passage of this legislation through the Taiwanese parliament. The first date, which we label *Event 1*, is June 8, 2011. This is the date when the legislation was subject to its first active parliamentary discussion. According to local media coverage, the expectation was that the proposal would not progress beyond this discussion.[24] The proposal was controversial because the Taiwanese Ministry of Economic Affairs, as well as the securities regulator expressed concerns over uncertainties the legislation would create with respect to the exercise of voting rights and the firm's governance.[25] However, despite these objections, the proposal underwent its final passage on October 25, 2011, making it certain that it would become law. We refer to this date as *Event 2*.[26]

Two specific features of this regulatory shock make it particularly useful in this empirical setting. First, since the outcome of parliamentary deliberations was unexpected, it is unlikely that firm insiders could have fully anticipated this change and pre-emptively altered their pledging levels prior to June 8. Second, the period of uncertainty associated with the legislative change was relatively short. The time between the proposed amendment's first active discussion until its final passage was approximately five months, providing us with a sharp demarcation between pre-shock and post-shock sample periods.

3.3. Treated and control firms.

We identify a set of treated firms defined as those firms whose insider pledging is likely to

[23] The legislation is found in section 197-1 in the Taiwan Corporations Act.

[24] For example a media article by An-Ni Lin and Yi Yang, "Board member power to shrink for excessive pledging" *Economic Daily*, June 9, 2011, http://www.jihyoung.com/news/100/06/1000609-2 states that "*prior to the meeting, the amendment proposed by Shou-Chung Ting, a counselor of the Chinese Nationalist Party, was expected to fail, due to the strong opposition from the Ministry of Economic Affairs. Nevertheless, after several rounds of a "back and forth seesaw battle", the amendment passed its first examination.*"

[25] There were two specific objections. First, because pledging merely entails a lender obtaining a claim over shares, there was a view that this should not result in any voting rights changes associated with those shares. Second, the amendment could create uncertainty regarding how the excluded votes would be treated in the shareholder voting process, and whether this could hamper corporate decision making.

[26] We also assess the information content associated with the initial tabling of the legislation or its "first reading" several months earlier. We find no significant response to this event. This is unsurprising given that the information content of this event was minimal relative to the two event dates that are the focus of our study.

decline because of this exogenous regulatory shock (the treatment). The amendment directly affects firms whose controlling shareholders pledge over 50% of their shareholdings. These insiders would be motivated to reduce their pledging in order to preserve their voting rights and thereby protect their private benefits of control. This should be especially the case when their control rights are threatened by other large shareholders. Thus, we also identify a further subcategory of treated firms which we label "Threatened Firms". This group is defined as firms where the voting control of the controlling shareholder could be challenged by another large shareholder if the insider's pledging level remains unaltered following the legislative amendment. We classify a treated firm as threatened if the second largest shareholder's voting rights exceed 50% of the controlling shareholder's voting rights, assuming that no change in pledging takes place and the controlling shareholder accordingly loses the voting rights on those pledged shares exceeding the 50% threshold.[27] While we believe that the treatment should specifically apply to closely held firms, for comparison purposes we also identify a set of treated widely held firms, where the decision maker pledges over 50% of his or her shareholding.[28]

While the regulatory change alters the incentives of treated firm controlling shareholders to pledge, we first verify whether this translates into an observed reduction in pledging. In Table 2, we provide a comparison of the mean changes in pledging around the legislative shock period for key decision makers in treated firms versus untreated firms. Untreated pledging firms are defined as those firms with a decision maker pledging between 0 and 50% of his/her stockholdings prior to the regulatory shock.

Table 2, Panel A shows a distinct difference between the changes in pledging levels for treated and untreated firms. Most significantly, the mean pledging level of *threatened* insiders in

[27] Since the 50% threshold to define a threatened controlling shareholder is chosen arbitrarily, we test the robustness of our results to different threshold levels. The results, which are reported in the Internet Appendix, remain consistent at the 40% and 25% threshold levels.
[28] Testing the effect of the regulatory shock on widely held firms is somewhat akin to a placebo test.

the treated group drops by over 24 percentage points from 87.8% to 63.4%. In contrast, pledging by insiders in untreated firms declines by only 3.12 percentage points. We also report pledging changes for key decision makers in widely held firms. Similar to the untreated sample, we find that the magnitude of the changes in their pledging levels is not substantial, consistent with the notion that voting control is not a critical concern for insiders in widely held firms. We obtain equivalent results when comparing medians across these three samples of firms.

The control firms for this experiment are a set of matched *non-pledging* firms chosen by propensity score matching (PSM). Untreated pledging firms (that have a decision maker pledging between 0% and 50%) are not included in the control group because they may also be affected by the shock, as the regulation also creates incentives for their insiders not to increase pledging levels beyond 50%. Our matching covariates include all the firm characteristics described in Panel B of Table 2. Specifically, each treated firm is matched to a control firm that (1) has no manager, board member or large shareholder pledging shares as at the end of May 2011, (2) is drawn from the same 2-digit SIC industry, (3) has a propensity score that differs from the treated firm's score by no more than 15%, and (4) has a similar ownership structure (either closely held or widely held). This procedure is applied to selecting the control firms for both the full sample and threatened sample of treated firms. Panel B of Table 2 examines whether the treated firms and control firms exhibit significant differences in firm-level characteristics. We find that treated firms are slightly older (by 2 years) and more levered, but similar to the control firms on other dimensions. The same conclusions are reached when we compare median characteristics across the two groups (unreported).

3.4. Difference-in-difference analysis.

3.4.1. Event study difference-in-difference evidence.

We use a difference-in-difference framework to study the share price reactions to the two key event dates associated with the legislative change. Since the regulatory change directly results

in an exogenous pledging reduction for treated firms (which we observe ex-post), this should translate into a significantly greater share price gain for treated firms relative to control firms, if insider pledging is viewed as value destroying. To test whether this is the case, we calculate CARs for 3-day windows around both Events 1 and 2, as well as the sum of these returns across both event dates *(Pooled*), to assess the accumulated impact of the regulatory change. Abnormal returns are calculated using the Fama-French 3-factor model, with an estimation window of [-210, -11]. We regress these announcement returns on a *Treated Firms* indicator variable, that equals one for treated firms and zero for our control firms. The regression models also include the matching covariates as control variables to account for any residual differences between treated and control firms that might explain CARs. Table 3 shows that treated firms indeed show a stronger positive response to the statutory change relative to the control firms.[29] Event 2 appears to be responsible for this difference. In particular, on the final passage of the amendment, treated firms with a threatened controlling shareholder experience a 3-day average CAR that is 2.5 percentage points larger than that of control firms. Event 1 does not appear to have carried any significant pricing information, as markets appeared to have remained doubtful regarding the amendment's final enactment. However, the stronger pooled announcement returns provide weak evidence that Event 1 carried some information.

We conduct two additional (unreported) tests on the share price responses to the above regulatory shocks. First, we construct a continuous measure of the magnitude of pledging (rather than an indicator variable) for the treated sample of firms. We find that the share price reaction to the regulatory shock is proportional to the amount of insider shares pledged. Second, we expand the analysis to examine whether the extent of pledging predicts share price responses for all firms in our sample. We perform this test because the share price reaction to the legislative change may

[29] We also find that CARs of treated firms are positive and statistically significant on their own and not just relative to control firms.

not be limited to treated firms, since the shock also limits future increases in pledging for untreated pledgers (who currently pledge less than half of their shareholdings). We find that the amount of pledging prior to the regulatory shock is positively related to a firm's share price reactions to Event 2, but only for firms with a controlling shareholder.

3.4.2. Tobin's Q difference-in-difference evidence.

In this section, we explore the longer-term changes in firm value brought about by an exogenous reduction of pledging in treated firms relative to control firms. Since the proposed law was discussed, passed, and enacted during 2011, we define 2009 and 2010 as the pre-shock period and 2011 and 2012 as the post-shock period. Following Bertrand, Duflo and Mullainathan (2004), we average the 2009-2010 pre-shock firm-year variables into single pre-shock values and likewise average the 2011-2012 post-shock variables into single post-shock values to ensure that any serial correlations in our variables do not lead us to understate the regression's standard errors.

The dependent variable in our regressions is Tobin's Q. This is regressed on *Treated Firms* and the same set of controls used in the announcement return regression. We also employ a second indicator variable, *Law Change*, that equals one for the treatment period (2011-2012) and zero for the 2009-2010 pre-treatment period, and an interaction term of these two indicator variables (the difference-in-difference variable). All models are estimated with industry fixed effects.

Before estimating difference-in-difference regression models, we first assess whether the parallel trends assumption that underlies the validity of a DiD experiment, holds in our setting. To test this assumption's validity, we separately calculate rates of change in Tobin's Q for the sample years leading up to the regulatory change (2003-2010), for the treated and control firms in the closely held and widely held firm subsamples. Panel A of Table 4 presents the differences in mean values for the rates of change in Tobin's Q, and their associated t-statistics. We find that the differences in Tobin's Q between the treated and control samples prior to the legislative shock are not statistically significant. We interpret this result as providing support for the parallel trends

assumption.

Panel B of Table 4 reports the diff-in-diff estimates. We estimate four specifications with alternative treated firm samples. First, we use only closely held firms with controlling shareholders (model (1)), and then narrow the analysis to firms with threatened controlling shareholders (model (2)). We then repeat the same breakdown for treated firms that are widely held in models (3) and (4). The coefficient estimates show that the effect of the treatment on the treated firms (*Treated Firms x Law Change*) is significantly positive. In terms of economic magnitude, treated firms experience a 0.063 increase in Tobin's Q relative to the control firms over the same period. The valuation effect for firms with threatened controlling shareholders is much larger, with the *Treated Firms x Law Change* coefficient showing a more than two-fold increase of 0.132 for this subsample. Given a sample mean Q of 1.37, this represents a 9.6% relative increase in Q. This is consistent with a substantially larger fall in pledging by threatened insiders so as to preserve their insider voting control and private benefits. This is clear evidence that insider pledging reduces firm value. In contrast, insiders pledging at widely held firms exhibit no significant effect, suggesting they are unaffected by the shock.[30]

Interestingly, the positive coefficient of *Treated Firms* suggest that widely held firms with a large (>50%) pledging manager had higher valuations prior to the legislative shock. Since Table 1 shows that widely held firms are significantly more likely to use pledging to purchase additional stock, this result most likely reflects the positive signaling effects of "pledging to buy" transactions in cases where control and entrenchment problems (typically associated with closely held firms) are likely to be much weaker.

One notable concern with the above results is the negative and statistically significant coefficient of *Law Change*, which indicates that during the post-shock period, control firms

[30] We also use a variety of placebo shock years (ranging from 2003 to 2006), but we do not detect any significant difference in firm value across treated and control firms that are generated by the placebo shock.

experience a very large decline in Tobin's Q of -0.349. This may reflect the fact that the post-shock years coincide with a major market-wide correction in Taiwan of over 30%. Thus, the interaction coefficients (*Treated Firms x Law Change*) indicates that the effect of the treatment is to reduce this price drop by around one-fifth in the full sample and one-third in the threatened sample.

An alternative explanation for our results is that pledging firms (the treated group) possess unobservable characteristics that allow them to perform better in market downturns, implying that their superior post-shock performance is not necessarily related to the treatment. To assess this alternative explanation, we redefine our sample of control firms to include only firms where the decision maker pledges above 0% but below 50% of their holding and thus, is not directly affected by the regulatory change. Using this alternative matched control sample, we find that our results continue to hold.[31] It also important to note that our event study tests in the previous section also help to rule out this alternative interpretation, as they capture the immediate stock price reactions to the legislative change and therefore, are not affected by potentially confounding longer term factors that occurred over the post-reform period.[32]

3.5. Tobin's Q analysis

While the above results provide causal evidence on the valuation impacts of pledging, these tests only utilize a restricted set of treated and control firms. In this section, we exploit the fact that we have pledging information for the entire sample of listed Taiwanese firms. This allows us to document the overall correlation between insider pledging and Tobin's Q. Importantly, a

[31] We do not use this sample of untreated firms as our control group in the first instance because they may also be affected by the shock (as explained earlier) and there is a significantly fewer number of these firms relative to firms with zero pledging, which limits our ability to select suitable matching firms.

[32] One possible alternative interpretation of these results is that the observed rise in Tobin's Q is driven by a reduction in the voting control held by potentially entrenched shareholders who do not reduce their pledging to below the 50% level. This can be the case if insiders have pledged to purchase shares, but they cannot unwind their positions to reduce their pledging. This concern is partly dealt with by controlling for ownership levels. However, linear controls may not correctly adjust for the effect of control thresholds. Nevertheless, we show that controlling shareholders reduce their pledging to an average of around 60%, meaning they give up control rights on only 10% of their votes following the shock. This is unlikely to be enough to significantly weaken their control. Further, even when we exclude firms whose pledging level does not respond to the shock and consequently their control comes under threat, we obtain qualitatively similar results.

significant fraction of firms in this expanded sample have insiders who appear to use pledging to finance additional purchases of stock. By introducing an indicator for the use of pledged proceeds, we can further explore whether the correlations between pledging and stock valuation changes depend on the use of loan proceeds.

We regress year-end Tobin's Q on several measures of insider pledging, along with a set of control variables. Our baseline tests employ two pledging measures. The first measure is designed to capture instances when pledging is used to finance purchases of additional stock. It is an indicator variable that equals one if a pledge by any firm manager, board member or blockholder is closely followed by an increase in their share ownership (*Pledging to Buy [1,0]*) after accounting for stock grants and option exercises. The second measure captures instances when pledging is conducted to access liquidity *(Pledging to Spend [1,0]*). This variable takes the value of one when we observe a change in at least one insider's pledging level for the firm-year, but no change in their ownership level. We also construct continuous measures of these same two variables by scaling the total number of insider shares pledged by the firm's total shares outstanding (*Pledging to Buy [%]* and *Pledging to Spend [%])*. Since pledging and shareholding levels can change throughout the year, we use average monthly pledging and shareholding levels over the twelve months in the calendar year. To allow for the possibility that pledging is only value-reducing when it is undertaken by a major decision maker in the firm, we also construct these variables separately for decision makers and non-decision makers.

To control for unobservable cross-sectional differences and yearly trends that could influence our results, we include both year and firm fixed effects in our regressions. This is particularly important given that pledging is strongly correlated with certain firm characteristics. In addition, some firm characteristics may evolve over time to make pledging more attractive to

corporate insiders. We use several control variables to capture such changed circumstances.[33] First, pledging becomes easier when firms become larger, less risky, more transparent, easier to value, and have more liquid stock. To capture these characteristics, we use the natural logarithm of a firm's total assets (*Firm Size*), the annual growth rate in sales (*Sales Growth*), the prior 36-month stock return volatility (*Volatility*), the natural logarithm of one plus the total number of analysts covering the firm (*Analyst Coverage*), average monthly trading volume (*Trading Volume*), and several balance sheet and income statement variables scaled by total assets, namely: total cash holdings (*Cash Holdings*), total intangible assets (*Intangible Assets*), total debt (*Leverage*), and capital expenditures (*CAPEX*). Balance sheet variables are based on beginning of year figures.

Pledging can also be related to the quality of a firm's corporate governance. We control for governance using the fraction of independent directors on the Board (*Board Independence*) and the total share ownership percentage of the firm's key decision makers (*Decision Maker Ownership).* For widely held firms, we control for the total percentage share ownership by all blockholders (*Blockholder Ownership*). Finally, we control for the number of board members (*Board Size*).

Table 5 reports our results. We find evidence that pledging is negatively associated with Tobin's Q regardless of whether proceeds are used to buy stock or to finance consumption or other investments. The coefficients of both *Pledging to Buy [1,0]* and *Pledging to Spend [1,0]* indicate that on average, when any insider initiates (or ceases) pledging, this is associated with an average fall (rise) in Tobin's Q of 0.05 and 0.09 respectively. Compared to the sample average *Q* of 1.37, this represents a 3.6% to 6.6% change in firm value. In models (4) – (7), we explore this relationship further. We find that this negative relation is stronger when a firm's key decision makers pledge to buy more stock, and especially when this is a firm's controlling shareholder. The fact that pledging continues to negatively affect firm value, even when it is used to finance additional stock purchases,

[33] While *Firm Age* is used in the prior specification, we drop it in these specifications as it is completely absorbed by firm fixed effects.

suggests that any positive signaling effects of this type of pledging are on average outweighed by concerns regarding increased insider entrenchment and extraction of private benefits.

3.6. Announcement returns to pledging

In this section, we exploit Taiwan's unique immediate disclosure requirements to conduct an event study on how firm share prices respond to changes in an individual insider's pledging position. Studying announcement returns to changes in insider pledging allows us to observe whether there are any positive signaling effect associated with such pledging. These tests can also provide corroborating evidence on the long-term valuation effects of pledging, with two added benefits. First, the immediate valuation effects of pledging are not contaminated by non-pledging related information revealed over the long-term and second, pledging announcements are not concentrated at a particular point in calendar time.

We again calculate CARs using a 3-day event window of [-1, 1] around each pledge announcement date. To ensure our results are robust to alternative measures of CARs, we also calculate CARs using a simple market-adjusted model over the same event window. We exclude observations where we cannot obtain sufficient stock price data to compute CARs or where another insider pledging announcement at the same firm occurs within 5 trading days. This restriction reduces our sample by approximately 26%. Our final sample of pledging announcements includes a relatively balanced group of 3,352 increases and 3,106 decreases.

The results are reported in Table 6. In Panel A, we separately examine the effects of pledging increases and decreases. On average, announcements of increases trigger a significantly negative (-0.53% CAR) share price reactions. On the other hand, shareholder reactions to announcements of decreases are mixed and generally insignificant. One possible explanation for this asymmetric effect is that an individual's initial pledge also represents a signal of their willingness and potential need to pledge in the future. An announced decrease in pledging is unlikely to fully reverse this signaling effect and thus, the price reaction is more muted. Further,

pledging increases tend to be significantly larger than decreases, which may also partially explain why announcement returns to pledging declines are lower.[34]

We next explore whether the wealth reducing impact of pledging announcements depend on specific characteristics of the pledge and the pledger. Panel B of Table 6 reports the mean CARs for various subsamples. Since the Panel A results suggest that announcements of a decline in pledging do not carry as much new information, in Panel B we focus on pledging increases. Within each sample, we split the announcements based on whether the pledger is a major firm decision maker. The CARs for pledging announcements by decision makers are significantly negative. This is in line with the *Insider Risk Aversion Hypothesis,* which implies that wealth losses to outside shareholders rise if the pledger plays an important role in a firm's decision making. For announcements of pledging by non-decision makers, the CARs are also negative, but are generally insignificant and are of a much smaller magnitude.

Next, we examine the effect of pledging size on announcement returns. Based on the *Crash Risk Hypothesis*, the shareholder wealth destruction effect should rise with a pledge's size. To measure pledge size, we scale the number of shares pledged by the firm's total shares outstanding. Splitting the announcements into above and below median pledges, we find that larger pledges on average trigger a significantly negative market reaction, while smaller pledges trigger an insignificant reaction. This result is consistent with the *Crash Risk Hypothesis*.

Pledging can also occur in response to a margin call. For these pledging announcements, it is unclear whether stock price falls are the result of pledging, or whether it is simply an insider responding to a stock price fall by pledging more shares to meet margin requirements. To deal with this reverse causality concern, we separately examine first-time and non-first-time pledging announcements based on whether the pledging insider has any existing pledged shares. The

[34] We find that the size of the median pledging increase is 20% larger than a pledging decrease. This is not surprising as by construction, the size of a pledging decrease cannot be larger than the initial pledging increase.

subsample of first-time pledges cannot be affected by margin calls. Yet, we find that these initial pledge announcement returns are significantly negative, particularly for the subsample of closely held firms and when the first-time pledger is a decision maker.

We next examine if the effects of pledging differ depending on whether a firm is closely or widely held. The results indicate that the value destroying effects of pledging appear to be more visible in firms with controlling shareholders than in widely held firms. This finding is consistent with controlling shareholders having stronger incentives to reduce risk to a sub-optimal level to preserve their control benefits. Interestingly, widely held firms also suffer significant share price declines when the primary decision maker begins to pledge. Since executives have incentives to avoid negative liquidity shocks arising from margin calls, pledging may induce them to choose more conservative corporate policies which might also be sub-optimal from a shareholder's perspective.

Finally, we examine the announcement returns for pledges that are used to finance the purchase of additional stock, identified using the procedure described in Section 2. It is important to note that the strength of this test is limited by the fact that insiders are not required to disclose the purpose of their pledges. Thus, an insider's purchase of shares financed by pledging can only be inferred from changes in disclosed monthly ownership filings that take place on the 15th of each month (or the next trading day after the 15th).[35] However, the market may still deduce that an insider is buying stock as a result of a pledge either due to voluntary disclosures made by the firm, or by observing abnormal share purchase volume around the pledge trading day. The final row of Table 6 shows a significantly negative market reaction to such pledging announcements. This evidence is consistent with insiders using pledging to strengthen their effective control through additional share purchases and does not support the positive signaling effects of pledging.

[35] If a pledging announcement takes place shortly before the 15th of the month, a subsequent share purchase may not show up in the ownership data until after the 15th. To address this time lag, we also examine share increases in the two-month period following the pledging announcement and find similar results.

4. Sources of value reduction

4.1. Ex-post-crash risk effects of pledging

In this section, we focus on establishing the channels through which pledging induces greater crash risk. We argue that pledging can trigger forced insider share sales when markets experience sharp declines, which in turn leads to a more severe negative stock price reaction. However, testing whether price declines at firms are driven by insider selling to meet margin calls is challenging since the relationship among stock prices, pledging and shareholding levels is endogenous. For instance, falling stock prices can *cause* greater insider share sales to meet margin requirements (rather than the other way around). To overcome these concerns, we use the Global Financial Crisis as our experimental setting because the crisis generates a large negative stock price shock that is exogenous to both pledging activity and insider shareholdings.

The onset of the GFC led to a sharp decline in Taiwanese stock market prices beginning in June 2008 which persisted until August 2008. We exploit the exogenous nature of the crisis by analyzing the changes in shareholdings of pledging insiders during this 3-month period. Specifically, for each insider (or a group of insiders if they are affiliated) and blockholder who holds shares at the end of May 2008, we determine the extent to which they are vulnerable to margin calls based on their pre-crisis pledging level. We construct an indicator variable that equals one if an insider pledges greater than 75% of their total shareholding (*Pledging>75% [0,1]*). We use 75% as the threshold because the magnitude of the crisis shock was about 30 percent. Therefore, insiders pledging in the range of 75% of their stock or more would be especially vulnerable to a margin call, as they would have insufficient unpledged shares available to satisfy their rising margin requirements. This benchmark also corresponds to approximately the top tercile of pledgers in the sample. It is important to note that since we do not know the exact price at which an insider pledged his or her stock, the 75% threshold is only a rough estimate of an insider's susceptibility

to the negative price shock associated with the crisis.[36] Thus, for robustness, we use a continuous measure of pledging, defined as the total number of shares pledged by an insider scaled by the total number of shares owned by the insider.[37]

The results of this analysis are reported in Panel A of Table 7. In models (1) and (2), the dependent variable is the percentage change in the number of shares owned by each insider (or group of insiders if they are affiliated) from the end of May 2008 to the end of August 2008. We estimate OLS regressions with industry fixed effects and control for important firm-level characteristics. The key pledging variables have statistically significant and economically meaningful coefficients. The estimates in model (1) indicate that during the crisis period, heavily pledged insiders sell about 6% more stock than other insiders. In models (3) and (4), we introduce a firm indicator variable into the model, which means that all firm-level control variables cannot be estimated as they are colinear with the firm indicator. This specification extracts out all the time invariant firm-level factors that could explain why insiders from certain firms engage in greater crisis induced share selling. In this model, the indicator variable for pledging is positive, but its p value is 0.14. However, our continuous pledging measure shows that during the crisis period, heavily pledged insiders sell significantly more firm stock than other insiders within the same firm. In models (5) and (6) we repeat the analysis in models (3) and (4), except this time we remove from the analysis insiders at firms that grant them stock during 2008 or have granted them options at any time during the sample period, to ensure that the changes in insider ownership are not contaminated by other factors. The results turn out to be stronger than in the base case. Overall, these results provide further evidence that the decline in insider shareholdings during the financial crisis can be

[36] Seventy-three percent of shares pledged by insiders at the onset of the crisis were already pledged at the beginning of 2003. Therefore, we cannot use our pledging announcement dates to reliably estimate share pledging prices, given that our pledging announcement data begins in 2003. However, when focusing on a subsample of insiders that accumulate pledging positions after the start of 2003, our results for insider selling remain consistent.

[37] We also conduct a sensitivity analysis on the effect of varying this threshold (reported in the Internet Appendix). Consistent with the size of the crisis shock, our results are strongest at the 70% thresholds and above, but continue to hold at lower thresholds, albeit with weaker statistical and economic significance.

partially attributed to the sale of pledged stock to meet margin calls.[38]

To provide a more complete picture of the crash risk channel, we subsequently examine whether the sales of insider stock in pledging firms magnify the decline in a firm's stock price at the onset of the financial crisis. In Panel B of Table 7, the dependent variable is the crisis period abnormal stock return, estimated from a Fama-French 3-factor model for the period from the end of May 2008 until the end of August 2008. We report the results of several model specifications that document the correlation between pledging induced selling and stock price changes.[39] Our key explanatory variable in this test is an indicator variable for a subsample of firms whose stock price should be severely affected by margin calls to insiders during the crisis period. These are firms where at least one insider: i) pledges more than 75% of his/her holdings, ii) owns at least 5% of the firm's outstanding shares (to ensure that there is a measurable price impact from margin call induced stock sales), and iii) sells stock between the end of May 2008 and the end of August 2008 (determined by examining the change in their stock ownership levels during this period). We label this variable *Pledging>75% & Holding>5% & Stock Sale*. For comparison purposes, we also construct a variable for firms who satisfy the first two conditions, but these insiders do not appear to sell stock during the crisis (*Pledging>75% & Holding>5% & No Stock Sale*).

The estimates from model (1) of Panel B indicate that share price declines during the height of the GFC period are greater for firms with insiders who possess the above characteristics. Most notably, it appears that heavily pledged insiders with a blockholding of 5% or more, and who sell shares during the crisis experience a 19% greater decline in stock returns.[40] In contrast, the crisis period stock returns of firms with pledging insiders who retain their shares (presumably because

[38] One further possibility is that pledging insiders hastily liquidate shares at the onset of the crisis to pay off their pledged loans as these loans unexpectedly become riskier due to the heightened margin call risk. While such share sales are not forced by the lender, they have a similar crash risk impact on the firm's stock price.
[39] The crash risk hypothesis predicts that price falls can lead to margin call induced selling, which can in turn lead to further price falls. Given this feedback loop, this analysis can only capture correlations, rather than causal effects.
[40] The effect increases to 24.2% when we focus only on insiders with a 10% block, consistent with a higher price impact, although this result is based on a smaller sample of pledgers. For brevity this result is not reported.

they can meet margin calls), have stock returns that are not significantly different from non-pledging firms.

For robustness, we replace the indicator variable in step (i) above with an alternative continuous pledging variable defined as the number of shares pledged by the largest pledger in the firm scaled by total shares outstanding. These results, shown in model (2), are consistent with those using the prior indicator variable. Among the control variables, large firms and firms with higher leverage appear to suffer the greatest declines in stock price during the crisis period.

Finally, we conduct two further robustness tests. First, to ensure that covariate imbalances between pledging and non-pledging firms are not biasing our results, we use a matched sample regression where firms with insiders that satisfy our pledging criteria are matched to a set of non-pledging control firms using the same PSM procedure described in Section 3.3. The results, reported in models (3) and (4), indicate that the magnitudes of the key coefficients become substantially larger. Second, we remove firms making stock grants to insiders in 2008 or any option granting firms (based on whether they issue options in the sample period) to ensure that our classification of firms into insiders who sold stock and those who retained their shares is not contaminated by non-margin call factors. The results, which are reported in models (5) and (6), remain qualitatively unchanged.

4.2. Ex-post crash risk vs. ex-ante risk-taking

In this section, we contrast the two different perspectives on pledging and firm risk. We focus on showing that while insider pledging significantly raises the ex-post stock price crash risk of a firm, it can also reduce an insider's risk-taking incentives ex-ante. Such effects can lead to sub-optimal corporate policies that can reduce firm value. To begin our analysis, we first document the baseline correlations between pledging and aggregate crash risk, where we measure aggregate crash risk using three alternative metrics, *Value-at-Risk, Expected Shortfall* and *Tail Risk,* which are defined in Appendix A. These measures are chosen because they measure the frequency and

magnitude of extreme left tail returns (see Liang and Park (2010) and Rosenberg and Schuermann (2006)). Similar to our earlier analysis, we use the existence of a large pledger with a significant block of stock as the key explanatory variable. In this test, we also examine the effect of having a 10% ownership block that is pledged. Similar to the approach followed in Table 7, we do not distinguish between closely and widely held firms, as this should not affect crash risk exposure.

The results are reported in Table 8. In models (1) – (3), we estimate a separate regression for each of the three crash risk metrics, where the key explanatory variable is our large pledger indicator for firms with insiders who hold a minimum of a 5% ownership block. These models show that this pledging variable is positive and statistically significant at the 5% level for all three crash risk measures. Models (4) to (6) consider large pledgers who have a minimum of a 10% ownership block. The results show an economically stronger effect, implying that when an insider with a large ownership stake pledges a significant fraction of their shares, the firm experiences even more extreme negative returns.

We next examine the correlation between insider pledging and firm risk-taking. While insiders can do little to prevent negative external shocks (e.g. market or industry-wide shocks) that cause crash risk, they can exercise some control over a firm's idiosyncratic risk exposure through the firm's corporate policy choices, which can at least reduce a stock's likelihood of experiencing a large price drop due to idiosyncratic causes. We hypothesize that pledging insiders are motivated to lower firm risk-taking in order to prevent costly margin calls and forced share sales.

To test the insider risk aversion hypothesis, we construct several measures of corporate risk-taking reported in Table 9. We are careful not to use any stock price-based measures of risk-taking in this analysis, as such measures can also reflect a firm's crash risk level. Our first measure of firm risk-taking is capital expenditures scaled by beginning of year total assets, which is a standard measure in the literature (see Bargeron, Lehn and Zutter (2010) and Coles, Daniel and Naveen (2006)). However, examining aggregate capital expenditures may not capture changes in

the risk profile of a firm's investments. In particular, pledging could lead to *more* diversifying investments and *less* high-risk investments. We use three measures of a firm's diversifying investment activity. First, we use the number of industry segments in which a firm operates, constructed for each sample year. Second, we construct a Herfindahl index based on the percentage of a firm's sales that are derived from each of these segments. This captures the fact that insiders may not just expand into *new* sectors, but they may diversify sales more evenly across existing segments. Third, we construct an indicator variable that equals one when a firm is both actively involved in the M&A market and conducts at least one diversifying acquisition in a given sample year. This captures a firm's diversification of its risk through M&A deals. Finally, we assess whether pledging affects the propensity to make high-risk investments, using R&D scaled by beginning of year total assets as our measure of *risk-increasing* investments.

In these tests, we only consider firms with controlling shareholders because this is where insider risk aversion (due to a potential loss of control) should be most apparent and because they have ultimate control over corporate policy decisions. To capture the overall fraction of shares pledged by the controlling shareholder, we use two alternate pledging measures: a continuous measure of pledging by the controlling shareholder (*Controlling Shareholder Pledged Shares /Total Shares Outstanding*), which is scaled by the firm's outstanding shares (to capture the value of stock at risk from margin calls), and secondly, a pledging variable similar to that used in our crash risk analysis, namely an indicator variable (*Controlling Shareholder Pledging >75%*) equal to one for firms where the controlling shareholder pledges over 75% of his/her shares (by definition the controlling shareholder will own at least 5% of a firm's outstanding shares, so there is no need to also impose a minimum ownership requirement). We also control for several other covariates that could be related to firm risk-taking.[41] All regressions are based on OLS models, except for the industry segment analysis, which is based on poisson regressions and the diversifying M&A

[41] We also control for the effect of options on risk-taking by excluding option issuing firms and find similar results.

analysis, which is based on logit models.

The results reported in Table 9 show that as pledging by controlling shareholders rises, the level of firm risk-taking falls. Note that in models that examine diversifying acquisitions, we impose industry fixed effects, since there is little within-firm variation in acquisition activity in Taiwan due to a relatively subdued market for corporate control. The above risk-taking results should be interpreted with some caution. While it would be ideal to examine how a firm's risk-taking responds to an exogenous shock to insider pledging, the corporate policy changes examined above respond quite slowly to changes in insider incentives (unlike Tobin's Q and our crash risk measures explored in previous sections), making it difficult to isolate the impact of a one-time shock to pledging from that of other factors. In this sense, our results are consistent with a link existing between insider pledging and firm risk-taking, but further evidence is needed to definitively confirm it. Nevertheless, we can rule out a number of confounding factors that might explain our earlier results.

First, by using firm and year fixed effects we ensure our results are not driven by potentially confounding time-invariant firm factors or annual effects. For example, an insider's risk preferences or certain time periods could be associated with both greater risk-taking and more insider pledging. A further confounding factor which cannot be fully accounted for by firm-fixed effects is the impact on pledging of a firm's life cycle. As a firm matures, its stock may become more "pledgeable", while at the same time a firm is taking on less risk.

While our control variables can partly account for these firm life-cycle effects (e.g. through sales growth, assets size etc.), we take two further steps to address these concerns. First, we repeat our analysis on separate subsamples of old and young firms, based on whether they are above or below the median firm age in our sample. We find similar results for both young and old firm subsamples. Second, to ensure covariate imbalances between firms with and without insider pledging are not driving our results, we match each pledging firm to an appropriate counterfactual

using a PSM approach.[42] The results continue to hold and are reported in the Internet Appendix.

5. Conclusions

Many firms around the world permit their insiders to pledge company stock as collateral for personal bank loans. While pledging alleviates insider liquidity constraints, this practice can also have adverse consequences for outside shareholder wealth. To test the causal effect of insider pledging on firm valuation, we employ a quasi-natural experiment facilitated by a statutory change in corporate law that places new restrictions on the voting of pledged shares for a subsample of Taiwanese firms. Using a diff-in-diff approach, we show larger improvements in Tobin's Q for firms subject to an exogenously induced reduction in pledging compared to a matched sample of control firms that have no insider pledging. The same conclusion is reached when we measure the valuation impact of this legislative shock using stock announcement returns around the law's passage. These results indicate a negative causal impact of insider pledging on firm value.

We also explore the potential sources of this observed shareholder wealth loss surrounding pledging. We use the 2008 Global Financial Crisis to examine whether pledging exacerbates a firm's crash risk. We find that during the depths of the crisis, firms with high levels of pledging often experienced significant declines in insider shareholdings, and these firms suffered larger stock price declines. This evidence is consistent with stock sales by insiders to cover margin calls being a significant source of heightened crash risk. Consistent with the hypothesis that pledging creates greater risk aversion by insiders who seek to preserve their private benefits of control, we find greater pledging is positively associated with more conservative corporate investment policies.

While potential concerns with pledging are recognized in several prior studies (Larcker, et al., 2013; Larcker and Tayan, 2010)， *causal* evidence of its impact on minority shareholder wealth

[42] We also examine whether non-decision maker insiders (directors not affiliated with the controlling shareholder) affect corporate policies when they are large (>75%) pledgers and only find weak results. Similarly, the effect of large pledgers on risk-taking in widely held firms is also very weak. This is consistent with the private benefits of control in widely held firms being less valuable and thus, manager risk aversion being weaker.

needed to inform effective regulatory responses, is lacking. Our findings show that insider pledging can create adverse insider incentives that are, on average, detrimental to firm value. This study provides evidence that shareholders can benefit from having a timely public disclosure requirement for insider pledging and that firms wishing to improve shareholder value and enhance their corporate governance practices may wish to discourage insider pledging activity.

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Appendix A: Variable definitions and data sources

Variable	Definition
Pledging Variables	
All shares pledged / Total shares	Total shares pledged by all insiders scaled by total shares outstanding. (Source: TEJ)
Any Pledging [1,0]	Indicator variable that equals one if any manager, board member, or large shareholder pledges and zero otherwise. (Source: TEJ)
Decision Maker Pledging to Buy [%]	Total number of shares pledged by the decision makers whose ownership subsequently increases (after adjusting for stock grants and option exercises) following an increase in pledging, divided by the total shares outstanding. (Source: TEJ)
Decision Maker Pledging to Buy [1,0]	Indicator variable that equals one if the decision maker in the firm has pledged and this pledge is followed by an increase in their ownership (after adjusting for stock grants and option exercises). (Source: TEJ)
Decision Maker Pledging to Spend [%]	Total number of shares pledged by the decision makers whose ownership does not subsequently increase following an increase in pledging, divided by the total shares outstanding. (Source: TEJ)
Decision Maker Pledging to Spend [1,0]	Indicator variable that equals one if the decision maker in the firm has pledged and this pledge is not followed by an increase in their ownership. (Source: TEJ)
Controlling Shareholder Pledging >75%	Indicator variable that equals one if the controlling shareholder of the firm pledges more than 75% of their shares and zero otherwise. (Source: TEJ)
Controlling Shareholder Pledged Shares /Total Shares Outstanding	Total number of shares pledged by the controlling shareholder divided by the total shares outstanding. (Source: TEJ)
Largest Pledge/Total Shares if No Stock Sale	Shares pledged by the largest pledger divided by total shares outstanding, if the largest pledger did not sell stock during the GFC. (Source: TEJ)
Largest Pledge/Total Shares if Stock Sale	Shares pledged by the largest pledger divided by total shares outstanding, if the largest pledger sold stock during the GFC. (Source: TEJ)
Pledging to Buy [%]	Total number of shares pledged by the insiders whose ownership subsequently increases (after adjusting for stock grants and option exercises) following an increase in pledging, divided by the total shares outstanding. (Source: TEJ)
Pledging to Buy [1,0]	Indicator variable that equals one if any manager, board member, or large shareholder has pledged and this pledge is followed by an increase in their ownership (after adjusting for stock grants and option exercises). (Source: TEJ)
Pledging to Spend [%]	Total number of shares pledged by the insiders whose ownership does not subsequently increase following an increase in pledging, divided by the total shares outstanding. (Source: TEJ)
Pledging to Spend [1,0]	Indicator variable that equals one if any manager, board member, or large shareholder has pledged and this pledge is not followed by an increase in their ownership. (Source: TEJ)
Pledging>75% & Holding>10% [1, 0]	Indicator variable that equals one if the firm has at least one insider (or group of affiliated insiders) that has pledged more than 75% of their shares and owns more than 10% of the company stock, and zero otherwise. (Source: TEJ)
Pledging>75% & Holding>5% & No Stock Sale [1,0]	Indicator variable that equals one if the firm has at least one insider (or group of affiliated insiders) that has pledged more than 75% of their shares, owns more than 5% of the company stock at the end of May 2008, and has not sold stock until the end of August 2008, and zero otherwise. (Source: TEJ)
Pledging>75% & Holding>5% & Stock Sale [1,0]	Indicator variable that equals one if the firm has at least one insider (or group of affiliated insiders) that has pledged more than 75% of their shares, owns more than 5% of the company stock at the end of May 2008, and has sold stock until the end of August 2008, and zero otherwise. (Source: TEJ)
Pledging>75% & Holding>5% [1, 0]	Indicator variable that equals one if the firm has at least one insider (or group of affiliated insiders) that has pledged more than 75% of their shares and owns more than 5% of the company stock, and zero otherwise. (Source: TEJ)
Shares pledged / Shares owned	Total shares pledged by all insiders scaled by the total shares owned by these pledging insiders. (Source: TEJ)

Crash Risk Variables	
Expected Shortfall	Negative value of the simple average of the firm's daily stock returns that are within the bottom one percentile over the 12 months starting at the beginning of the next fiscal year after the pledging variables are measured. (Source: Datastream)
Tail Risk	The deviation from the mean return, conditional upon breaching the VAR threshold (the lowest one percentile of returns), calculated as $TR_t = \sqrt{\sum(R_t - E_t(R))^2}$, where R_t are all the daily stock returns of Firm t that are lower than the VAR threshold, and $E_t(R)$ is the mean value of all daily stock returns of Firm *t* over the 12 months starting at the beginning of the next fiscal year after the pledging variables are measured. (Source: Datastream)
Value at Risk	Negative value of the cut-off value of the bottom one percentile of the firm's daily stock returns over the 12 months starting at the beginning of the next fiscal year after the pledging variables are measured. (Source: Datastream)
Risk-taking Variables	
CAPEX	Capital expenditure scaled by prior year-end total assets. (Source: TEJ)
Diversifying M&A	Indicator variable that equals one if the acquirer and the target in the deal are from different 2-digit SIC industries. (Source: SDC)
Industry Segments	Number of industry segments under which the firm reports product sales. (Source: Worldscope)
R&D	Research and Development expenditure scaled by prior year-end total assets. (Source: TEJ)
Segment HHI	Sum of the squared percentages of total sales deriving from each of firm's industry product segments (Source: Worldscope)
Firm Characteristics	
Analyst Coverage	Natural logarithm of one plus the total number of analysts covering the firm at the prior year-end. (Source: I/B/E/S)
Blockholder Ownership	Total ownership by all the non-controlling blockholders whose ownership exceeds 5%. (Source: TEJ)
Board Independence	Mean value of the number of independent directors (supervisors) scaled by the total number of directors on board at the end of each month during the year. (Source: TEJ)
Board Size	Natural logarithm of the mean value of the number of managers, directors and independent directors (supervisors) on board at the end of each month during the year. (Source: TEJ)
Cash Holdings	Cash and other marketable securities scaled by prior year-end total assets. (Source: TEJ)
Decision Maker Ownership	Total number of shares owned by the decision maker divided by the total shares outstanding. (Source: TEJ)
Firm Age (Years)	The number of years since the firm was founded. (Source: TEJ)
Firm Age	Natural logarithm of the number of years since the firm was founded. (Source: TEJ)
Total Assets (NT$ billions)	Total assets in NT$ billions measured at the prior year-end. (Source: TEJ)
Firm Size	Natural logarithm of total assets measured at the prior year-end. (Source: TEJ)
Intangible Assets	Intangible assets scaled by prior year-end total assets. (Source: TEJ)
Leverage	Book value of debt scaled by book value of total assets measured at the prior year-end. (Source: TEJ)
Sales Growth	Log ratio of the net sales in the current year over the net sales in the past year. (Source: TEJ)
Tobin's Q	Sum of the market value of equity and the book value of debt scaled by total assets measured at the prior year-end. (Source: TEJ)
Trading Volume	Annual average of monthly stock trading volume scaled by the total number of shares outstanding. (Source: Datastream)
Volatility	Monthly stock return volatility over the 36 months prior to the beginning of the current year. (Source: Datastream)

Appendix B: Pledging scandals

1. Selected U.S. pledging related scandals

Chesapeake Energy

Aubrey McClendon, founder and former CEO of Chesapeake Energy Corp., was forced to sell 31.5 million shares, or 94% of his 5.8% stake in the company, to meet margin calls. These shares were sold over a three-day period in October 2008 for $569 million, which were worth $2.2 billion in July 2008. The stock price experienced a 70% fall over the three-month window.

See: https://www.wsj.com/articles/SB122385842864427455

WorldCom

According to a *Report of Investigation* dated March 31, 2003, one of the major factors behind the fraud at WorldCom was the desire of the former CEO (Bernie Ebbers) to protect his position in pledged stock. Ebbers needed to show continually growing net worth in order to avoid margin calls on his own WorldCom stock that he had pledged to secure loans.

See: http://www.ecommercetimes.com/story/45542.html

Valeant Pharmaceuticals International

Michael Pearson, the CEO of Valeant Pharmaceuticals International, pledged 2 million of his shares in order to secure a $100 million loan from Goldman Sachs in 2014, which among other things was used to finance a community swimming pool and contributions to Duke University. In November 2015, margin calls led to 1.3 million shares, worth around $100 million, being dumped on the market, which dragged the stock price down by 14% in a single trading session.

See: http://fortune.com/2015/11/06/valeant-michael-pearson-stock-sale/

Answerthink Inc.

Ulysses Knotts III was the director and executive vice president of technology-consulting group Answerthink. He had borrowed against his company shareholdings to help purchase real estate and make other investments. In November 2000, the stock price was $15, down from its $40 peak in January, forcing share sales by pledging executives. The stock further dropped below $3 in December, forcing Knotts to sell 325,000 shares, or 23% of his holdings, for $950,000 to meet margin calls. These shares had a value of $13 million at their peak.

See: https://www.wsj.com/articles/SB981495830459062101

Life Time Fitness

A news article published by the New York Times on October 20 2008, at the very early stage of the crisis, states that at least 36 companies had executives dumping their stock to meet margin calls. The aggregate value of these sales exceeded $1 billion. One of these companies was Life Time Fitness, whose founder and CEO (Bahram Akradi) was holding slightly more than 10% of the company's stock in 2008. Having pledged almost all of his 4.1 million shares as collateral, Akradi had to sell 1.5 million shares to cover margin call obligations. The company's shares were trading at about $60 in October 2007, around $40 in September 2008, and under $20 in October 2008.

See: http://www.nytimes.com/2008/10/20/business/20pay.html

XL Capital

Brian M. O'Hara, the chairman of XL Capital, a Bermuda insurer, was forced to sell about 80% of his holdings, to cover margin calls on loans which he said had been used to buy more shares to avoid the expiration of his stock options.

See: http://www.nytimes.com/2008/10/20/business/20pay.html

Green Mountain Coffee Roasters

Robert Stiller pledged 75% of his shares in Green Mountain Coffee Roasters, of which he was the founder and the chairman. These pledged shares represented about 8.3% of the company's shares outstanding. In May 2012, Stiller received a margin call of $123 million. This margin call ultimately forced Stiller to sell a substantial portion of his stock, as well as resigning as chairman of the board.

See: https://blogs.wsj.com/cfo/2012/05/15/margin-call-the-most-exposed/

Swift Transportation

Jerry Moyes, the founder and CEO of Swift Transportation, one of the largest trucking firms in the US, pledged more than $600 million of his company stock, or a quarter of the outstanding shares. In 2015, Swift's stock tumbled by 52%. The pressure to meet the margin requirements led Moyes to initiate a $100 million stock buyback plan in November 2015, and another $200 million buyback in January 2016. See: https://teamster.org/news/2016/01/board-struggles-its-ceos-borrowing

2. **Selected non-U.S. pledging scandals**

***Sino-Environment Technology Group* (Singapore)**

Sino-Environment Technology Group is listed on the SGX main board. The CEO, Sun Jiangrong, secured margin loans against his entire 56% ownership stake in the firm. In March 2009, the default of his loans led to a reduction of his stake from 56% to 6%, a reduction in share price of more than 70% over a 2-month period, and a change in control at the company.

See: https://sias.org.sg/investment_thoughts/sino-environment-technology-group-limited/

Satyam Computer (India)

Satyam Computer is an Indian computer outsourcing company listed on the BSE and NSE in India, with ADRs listed on NYSE.. In September 2008, the company's chairman Ramalinga Raju had pledged about 8.6% of his stock in the company to secure funding from several banks. In December 2008, Satyam announced a takeover deal which triggered investor selling shares in the US market. The share price fell by 55% within a few hours of the announcement. As a result, Raju's stake was reduced to 3.6%.

See: http://www.wsj.com/public/resources/documents/Satyam.pdf

ABC Learning Centres (Australia)

ABC Learning Centers was the world's largest childcare service provider and listed on the ASX. In February 2008, the directors of the company jointly owned 10.5% of shares outstanding, and pledged some of these shares to secure margin lending arrangements. On February 27 2008, the price of ABC Shares plunged 43%, forcing the ABC Learning directors to dump 26 million shares to meet margin calls. The shares were suspended at the end of the day. The company went into receivership in August 2008.

See: https://www.smh.com.au/business/eddy-faces-annihilation-as-abc-board-caught-by-margin-calls-20080227-1v5b.html

Carphone Warehouse (UK)

In the UK, the failure to disclose personal pledging caused Carphone Warehouse's co-founder David Ross, who has pledged 136.4 million company stock, to resign from his deputy chairman position. During the same time, Ross also admitted to having pledged 11.5 million shares in Big Yellow, another listed company where he had a significant holding. Big Yellow's shares fell by 5% after the news.

See: http://www.telegraph.co.uk/finance/3681461/Carphone-Warehouse-co-founder-David-Ross-quits-after-disclosure-failure.html

Huishan Dairy (Hong Kong)

Kai Yang was the controlling shareholder and chairman of Huishan Dairy and second wealthiest businessman in Northeastern China. Yang had pledged almost his entire 72% stake in Huishan Dairy as collateral for loans either to the company, or to fund his personal ventures, according to Hong Kong's Central Clearing & Settlement System (CCASS) records. In March 2017, the dairy Huishan Dairy disclosed a cash crunch that could lead to a US$5.8 billion debt default. This disclosure drove Huishan's stock price into an 85% plunge, wiping US$4 billion off its market value. News reports indicates that "*a third of the shares traded during the sell-off were owned by Mr Yang's main investment vehicle"* indicating an inability to meet margin calls. There were also reports that this "*put his control of the company in doubt"*. At least six board members tendered their resignations as a result of this scandal, leaving Yang as the sole member of the company board.

See: https://www.ft.com/content/5bd008e4-1a93-11e7-a266-12672483791a

Shenzhen Comix Group Co (China)

Shenzhen Comix's controlling shareholder pledged about 27% of the company's stocks for loans with Guosen Securities Co, China Citic Bank Corp, Huarong Securities Co and Industrial & Commercial Bank of China Ltd., the company said in an exchange filing. When Shenzhen Comix plunged 9.7%, margin calls were triggered for some of the pledged stocks, and the stock was placed in a trading halt.

See: http://www.businesstimes.com.sg/government-economy/ubs-has-a-warning-for-those-seeing-china-stock-respite

Other Insider Share Pledging Issues in China

During 2018, the Shenzhen Stock Exchange Composite Index fell approximately 40%. Prior to this fall, many companies and their founders had pledged shares at high stock prices. Throughout the period of the market decline, more than 100 companies flagged problems with meeting margin calls on pledged loans. Among them were Dongguan Kingsun Optoelectronic, an LED lighting company, and textile producer Dohia Group. The two companies suspended trading in their shares in April and June, respectively, citing margin calls being triggered by share price falls. From June 2018, insiders at 36 companies had their pledged stock liquidated by brokerage houses in order to meet margin calls. Similar problems have also plagued firms on the Chinext exchange, where more than 140 smaller listed companies announced that insiders had pledged additional shares to shore up the value of their loan collateral. These pledging related problems prompted the central government to try to limit margin call selling by instructing brokers to seek government approval before liquidating stock. Regulators are also now considering how to further limit the risk pledging creates.

See: https://www.reuters.com/article/us-china-collateral-stocks-insight/in-china-stocks-for-loans-under-stress-as-markets-slide-idUSKBN1900TA and https://www.bloomberg.com/news/articles/2018-10-16/china-s-stock-rout-puts-613-billion-of-share-pledges-at-risk

Table 1: Summary statistics

This table reports basic summary statistics at the firm-year level over the 2003-2013 period. Panel A summarizes stock ownership and pledging information for all firms, as well as for *Closely Held Firms* and *Widely Held Firms* separately. *Closely Held Firms* (*Widely Held Firms*) are firms that (do not) have a controlling shareholder. *Decision Maker* refers to the controlling shareholder in *Closely Held Firms* and managers in *Widely Held Firms*. For each pledge, if the number of shares owned by this pledger increases from the end of the month before the pledge to the end of the next month following the pledge, after adjusting for option and stock grants, then the pledge is classified as being used to buy additional shares. Panel B provides descriptive statistics for firm level variables. All variable definitions are reported in Appendix A. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A - Ownership and Pledging

	All Firms	Closely Held Firms	Widely Held Firms
Total firm-year observations	8,003	5,288	2,715
Percentage of firm-years with pledging	50.63%	46.39%	58.90%
Percentage of firm-years where at least one pledge is used to buy additional shares	6.30%	5.71%	7.44%
Percentage of pledging firm-years where at least one pledge is used to buy additional shares (Pledging Sample)	12.42%	12.31%	12.63%
Percentage of firm-years with pledging by Decision Maker	35.30%	25.34%	54.70%
Percentage of firm-years where the Decision Maker uses pledging to buy additional shares	4.25%	3.46%	5.78%
Percentage of firm-years with a large pledger (>50%)	37.72%	33.06%	46.81%
Percentage of firm-years with a large pledging Decision Maker (>50%)	22.07%	12.22%	41.25%
Percentage of firm-years with more than 5% total shares pledged	19.81%	22.54%	14.48%
Shares pledged / Shares owned (Full Sample)	7.62%	7.72%	7.44%
Shares pledged / Shares owned (Pledging Sample)	15.06%	16.30%	12.63%
Shares pledged / Total shares outstanding (Full Sample)	3.15%	3.65%	2.17%
Shares pledged / Total shares outstanding (Pledging Sample)	6.22%	7.53%	3.72%

Panel B - Firm Level Characteristics												
	N	Mean	Median	SE	25%	75%	Pledging Firm *N*	Pledging Firm Mean [1]	Non-Pledging Firm *N*	Non-Pledging Firm Mean [2]	[1] - [2]	t-stat
Analyst Coverage	7,644	0.696	0	0.905	0	1.153	3,593	0.782	4,051	0.62	0.161	7.809***
Board Independence	7,644	0.275	0.261	0.121	0.185	0.357	3,593	0.25	4,051	0.298	-0.048	-17.813***
Board Size	7,644	17.153	15	7.838	12	20	3,593	18.402	4,051	16.045	2.357	13.270***
CAPEX	7,638	0.03	0.012	0.051	0.003	0.034	3,592	0.03	4,046	0.031	-0.001	-2.947***
Cash Holdings	7,642	0.097	0.058	0.109	0.024	0.129	3,592	0.077	4,050	0.114	-0.037	-15.198***
Expected Shortfall	6,670	0.072	0.072	0.026	0.065	0.073	3,175	0.071	3,495	0.073	-0.002	-3.228***
Firm Age (Years)	7,601	10.341	10	6.428	5	15	3,584	12.258	4,017	8.631	3.627	25.593***
Industry Segments	6,496	2.321	2	1.579	1	3	3,092	2.682	3,404	1.992	0.69	18.032***
Intangible Assets	7,642	0.005	0	0.019	0	0.003	3,592	0.005	4,050	0.005	0	-1.057
Leverage	7,642	0.184	0.16	0.164	0.036	0.288	3,592	0.21	4,050	0.161	0.049	13.125***
R&D	7,636	0.019	0.008	0.029	0	0.024	3,591	0.015	4,045	0.022	-0.008	-11.405***
Sales Growth	7,644	0.032	0.013	0.406	-0.085	0.151	3,593	0.026	4,051	0.037	-0.011	-1.22
Segment HHI	6,495	79.658	96.978	24.701	55.436	100	3,091	74.794	3,404	84.075	-9.281	-15.396***
Tail Risk	6,670	0.073	0.071	0.028	0.066	0.075	3,175	0.072	3,495	0.074	-0.002	-2.879***
Tobin's Q	7,315	1.371	1.151	0.78	0.92	1.549	3,521	1.277	3,794	1.459	-0.183	-10.067***
Total Assets (NT$ billions)	7,644	20.768	5.475	69.117	2.647	12.285	3,593	30.785	4,051	11.883	18.902	12.046***
Trading Volume	7,165	0.019	0.012	0.022	0.005	0.025	3,470	0.018	3,695	0.02	-0.002	-4.463***
Value-at-Risk	6,709	0.104	0.102	0.096	0.085	0.118	3,183	0.101	3,526	0.107	-0.005	-2.276**
Volatility	7,148	0.446	0.424	0.166	0.334	0.532	3,490	0.44	3,658	0.452	-0.011	-2.863***

Table 2: Changes in pledging and matching comparison for the amendment to the Taiwan Corporation Act

Panel A of this table compares pre-shock and post-shock pledging levels. Pre-shock pledging is based on pledging data in 2009 and 2010, while post-shock pledging is based on pledging data in 2011 and 2012. Panel B reports the comparisons between *Treated* and *Control* firms across a number of firm level characteristics defined in Appendix A. *Closely Held Firms* (*Widely Held Firms*) are firms that (do not) have a controlling shareholder. *Decision Maker* refers to the controlling shareholder in *Closely Held Firms* and managers in *Widely Held Firms*. *Treated Firms* are firms where the *Decision Maker* already pledges over 50% of his/her shares at the end of May 2011. *Untreated Firms* are firms where the *Decision Maker* pledges between 0 and 50% of his/her shares at the end of May 2011. *Control Firms* are firms identified using a Propensity Score Matching method that have no pledging at all. *Threatened* refers to cases where the second largest shareholder's voting rights exceed 50% of the controlling shareholder's voting rights assuming that no change in pledging takes place and the controlling shareholder loses the voting rights on the shares they pledge above the 50% threshold. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A: Changes in Pledging among Treated and Untreated Firms

	Closely Held Firms				Widely Held Firms			
Pre: 2009 & 2010. Post: 2011 & 2012	Firms	Pre	Post	Change	Firms	Pre	Post	Change
Pledging by all Decision Makers - Mean	127	53.70%	46.53%	-7.16%	102	56.73%	52.11%	-4.62%
Pledging by all Decision Makers - Median	127	48.85%	40.47%	-8.38%	102	47.73%	43.45%	-4.28%
Untreated Pledging Mean (Pledging between 0% and 50% by Pledging Decision Makers)	83	34.10%	30.98%	-3.12%	48	31.97%	29.99%	-1.98%
Untreated Pledging Median (Pledging between 0% and 50% by Pledging Decision Makers)	83	30.94%	27.25%	-3.70%	48	32.21%	28.35%	-3.87%
Treated Pledging Mean (Above 50% Pledging Decision Makers)	44	79.41%	62.64%	-16.76%	54	83.07%	77.70%	-5.36%
Treated Pledging Median (Above 50% Pledging Decision Makers)	44	74.93%	65.93%	-9.00%	54	78.59%	78.28%	-0.30%
Treated Pledging Mean (Above 50% Pledging and Threatened Decision Makers)	22	87.80%	63.35%	-24.45%	23	87.17%	87.10%	-0.07%
Treated Pledging Median (Above 50% Pledging and Threatened Decision Makers)	22	82.22%	63.81%	-18.41%	23	87.50%	89.73%	2.23%

Panel B: Comparison of Treated and Control Firms

	Closely Held Firms				Widely Held Firms			
	Treated	Control	Difference	t-stat	Treated	Control	Difference	t-stat
Total Assets (NT$ billions)	20.964	10.322	10.642	1.13	30.086	20.506	9.58	0.665
Sales Growth	-0.02	0.034	-0.054	-1.317	0.078	0.021	0.056	1.406
Cash Holdings	0.084	0.112	-0.027	-1.008	0.117	0.128	-0.011	-0.631
Intangible Assets	0.006	0.004	0.002	0.506	0.006	0.003	0.003	1.447
Leverage	0.205	0.163	0.042	1.832*	0.159	0.115	0.043	1.950*
CAPEX	0.026	0.015	0.011	1.27	0.035	0.027	0.008	0.925
Volatility	0.487	0.489	-0.002	-0.055	0.477	0.518	-0.041	-1.568
Firm Age (Years)	16.536	13.944	2.591	2.295**	12.641	10.763	1.878	1.844*
Board Size	2.759	2.708	0.05	0.61	2.855	2.792	0.063	0.97
Board Independence	0.243	0.258	-0.014	-0.602	0.246	0.282	-0.036	-1.713*
Analyst Coverage	0.498	0.646	-0.149	-0.859	0.876	0.879	-0.004	-0.018
Trading Volume	0.111	0.136	-0.025	-0.972	0.171	0.163	0.007	0.242
Decision Maker Ownership	0.182	0.166	0.016	0.518	0.102	0.085	0.017	1.557
Number of Firms	28	54			39	59		

Table 3: Shareholder reaction to the amendment to the Taiwan Corporations Act

This table reports results of OLS regressions where the dependent variable is the CAR for each firm measured using the Fama-French 3-factor model with an estimation window of [-210,-11] and an event window of [-1,1]. *Event 1* refers to the first active discussion of the proposal, which took place on June 8, 2011, while *Event 2* refers to the final passage of the proposal on October 25, 2011. *Pooled* is the sum of *Event 1* and *Event 2* CARs. The sample in models (1)-(3) includes all treated firms with a controlling shareholder and their matched control firms, while the sample in models (4)-(6) includes only the threatened treated firms and their matched control firms. *Treated Firms* equals one for firms where the *controlling shareholder* pledges over 50% of his/her shares at the end of May 2011, and zero for control firms. We identify control firms (that have no insider pledging) using a Propensity Score Matching method. *Threatened* refers to cases where the second largest shareholder's voting rights exceed 50% of the controlling shareholder's voting rights assuming that no change in pledging takes place and the controlling shareholder loses the voting rights on the shares they pledge above the 50% threshold. Industry is defined based on the 2-digit SIC codes. All control variable definitions are reported in Appendix A. P-values are reported beneath each coefficient. Standard errors are clustered at the industry level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Dependent Variable: CAR [-1, 1]					
	Full			Threatened		
	Event 1	Event 2	Pooled	Event 1	Event 2	Pooled
	(1)	(2)	(3)	(4)	(5)	(6)
Treated Firms	0.525	1.948**	2.473**	0.141	2.539**	2.680**
	(0.221)	(0.042)	(0.029)	(0.773)	(0.049)	(0.039)
Decision Maker Ownership	1.512	-0.682	0.831	2.340	-3.154	-0.815
	(0.623)	(0.845)	(0.816)	(0.562)	(0.332)	(0.895)
Firm Size	-0.334	-0.072	-0.406	0.190	-0.935**	-0.746
	(0.667)	(0.910)	(0.589)	(0.633)	(0.043)	(0.200)
Sales Growth	-4.193	3.615	-0.578	-1.919	-0.041	-1.960
	(0.142)	(0.220)	(0.865)	(0.131)	(0.949)	(0.292)
Cash Holdings	-0.854	-2.781	-3.635	-2.675	1.488	-1.187
	(0.901)	(0.117)	(0.648)	(0.622)	(0.488)	(0.814)
Intangible Assets	24.062	-28.082	-4.020	20.741	-31.679	-10.938
	(0.253)	(0.189)	(0.915)	(0.256)	(0.103)	(0.696)
Leverage	3.612	-1.832	1.780	0.378	0.219	0.597
	(0.206)	(0.460)	(0.612)	(0.894)	(0.937)	(0.891)
CAPEX	-15.103	3.260	-11.843	6.338	24.993	31.332*
	(0.112)	(0.778)	(0.538)	(0.444)	(0.143)	(0.066)
Volatility	-6.812	-0.213	-7.025	-5.926**	-0.208	-6.134
	(0.103)	(0.941)	(0.228)	(0.048)	(0.925)	(0.106)
Firm Age	0.021	-0.425	-0.404	-0.149	1.025	0.876
	(0.985)	(0.819)	(0.879)	(0.952)	(0.698)	(0.861)
Board Size	-0.074	-1.541	-1.615	-0.586	1.325	0.738
	(0.919)	(0.330)	(0.280)	(0.560)	(0.320)	(0.729)
Board Independence	-1.933	0.008	-1.925	-4.196	1.620	-2.576
	(0.298)	(0.998)	(0.479)	(0.148)	(0.681)	(0.651)
Analyst Coverage	-0.313	0.291	-0.022	-1.051***	0.910**	-0.142
	(0.443)	(0.624)	(0.952)	(0.004)	(0.046)	(0.722)
Trading Volume	-1.527	-5.665	-7.192	8.526	0.526	9.052
	(0.742)	(0.128)	(0.316)	(0.431)	(0.922)	(0.450)
Industry Indicators	Yes	Yes	Yes	Yes	Yes	Yes
Observations	82	82	82	49	49	49
Adjusted R-squared	0.066	0.138	0.141	0.174	0.299	0.017

Table 4: Diff-in-diff analysis of the amendment to the Taiwan Corporations Act

Panel A of this table reports the average rates of change in Tobin's Q over the 2003-2010 period for the *Treated* and *Control* firms within the *Closely Held Firms* and *Widely Held Firms* sample. Panel B reports results of OLS regressions where the dependent variable is Tobin's Q. *Closely Held Firms* (*Widely Held Firms*) are firms that (do not) have a controlling shareholder. *Decision Maker* refers to the controlling shareholder in *Closely Held Firms* and managers in *Widely Held Firms*. *Treated Firms* are firms where the *Decision Maker* already pledges over 50% of his/her shares at the end of May 2011. *Control Firms* are similar firms that have no pledging at all, chosen using a Propensity Score Matching method. *Threatened* refers to cases where the second largest shareholder's voting rights exceed 50% of the controlling shareholder's voting rights assuming that no change in pledging takes place and the controlling shareholder loses the voting rights on the shares they pledge above the 50% threshold. *Law Change* equals one for observations in 2011 and 2012 and zero for observations in 2009 and 2010. Models (1) and (3) are based on all treated and control firms, while models (2) and (4) are based on *Threatened* treated firms and their corresponding control firms only. Industry is defined based on 2-digit SIC codes. All control variable definitions are reported in Appendix A. P-values are reported beneath each coefficient. Standard errors are clustered at the industry level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A: Parallel Trends Tests

	Closely Held Firms				Widely Held Firms			
Sample Period: 2003-2010	Treated	Control	Difference	t-stat	Treated	Control	Difference	t-stat
Full Sample - Changes in Q	-0.019	-0.034	0.015	-0.454	-0.029	-0.042	0.013	-0.412
Full Sample - *N*	195	377			252	395		
Threatened Sample - Changes in Q	-0.021	-0.039	0.018	-0.416	-0.02	-0.049	0.029	-0.471
Threatened Sample - *N*	119	223			53	202		

Panel B: Diff-in-diff Regressions				
Dependent Variable: Tobin's Q				
	Closely Held Firms		Widely Held Firms	
	Full	Threatened	Full	Threatened
	(1)	(2)	(3)	(4)
Treated Firms	-0.083	-0.157	0.112**	0.267*
	(0.343)	(0.197)	(0.046)	(0.093)
Law Change	-0.349***	-0.417***	-0.421***	-0.389***
	(0.000)	(0.000)	(0.000)	(0.009)
Treated Firms*Law Change	0.063*	0.132**	-0.006	-0.031
	(0.074)	(0.036)	(0.898)	(0.715)
Decision Maker Ownership	-0.110	-0.021	0.112	2.061***
	(0.728)	(0.941)	(0.802)	(0.007)
Firm Size	-0.068	0.027	-0.091**	0.009
	(0.253)	(0.423)	(0.012)	(0.118)
Sales Growth	0.165	0.184**	0.439***	0.491**
	(0.351)	(0.012)	(0.008)	(0.020)
Cash Holdings	0.765	0.724*	1.340***	2.389***
	(0.168)	(0.066)	(0.001)	(0.006)
Intangible Assets	0.821	-1.745	-2.174	3.873**
	(0.601)	(0.531)	(0.103)	(0.014)
Leverage	-0.152	-0.525	-0.850***	-0.941**
	(0.216)	(0.105)	(0.009)	(0.021)
CAPEX	-1.576	-0.306	-0.330	-1.417**
	(0.278)	(0.690)	(0.299)	(0.020)
Volatility	0.270	0.143	0.686	0.700**
	(0.310)	(0.533)	(0.116)	(0.036)
Firm Age	-0.157	-0.323	0.033	0.102***
	(0.555)	(0.119)	(0.496)	(0.008)
Board Size	-0.118	-0.236***	-0.028	-0.333**
	(0.172)	(0.010)	(0.849)	(0.015)
Board Independence	0.056	-0.964**	0.471	0.542**
	(0.767)	(0.025)	(0.219)	(0.039)
Analyst Coverage	0.308***	0.264**	0.296***	0.185**
	(0.000)	(0.017)	(0.000)	(0.026)
Trading Volume	-0.045	0.454	0.573*	0.803**
	(0.891)	(0.440)	(0.074)	(0.014)
Blockholder Ownership			0.207*	0.375**
			(0.067)	(0.024)
Industry FEs	Yes	Yes	Yes	Yes
Observations	164	98	196	84
Adjusted R-squared	0.420	0.476	0.426	0.579

Table 5: Effects of pledging on firm value at closely held versus widely held firms

This table reports results of OLS regressions where the dependent variable is yearly Tobin's Q over the 2003-2013 period. *Closely Held Firms* (*Widely Held Firms*) are firms that (do not) have a controlling shareholder. *Decision Maker* refers to the controlling shareholder in *Closely Held Firms* and managers in *Widely Held Firms*. Column 1 reports results based on the full sample where *Any Pledging [1, 0]* equals one as long as any manager, board member, or large shareholder pledges. For models (2) and (3), the indicator variable *Pledging to Buy [1,0]* equals one as long as any manager, board member, or large shareholder has pledged shares and this pledge is followed by an increase in their ownership (adjusted for stock grants and option exercises). *Pledging to Spend [1,0]* equals one if any manager, board member, or large shareholder has pledged and there is no reported change in their ownership. The continuous version of these variables, *Pledging to Spend [%]* and *Pledging to Buy [%]*, captures all shares pledged (to spend or buy) by managers, board members, and blockholders divided by total shares outstanding in the firm. *Decision Maker Pledging to Spend [1,0]* and *Decision Maker Pledging to Buy [1,0]* are equal to one if the firm's key decision maker pledges shares to spend or buy respectively. The continuous version of these variables is defined in the same way as above. All control variable definitions are reported in Appendix A. P-values are reported beneath each coefficient. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Dependent Variable: Tobin's Q						
	All Firms			Closely Held Firms		Widely Held Firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Any Pledging [1,0]	-0.090***						
	(0.009)						
Pledging to Spend [1,0]		-0.051*					
		(0.091)					
Pledging to Buy [1,0]		-0.090**					
		(0.012)					
Pledging to Spend [%]			-0.875				
			(0.130)				
Pledging to Buy [%]			-1.121*				
			(0.090)				
Decision Maker Pledging to Spend [1,0]				-0.081		-0.042	
				(0.195)		(0.198)	
Decision Maker Pledging to Buy [1,0]				-0.122**		-0.075*	
				(0.041)		(0.057)	
Decision Maker Pledging to Spend [%]					-1.506*		-2.039**
					(0.079)		(0.024)
Decision Maker Pledging to Buy [%]					-1.645**		-1.639
					(0.044)		(0.108)

(Continued)

Table 5: Effects of pledging on firm value at closely held versus widely held firms *(Continued)*

	Dependent Variable: Tobin's Q						
	All Firms			Closely Held Firms		Widely Held Firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non-Decision Maker Pledging [1,0]				-0.033		0.074	
				(0.566)		(0.163)	
Non-Decision Maker Pledging [%]					0.336		1.410
					(0.580)		(0.280)
Decision Maker Ownership	0.548***	0.554***	0.575***	0.605***	0.622***	-0.129	0.014
	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.816)	(0.981)
Firm Size	-0.153***	-0.154***	-0.154***	-0.182**	-0.169**	-0.119*	-0.119*
	(0.004)	(0.004)	(0.003)	(0.016)	(0.016)	(0.086)	(0.085)
Sales Growth	0.131***	0.136***	0.136***	0.100**	0.100**	0.207***	0.206***
	(0.000)	(0.000)	(0.000)	(0.022)	(0.021)	(0.000)	(0.000)
Cash Holdings	0.490***	0.488**	0.477**	0.437*	0.443*	0.581*	0.577*
	(0.009)	(0.011)	(0.013)	(0.074)	(0.066)	(0.096)	(0.096)
Intangible Assets	-1.170	-1.157	-1.200	-0.339	-0.396	-1.492	-1.519
	(0.283)	(0.297)	(0.275)	(0.777)	(0.734)	(0.422)	(0.413)
Leverage	-0.378***	-0.370**	-0.340**	-0.474**	-0.446**	-0.177	-0.145
	(0.008)	(0.010)	(0.024)	(0.021)	(0.035)	(0.360)	(0.442)
CAPEX	0.625***	0.670***	0.621***	0.300	0.216	0.841*	0.819*
	(0.003)	(0.002)	(0.005)	(0.181)	(0.401)	(0.077)	(0.083)
Volatility	0.397***	0.406***	0.398***	0.368***	0.361***	0.229	0.204
	(0.000)	(0.000)	(0.000)	(0.006)	(0.007)	(0.121)	(0.162)
Board Size	0.004	0.004	0.003	0.055	0.055	-0.026	-0.026
	(0.935)	(0.934)	(0.952)	(0.441)	(0.446)	(0.765)	(0.760)
Board Independence	0.320**	0.321**	0.326**	0.294	0.304*	0.407*	0.422*
	(0.025)	(0.026)	(0.023)	(0.107)	(0.097)	(0.068)	(0.058)
Analyst Coverage	0.201***	0.203***	0.199***	0.226***	0.218***	0.168***	0.171***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trading Volume	6.688***	6.708***	6.642***	7.340***	7.211***	6.041***	6.081***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Blockholder Ownership						0.085*	0.074
						(0.053)	(0.136)
Firm and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,033	6,882	6,882	4,432	4,432	2,450	2,450
Adjusted R-squared	0.645	0.642	0.643	0.640	0.643	0.734	0.735

Table 6: Market reaction to pledging announcements at closely held versus widely held firms

This table reports the market reaction to various types of pledging announcements over the 2003-2013 period. Panel A shows announcement returns of both pledging increases and decreases and reports t-tests, signed-rank tests, and sign tests on whether the reaction is significantly different from zero. Panel B includes only announcements of increases in pledging, and partitions the sample based on various pledge characteristics. *Closely Held Firms* (*Widely Held Firms*) are firms that (do not) have a controlling shareholder. *Decision Maker* refers to the controlling shareholder in *Closely Held Firms* and managers in *Widely Held Firms*. CARs are measured using the Fama-French 3-factor model with an estimation window of [-210, -11] and an event window of [-1,1]. *First-Time Pledging* refers to when the shareholder has no existing pledging prior to the announced pledging. *Decision Maker Pledging to Buy* refers to cases where a decision maker's pledge is followed by an increase in their ownership level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A: Nature of Announcements

		N	Mean	t-Statistics	Median	Signed-Rank Z-Score	Sign Test P-Value
FF 3-factor [-1,1]	Pledging Up	3352	-0.532%	-2.823	-0.515%	-4.598	0.000
	Pledging Down	3106	0.068%	0.62	-0.229%	-1.001	0.317
Market Adjusted [-1,1]	Pledging Up	3352	-0.568%	-5.46	-0.513%	-6.13	0.000
	Pledging Down	3106	0.172%	1.353	-0.085%	-0.172	0.863

Panel B: Characteristics of Pledging Increase Announcements

	Closely Held Firms		Widely Held Firms	
	N	Mean	N	Mean
Decision Maker Pledging	1074	-0.627%***	1282	-0.601%*
Non-Decision Maker Pledging	786	-0.349%	210	-0.309%
Pledged/Total Outstanding > Median	930	-0.718%***	746	-0.654%*
Pledged/Total Outstanding ≤ Median	930	-0.301%	746	-0.466%*
First-Time Pledging	369	-0.576%*	336	-0.585%
Non-First-Time Pledging	1491	-0.493%**	1156	-0.553%*
Decision Maker & Pledged/Total Outstanding > Median	801	-0.771%**	681	-0.648%*
Decision Maker & First-Time	127	-0.531%*	281	-0.468%
Decision Maker Pledging to Buy	112	-0.973%**	141	-0.273%

Table 7: Global Financial Crisis analysis

This table reports results from OLS regressions using the Global Financial Crisis (GFC) as an exogenous shock. In Panel A, the dependent variable is the percentage change in ownership of each firm insider (or group of insiders if they are affiliated) from the end of May 2008 to the end of August 2008. The independent variable *Pledging>75% [0, 1]*, equals one if an insider (or a group of affiliated insiders) pledges more than 75% of their shares at the end of May 2008; and zero otherwise. *Pledging/Holding* is a continuous variable defined as the total number of shares pledged by an insider scaled by the total number of shares that they own. In Panel B, the dependent variable is firm stock returns from the end of May 2008 to the end of August 2008. *Pledging>75% & Holding>5% & (No) Stock Sale [1,0]* is an indicator variable that equals one if the firm has at least one insider that owns more than 5% of the company stock, has pledged more than 75% of their shares at the end of May 2008, and has sold (no) stock by the end of August 2008. *Largest Pledge/Total Shares if Stock Sale* and *Largest Pledge/Total Shares if No Stock Sale* are the corresponding continuous variables, defined as the number of shares pledged by the largest pledger scaled by the total shares outstanding. The propensity score matching method in models (3), (4), and (6) is identical to the one used in Table 2. For models (5)-(6) in both Panels A and B we remove from the analysis firms that grant stock to insiders during 2008 or have granted options at any time during the sample period. *Decision Maker* refers to the controlling shareholder in C*losely Held Firms* and managers in W*idely Held Firms*. *Closely Held Firms* (*Widely Held Firms*) are firms that (do not) have a controlling shareholder. All explanatory variables related to pledging are based on data at the end of May 2008. All explanatory variables constructed using financial statement data are measured as at the end of December 2007. All control variables are defined in Appendix A. P-values are reported beneath each coefficient. Industry is defined based on 2-digit SIC codes. Standard errors are clustered at the firm level in Panel A and industry level in Panel B. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Panel A: Shareholding Changes						
Dependent Variable: Percentage Change in Ownership						
	Full Sample				Option & Stock Grants Adjusted	
	(1)	(2)	(3)	(4)	(5)	(6)
Pledging>75% [0,1]	-0.059**		-0.033		-0.079**	
	(0.044)		(0.140)		(0.042)	
Pledging/Holding		-0.084***		-0.087***		-0.107***
		(0.001)		(0.000)		(0.001)
Firm Size	0.011	0.012				
	(0.393)	(0.384)				
Sales Growth	0.027	0.026				
	(0.577)	(0.593)				
Cash Holdings	0.088	0.087				
	(0.447)	(0.454)				
Intangible Assets	-0.717	-0.683				
	(0.422)	(0.441)				
Leverage	-0.078	-0.080				
	(0.143)	(0.137)				
CAPEX	-0.070	-0.062				
	(0.606)	(0.651)				
Volatility	-0.001	0.001				
	(0.979)	(0.990)				
Firm Age	-0.049***	-0.048***				
	(0.005)	(0.006)				
Board Size	0.063**	0.063**				
	(0.029)	(0.028)				

(Continued)

Table 7: Global Financial Crisis analysis (*Continued*)

Panel A: Shareholding Changes						
Dependent Variable: Percentage Change in Ownership						
	Full Sample				Option & Stock Grants Adjusted	
	(1)	(2)	(3)	(4)	(5)	(6)
Board Independence	0.024	0.025				
	(0.773)	(0.765)				
Analyst Coverage	0.034***	0.033***				
	(0.004)	(0.005)				
Trading Volume	1.244***	1.255***				
	(0.003)	(0.003)				
Industry indicators	Yes	Yes	No	No	No	No
Firm indicators	No	No	Yes	Yes	Yes	Yes
Observations	5,992	5,992	6,708	6,708	3,956	3,956
Adjusted R-squared	0.082	0.083	0.247	0.249	0.268	0.270

Panel B: Stock Returns						
Dependent Variable: Stock Returns May 2008 - Aug 2008						
	Full Sample				Option & Stock Grants Adjusted	
	All Firms		PSM		All Firms	PSM
	(1)	(2)	(3)	(4)	(5)	(6)
Pledging>75% & Ownership>5% & Stock Sale [1,0]	-0.190**		-0.216*		-0.164*	-0.318**
	(0.048)		(0.070)		(0.062)	(0.010)
Pledging>75% & Ownership>5% & No Stock Sale [1,0]	0.035		0.041		0.042	0.047
	(0.255)		(0.462)		(0.245)	(0.642)
Largest Pledge/Total Shares if Stock Sale		-0.005*		-0.005**		
		(0.051)		(0.043)		
Largest Pledge/Total Shares if No Stock Sale		-0.001		-0.001		
		(0.677)		(0.591)		
Decision Maker Ownership	0.120**	0.125**	0.435**	0.122*	0.052	0.402
	(0.044)	(0.039)	(0.040)	(0.063)	(0.466)	(0.169)
Firm Size	-0.021**	-0.022**	0.030	-0.023**	-0.035***	0.016
	(0.020)	(0.018)	(0.225)	(0.025)	(0.007)	(0.687)
Sales Growth	-0.011	-0.011	-0.220***	0.002	-0.025	-0.088
	(0.621)	(0.633)	(0.002)	(0.924)	(0.387)	(0.573)
Cash Holdings	-0.051	-0.055	-0.218	-0.046	0.038	0.677
	(0.501)	(0.471)	(0.768)	(0.606)	(0.729)	(0.376)
Intangible Assets	0.128	0.091	-1.856	0.481	0.729	-0.689
	(0.796)	(0.850)	(0.213)	(0.574)	(0.403)	(0.771)
Leverage	-0.171***	-0.169***	-0.194	-0.194***	-0.137*	-0.315
	(0.004)	(0.004)	(0.318)	(0.002)	(0.054)	(0.313)
CAPEX	-0.042	-0.041	-0.565	-0.149	0.009	-0.685
	(0.786)	(0.796)	(0.313)	(0.369)	(0.973)	(0.794)
Volatility	-0.127*	-0.127*	0.071	-0.147**	-0.157**	0.189
	(0.055)	(0.052)	(0.713)	(0.038)	(0.044)	(0.457)
Firm Age	-0.000	0.003	-0.044	0.013	0.028	0.001
	(0.977)	(0.858)	(0.578)	(0.496)	(0.206)	(0.994)
Board Size	-0.001	0.002	0.038	0.024	-0.014	-0.056
	(0.954)	(0.943)	(0.583)	(0.357)	(0.628)	(0.630)
Board Independence	-0.072	-0.061	-0.128	-0.055	-0.036	-0.653*
	(0.346)	(0.430)	(0.704)	(0.508)	(0.711)	(0.087)
Analyst Coverage	0.034***	0.033***	0.020	0.033***	0.031*	0.008
	(0.003)	(0.004)	(0.634)	(0.007)	(0.066)	(0.917)
Trading Volume	0.175	0.194	2.601	0.214	-0.885	1.992
	(0.679)	(0.649)	(0.234)	(0.645)	(0.202)	(0.320)
Industry Indicators	Yes	Yes	Yes	Yes	Yes	Yes
Observations	620	620	60	494	401	50
Adjusted R-squared	0.113	0.104	0.228	0.113	0.120	0.215

Table 8: Effects of pledging on crash risk

This table reports OLS estimates of the effects of pledging on firm crash risk over the 2003-2013 period. Crash risk measures include *Value-at-Risk*, *Expected Shortfall*, and *Tail Risk*. These measures are constructed based on 12 months of daily stock returns starting from the next fiscal year after the pledging variables are measured. *Pledging>75% & Holding>5%* and *Pledging>75% & Holding>10%* are indicator variables that equal one if the firm has at least one group of insiders that has pledged more than 75% of their shares and owns more than 5% or 10% of the company stock, respectively. *Decision Maker* refers to the controlling shareholder in *Closely Held Firms* and managers in *Widely Held Firms*. *Closely Held Firms* (*Widely Held Firms*) are firms that (do not) have a controlling shareholder. All control variable definitions are reported in Appendix A. P-values are reported beneath each coefficient. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Dependent Variables:	Value-at-Risk	Expected Shortfall	Tail Risk	Value-at-Risk	Expected Shortfall	Tail Risk
	(1)	(2)	(3)	(4)	(5)	(6)
Pledging>75% & Holding>5%	0.302**	0.632**	0.658**			
	(0.019)	(0.039)	(0.040)			
Pledging>75% & Holding>10%				0.511***	0.965*	0.998*
				(0.004)	(0.059)	(0.063)
Decision Maker Ownership	-0.769	0.095	0.302	-0.721	0.173	0.382
	(0.144)	(0.918)	(0.764)	(0.172)	(0.849)	(0.701)
Firm Size	-0.351**	-0.289	-0.308	-0.356**	-0.296	-0.315
	(0.013)	(0.129)	(0.156)	(0.012)	(0.116)	(0.142)
Sales Growth	0.067	-0.131	-0.079	0.066	-0.133	-0.081
	(0.289)	(0.332)	(0.586)	(0.299)	(0.329)	(0.580)
Cash Holdings	-0.290	0.851	1.109*	-0.282	0.862*	1.121*
	(0.407)	(0.103)	(0.058)	(0.421)	(0.098)	(0.056)
Intangible Assets	-1.973	0.351	0.124	-2.023	0.280	0.052
	(0.227)	(0.781)	(0.926)	(0.214)	(0.827)	(0.969)
Leverage	2.050***	2.384***	2.373**	2.039***	2.364***	2.352**
	(0.000)	(0.006)	(0.015)	(0.000)	(0.006)	(0.014)
CAPEX	-1.773**	-0.485	-0.620	-1.758**	-0.458	-0.593
	(0.040)	(0.554)	(0.477)	(0.041)	(0.576)	(0.496)
Board Size	0.131	-0.084	-0.073	0.132	-0.082	-0.072
	(0.312)	(0.689)	(0.753)	(0.309)	(0.693)	(0.757)
Board Independence	-0.364	-1.131*	-1.179*	-0.359	-1.119*	-1.166*
	(0.318)	(0.056)	(0.069)	(0.327)	(0.061)	(0.075)
Analyst Coverage	0.121**	0.117*	0.073	0.124**	0.120*	0.076
	(0.028)	(0.099)	(0.365)	(0.026)	(0.089)	(0.343)
Trading Volume	20.330***	4.685***	6.052***	20.337***	4.682***	6.047***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
Firm and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,558	6,538	6,538	6,558	6,538	6,538
Adjusted R-squared	0.681	0.330	0.288	0.682	0.331	0.289

Table 9: Effects of insider pledging on firm risk-taking

This table reports estimates from regression models that examine the effect of controlling shareholder pledging on firm risk-taking over the 2003-2013 period. Only firms with a controlling shareholder (closely held firms) are included in these models. The dependent variables are capital expenditures to total assets (*CAPEX*), the number of industry segments (*Industry Segments*), an industry segment concentration index (*Segment HHI*), whether an M&A deal is a diversifying deal (*Diversifying M&A*), and R&D expenses to total assets (*R&D*), which are all defined in Appendix A. *CAPEX* and *R&D* ratios are multiplied by 100. All the regressions estimates are based on OLS models, except for the *Industry Segments* regressions, which are poisson model estimates and the *Diversifying M&A* regressions, which are logit model estimates. *Controlling Shareholder Pledged Shares / Total Shares Outstanding* refers to all shares pledged by the controlling shareholder scaled by the firm's total shares outstanding. *Controlling Shareholder Pledging>75%* is an indicator variable that equals one if the controlling shareholder pledges more than 75% of their shares (by definition the controlling shareholder also owns more than 5% of company stock). All control variables are defined in Appendix A. P-values are reported beneath each coefficient. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Dependent Variable:	CAPEX	Industry Segments	Segment HHI	Diversifying M&A	R&D	CAPEX	Industry Segments	Segment HHI	Diversifying M&A	R&D
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Controlling Shareholder Pledged Shares /Total Shares Outstanding	-0.083***	0.010***	-0.327*	0.063**	-0.009*					
	(0.001)	(0.000)	(0.061)	(0.025)	(0.091)					
Controlling Shareholder Pledging>75%						-1.392*	0.091**	-3.290	0.850	-0.132**
						(0.075)	(0.012)	(0.293)	(0.353)	(0.029)
Decision Maker Ownership	7.539***	0.329**	2.842	0.076	0.192	7.323***	0.358**	2.456	0.535	0.171
	(0.002)	(0.015)	(0.787)	(0.962)	(0.547)	(0.002)	(0.011)	(0.820)	(0.724)	(0.592)
Firm Size	0.558	-0.022	0.571	0.548***	-0.125	0.524	-0.010	0.249	0.611***	-0.129
	(0.489)	(0.488)	(0.813)	(0.003)	(0.228)	(0.523)	(0.744)	(0.918)	(0.001)	(0.216)
Sales Growth	0.344***	0.026	-0.501	1.023*	0.083**	0.347***	0.025	-0.496	1.036**	0.083**
	(0.009)	(0.107)	(0.334)	(0.061)	(0.029)	(0.010)	(0.115)	(0.340)	(0.045)	(0.029)
Cash Holdings	-1.903	-0.035	3.257	-1.337	-0.171	-1.768	-0.035	3.522	-1.165	-0.157
	(0.277)	(0.745)	(0.604)	(0.400)	(0.744)	(0.318)	(0.747)	(0.573)	(0.433)	(0.764)
Intangible Assets	-2.659	0.734	-46.844*	4.420	-0.122	-2.731	0.615	-46.666*	1.200	-0.128
	(0.743)	(0.165)	(0.081)	(0.556)	(0.964)	(0.736)	(0.268)	(0.080)	(0.862)	(0.962)
Leverage	-0.040	0.155	-7.970	-1.016	-0.153	-0.199	0.146	-8.074	-0.855	-0.169
	(0.975)	(0.127)	(0.228)	(0.411)	(0.648)	(0.874)	(0.154)	(0.225)	(0.482)	(0.613)
Volatility	-0.677	0.083	-2.969	1.582	-0.399	-0.472	0.055	-2.232	1.378	-0.379
	(0.657)	(0.328)	(0.645)	(0.257)	(0.183)	(0.756)	(0.529)	(0.732)	(0.311)	(0.209)

(*Continued*)

Table 9: Effects of insider pledging on firm risk-taking (*Continued*)

Dependent Variable:	CAPEX	Industry Segments	Segment HHI	Diversifying M&A	R&D	CAPEX	Industry Segments	Segment HHI	Diversifying M&A	R&D
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Board Size	-0.992	0.068	-0.935	0.744	0.474**	-0.902	0.061	-0.654	0.847	0.483**
	(0.329)	(0.222)	(0.824)	(0.200)	(0.023)	(0.375)	(0.275)	(0.877)	(0.134)	(0.022)
Board Independence	-2.008	0.271**	-16.736**	3.839**	0.130	-1.963	0.256**	-16.398**	4.248**	0.135
	(0.298)	(0.014)	(0.044)	(0.046)	(0.726)	(0.311)	(0.021)	(0.050)	(0.024)	(0.717)
Analyst Coverage	0.438	0.014	-0.543	-0.329	-0.012	0.475*	0.005	-0.284	-0.462*	-0.008
	(0.119)	(0.458)	(0.648)	(0.198)	(0.846)	(0.094)	(0.795)	(0.809)	(0.060)	(0.900)
Trading Volume	20.140***	-1.105**	29.279	-19.342*	2.561**	20.695***	-1.225**	32.673	-17.134	2.627**
	(0.006)	(0.027)	(0.348)	(0.093)	(0.034)	(0.005)	(0.015)	(0.297)	(0.125)	(0.028)
Firm Age				-0.181					-0.148	
				(0.608)					(0.668)	
Industry FEs	No	No	No	Yes	No	No	No	No	Yes	No
Firm FEs	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,142	3,565	3,565	281	4,141	4,142	3,565	3,565	281	4,141
Adjusted R-squared	0.427		0.701		0.929	0.426		0.699		0.929
Pseudo R-squared		0.205		0.223			0.204		0.211	

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