Information Transfers among Coowned Firms

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We study how information about one firm transmits to otherwise unrelated firms sharing the same major blockholder. Using information on US firms over the 2001–2008 period, we show that the financial conditions of these firms signal the controlling ability of the owner and therefore indirectly affects the quality of the firms in which the owner has a major stake. Bad news on credit quality in coowned firms raises the firm's credit risk. Our results are robust to instrumental variables estimation where we instrument the changes in credit risk of coowned firms by the natural disaster events in the counties of coowned firm headquarters.

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Introduction

> *The global economy is dominated by a small, tight-knit group of companies, according to a network analysis of 43,060 transnational corporations... A group of intricately interlinked companies that essentially hold a majority share of one another is both surprisingly small and exceptionally powerful. The top 737 companies exert 80% of the control over the value of the entire network. Most of these companies are financial institutions.* (Nature, 22 Dec 2011)

One of the standard premises of studies on how information is transmitted in the financial markets is that information and disclosure about one firm may provide a signal about other firms that have similar cash flows and business structures. However, few if any studies have focused on the information mediating role played by the fact that different firms share the same controlling shareholders – i.e., they are bound by "common ownership".

This is all the more bizarre as common ownership has become an increasingly important phenomenon in the United States over the last decade. For instance, Azar (2011) finds that the fraction of publicly traded US corporations in which the same institutional investor owns at least 5% of each company has more than tripled between 2000 and 2010, increasing from 4% to 14%.

Indeed, sharing a common controlling blockholder may have relevant signaling implications for financial markets. The blockholder with a good track record of ownership provides a certification about the value of the firm to other financiers. Certification arises either from the controlling blockholder's ability to monitor or from its skills in selecting reliable firms to acquire control. Thus, while a common wisdom holds that blockholders reduce transparency because they act as insiders or because, by reducing the float, they eliminate price discovery, *common* blockownership may in fact increase information disclosure – and thus transparency – in the market. Such disclosure is provided by the shared blockholder's reputation, which is maintained (or lost) as a function of the status of the coowned firms.

In this paper, we study these issues by empirically investigating the cases in which otherwise unrelated firms have the same "major" blockholder. The existing literature (e.g., Cronqvist and Fahlenbrach, 2009) shows that blockownership by institutional investors (e.g., mutual funds) provides monitoring which affects firm value and corporate policies. We build on this literature and provide the novel intuition that common blockownership provides a signal about the controlling owner's ability to

run the other firms. We argue that, if one investor is the major blockholder in several firms, then the financial conditions of each of these firms sends a signal to the market about the blockholder's controlling ability that spills over to other coowned firms. By making the value of a firm sensitive to the value and cash flow shocks of the other coowned firms, coownership produces informal links in how the market perceives formally independent firms.

Our sample includes all publicly listed US corporations over the 2001–2008 period. We find that such common controlling blockholder links exist among 15-20% of our sample firms. We focus on the US as we want to make sure that the coowned firms are not part of the same business groups nor do they have any other direct relationships between themselves. Given that US market is characterized by the lack of pyramids and complex business groups that are often present in other countries, we are confident that there are no cash flow transfers between the coowned firms. Moreover, the presence of the data lets us control for the other types of business links between the coowned firms. In particular, we show that coownership is not related to (and does not proxy for) direct organizational links between the firms. In other words, coowned firms do not have overlapping directors, nor do they have a parent–subsidiary or a customer–supplier relation.

We focus on the implication of coownership for the firm's standing in the debt market. We do it for several reasons. First, the reputation effects should be primarily relevant after the market learns significant news – and especially negative news – about the coowned firms. Given that in the debt market the negative events are more informative than the positive ones, the analysis based on the debt market allows us to design sharper tests on the value of the firm. Identifying analogous events that have unambiguous implications for the value of equity is more challenging. Moreover, the accounting literature has shown that there is asymmetry between how good news and bad news are released to the markets (e.g. Skinner (1994), Kothari et al. (2009)). Therefore, the focus on debt allows us to study the bad news ("negative credit events") only and investigate how they spread among coowned firms. In such a case, learning from additional sources – e.g. the performance of coowned firms – may be the most relevant.

Also, we can better identify and focus on the reputation effect in the debt market than in the equity market as in this case we are less affected by the potential implications of coownership on the

liquidity of firm's shares and the endogeneity of equity ownership to the price of firm's equity. Indeed, having/sharing a blockholder might affect stock liquidity and this may impact the incentives for the blockholders to remain in control (e.g., Kahn and Winton (1998), Maug (1998)).

We divide the analysis into two parts. We first establish the links between coowned firms by showing that their credit risks are correlated. Then, we design a set of tests that help us to rule out endogeneity concerns.

We start by testing whether coownership creates indirect financial links between *peers*: firms that share the same major blockholder. We first show that the firm's probability of distress, credit rating, and yield spread in the secondary bond market are directly related to the financial situation of its peer firms. For instance, one standard deviation higher probability of distress of the peer firms is associated with 18% higher probability of distress of the firm over the mean.

Next, we look at the credit shocks and ask how the market reacts to an increase in the credit risk of peer firms. We show that a 100 bp change in the average yield spread of the peer firms corresponds to a 2.4 bp change in the firm's yield spread. As expected, this effect is much more pronounced for negative shocks than for positive ones. In addition, it is much stronger (the corresponding effect is equal to 10.3 bp) for individual blockholders that usually hold fewer blocks and thus yield spreads should be more sensitive to the information about their controlling ability. Moreover, a downgrade by Moody's of at least one peer firm corresponds to a 5.3 bp increase in the firm's yield spread.

These information transmission links between coowned firms are consistent and robust across alternative specifications, and are stronger when the information provided by the financial situation of the peers is more valuable – that is, for unrated firms and firms about which there is more disagreement among analysts. Importantly, "placebo tests", which replicate the same analysis but replace the peers with the firms from the same 3-digit SIC industry that are closest in asset size to the actual peer firms, yield no significant relationships.

Finally, we examine how, by providing more blockholder-specific information, coownership affects the firm's sensitivity to market-wide shocks. We focus on three exogenous shocks: a change in the federal funds rate, a change in the AAA–Treasury spread, and a change in the BAA–AAA spread. We find that coownership reduces the impact of such common shocks. The effect has a strong

economic significance: being coowned reduces the sensitivity of yield spreads to changes in the federal funds rate by 20% of the unconditional effect of the shock, and it reduces the sensitivity to changes in the AAA–Treasury (BAA–AAA) spread by 2% (15%). The effect is again stronger for individual blockholders.

It may be argued that the informal links that we document simply reflect the fact that blockholders choose firms with common characteristics. This, of course, goes against the principle of diversification, and would saddle them with more concentrated risks. However, we address this issue in a two-pronged approach.

First, we investigate how changes in coownership affect the close relationship between a firm and its peers. We look at firms for which the controlling blockholder changes during our sample period and find that the correlation between the monthly bond yield spreads of the firm and the average spreads of its peers in the secondary market becomes significantly weaker when the coowner loses control. In contrast, the correlation between the yield spreads of a firm and those of its new peers becomes larger when a previously non-controlling coowner acquires control of the firm. These findings do not support the alternative explanation that the correlation is spuriously due to selection of similar firms by the common blockholders.

Next, we implement an instrumental variables estimation where we instrument the yield spread shocks of coowned peers by the recent natural disasters that have occurred in the counties where the peer firms are located. We find that such big natural disasters with a total monetary damage of over $1bn predict an increase in the coowned peer firm credit risk. Moreover, when instrumented with such natural disasters, peer yield spread shocks are positively associated with unaffected coowned firms yield spreads. Such finding cannot simply reflect a selection of similar stocks, since crucially to our estimation we make sure that focal coowned firms are not themselves located in the counties that are affected by the natural disasters.

The findings in this paper offer a new perspective on the role of coownership in financial markets. We contribute to two streams of literature. First, we contribute to the burgeoning literature on common ownership (e.g., Matvos and Ostrovsky (2008), Azar (2011), Harford et al. (2011)) and, in particular, its effects on debt markets (Ivashina and Kovner (2011)). The focus of this analysis is on

voting of investors with joint portfolio ownership – where the stakes of institutional investors need not be part of a controlling block. For example, Matvos and Ostrovsky (2008) and Harford et al. (2011) show the role of common ownership in voting for acquisition choices. Azar (2011) as well as Azar et al. (2015) focus on the effect of common institutional shareholders in the setting of product–market collusion. We establish the role of information in debt markets.

Second, we contribute to the literature on the relationship between blockholding and information disclosure. For instance, Ajinkya et al. (2005) and Chen et al. (2008) show that firms with blockholding are less likely to promote information disclosure. We show how the market, especially in the context of bad news, is able to circumvent this disadvantage by learning about the firm from multiple blockholdings of large investors.

The rest of the paper is organized as follows. Section 2 describes the sample and the main variables that we use. Section 3 discusses the phenomenon of coownership and gives some preliminary evidence. Section 4 provides evidence that credit risk is linked among coowned firms, and Section 5 helps to rule out endogenous selection. A brief conclusion follows in Section 6.

2. Data

Our sample consists of US publicly listed firms over the period 2001–2008. We construct our main measures of blockholding using time-series data from the Bureau van Dijk databases. For the period of 2006-2008, we use the Orbis database, while for the period 2001-2005, we rely on Osiris database. Orbis contains ownership, financial and corporate governance data for over 16 million firms across the globe (as of July, 2008). Osiris is a subset of Orbis for all global listed firms.

The use of Orbis provides many advantages over other sources of ownership data. First, the ownership data in Orbis is renowned for its scope and accuracy. It gives the following statement on how it collects ownership data: “For US listed companies, ownership information is systematically collected from the Free Edgar File which includes all companies filing proxy statements. These links cover all known shareholders (corporations or individuals) with an ownership percentage of 5% or more, as well as the ownership of directors and executive officers (with no lower ownership percentage limitation). Data is gathered tracking lower levels percentages owned by corporations.

This is done by querying the NASDAQ web-site under the entry "Beneficial Owner" which is associated to the display of a company. This covers all companies listed in the US stock exchanges, not only those listed on the NASDAQ."

We remark that our summary statistics are comparable to those in Dlugosz et al. (2006), Villalonga and Amit (2006), Holderness (2009) and other studies on the blockholding of US public firms. We attribute our sample's slightly higher mean blockholding level than the one reported in other studies to our larger sample, which contains a higher proportion of small firms.

The second advantage of using Orbis is that we can employ different vintages of Orbis data over the 2001–2008 period to reconstruct the dynamics of blockholding in US public firms. Hence we have a possibility to exploit time-series variation in the analysis.

Data on bank lending are provided by the LPC LoanConnector database, while data on bond issues come from SDC Global New Issues and the Mergent/FISD Corporate Bond data sets. Monthly data on yield spreads in the secondary market come from TRACE (and from Bloomberg for periods in which TRACE data are not available). Data on the market interest rates are from the Federal Reserve Bank of St. Louis. Financial data on firms are collected from the CRSP/Compustat database, and the dispersion in analysts' earnings forecasts is drawn from I/B/E/S.

All of our specifications control for the firm's financial characteristics, including tangibility of assets, ROA, leverage, market-to-book ratio, and asset size. We also control for the fraction of institutional ownership in the firm using information from the Thomson-Reuters Institutional Holdings (13F) Database.

We match the Orbis data with that from other sources (e.g., Compustat) either by using common identifiers or by matching names manually. We successfully match about two thirds of the Compustat sample; observations that cannot be matched are excluded. We also exclude firms for which any observation involves a negative market-to-book ratio. In the debt analysis, we exclude convertible bonds, equity-related issues, and perpetual maturity issues as well as bonds of maturity less than one year – e.g., commercial paper.

Table 1 reports the descriptive statistics of our sample. The book value of assets of a median firm with blockholding data available from Orbis is $297 million, slightly higher than the median of $244

million for the entire Compustat sample. The median level of leverage in our sample is 0.23, tangibility is 0.95, market-to-book is 1.27 while profitability is 3.6%. For the unconditional sample of Compustat firms, the respective values are 0.21, 0.96, 1.21, and 2.6%. These comparisons suggest that our sample is made of slightly larger and more profitable firms that, on average, have higher leverage and market-to-book ratios than does the overall population of publicly listed firms. That being said, these differences are not statistically significant. A complete list of the variables we use is given in Appendix 1.

Finally, for our instrumental variables estimation, we follow Barrot and Sauvagnat (2014) and rely on major natural disasters from the SHELDUS (Spatial Hazard and Loss Database for the United States) database of the University of South Carolina. Similarly to Barrot and Sauvagnat (2014), we only look at major natural disasters with total direct estimated damages above one billion (2000 constant) dollars. Contrary to them, we do restrict the sample to disasters lasting less than thirty days as the data on the start and end dates of each disaster is not available to us.

3. Blocks in Multiple Firms

We now describe the construction of our main variables and provide some preliminary description of the coownership in our data.

3.1. Major Blockholder and Measure of Coownership

Our empirical analysis relies on identifying the firm's major blockholder. Even if we do not explicitly rely on its actual controlling ability, we define as "major" that blockholder which, given the type of ownership structure, the market *may reasonable assume* to be the more influential blockholder. We therefore use two empirical proxies to identify the controlling blockholder.

The first proxy identifies the major (controlling) blockholder by estimating who holds the largest fraction of the firm's voting rights. Following the literature (e.g., La Porta et al. (1999)), we apply the weakest link principle (WLP). In particular, we calculate the minimum percentage of voting rights in the control path from a subject company up to the ultimate owner. The second proxy relies on the fact that the control power of any ultimate blockholder depends on the blockholding fraction of the other

blockholders in the firm. We capture this control power by using a version of the Shapley–Shubik index (SSI) for oceanic games as adjusted for pyramidal structures. This measure accounts for the ownership shares of other blockholders and yields the probability that a specific blockholder is in a winning coalition of a voting game. A detailed description of the derivation and the use of the SSI are given in Appendix 2. Because the results are the same irrespective of which measure is used, in the interest of brevity, we mostly report findings based on the second measure, which is a more comprehensive indicator of controlling power.

We proceed as follows. For each shareholder of the firm, we extract information about its immediate shareholders. Then, for each one of these immediate shareholders, we extract information about their own immediate shareholders, and so on. By doing this, we exclude shareholdings lower than 10% and aggregated ownership that is not attributed to any particular shareholder or group of shareholders (e.g., "employees", "other shareholders", "public"). Thus, if a firm has no shareholders with a stake greater than 10%, we consider it to be widely dispersed (e.g., La Porta et al. (1999)).

After building the blockholding structures, for each firm we identify the ultimate shareholders that have equity interest in the firm either directly or via other shareholders. We calculate our two measures of control power and then use the values so obtained to define the "ultimate" controlling shareholder – the *blockholder* – as the one with the highest value (as calculated via WLP or SSI and further referred as "Ownership %").

Next, we check for whether this ultimate controlling shareholder is also the ultimate controlling shareholder in another firm – that is, whether it is also the largest blockholder in any other US public corporation. In doing this we rely on manual name matching to ensure that all firms are correctly grouped in the commonly held structures. We refer to such shared blockholders as *coowners* and to the commonly held firms as *peers*.

3.2. Coownership in the Data

We now describe the degree of coownership observed in our sample. From Panel A of Table 2, we see that about 56% of the firms have a blockholder. Among these firms, about 30% share blockholders with other firms. The average SSI is 31% (42%) for coowned (non-coowned) blockheld firms.

Panel B reports the distribution of blockholder types. We assign these types after manually web-searching for information on coowners. We find that, in most cases, the coowner is a mutual fund family or a money manager. For instance, the investment managers Legg Mason Inc, Wellington Management Co LLP, AXA Group, Neuberger Berman Inc, and T Rowe Price Associates Inc each hold significant control stakes in 15–30 US public firms. The distribution of the blockholder types mimics what has been reported in other studies. For instance, Cronqvist and Fahlenbrach (2009) show that 61.2% of their sample firms have a mutual fund as a blockholder and another 24.4% have an insurance company or a money manager as the blockholder. Although our categories do not match perfectly, they agree on the fact that most of the blocks are held by investment advisors to high net worth individuals, foundations, endowments, mutual funds, etc.

Nearly 25% of the coowners are individuals. For instance, Cascade Investments LLC, a private investment and holding company controlled by Bill Gates, held at least 10% voting power in six firms for at least some portion of our sample period. Among them, were biofuel producer Pacific Ethanol Inc, amusement park corporation Six Flags Inc, waste manager Republic Services Inc, media company Univision Communications Inc, cancer drug manufacturer Seattle Genetics Inc, and energy holding company PNM Resources Inc. In other two firms – Avista Corp and Otter Tail Corp – Bill Gates indirectly held 7% voting power.

As shown in Panel C of Table 2, some coowners are blockholders in many firms. However, coownership usually involves just two firms that are paired by the joint coownership.

Panel D of Table 2 characterizes coownership in terms of potential direct links. First, we check for whether there are direct ownership links between the firms linked by coownership (i.e., for whether one is a subsidiary of the other). We find that only 0.1% of the firms have such links. This is important because it indicates that we are not dealing with a typical business group in which controlling ties link the different entities.

Second, we check for whether the peers have overlapping directors (i.e., for whether they are actively co-managed). We merge our sample with Boardex, a database that reports the data on the directors of the boards and their characteristics. We find that, among the 62% of coowned firm pairs that we are able to match with Boardex, fewer than two in a hundred (only 1.67%) share board

members. Although this is about four times the ratio for the entire sample, it is clearly still a small fraction. This near absence of overlapping directors further confirms that the links provided by coownership do not translate in more operative controlling positions.

We also check for whether the peer firms have any direct product–market links – i.e., for whether they have a customer–supplier relation. We follow Cohen and Frazzini (2008) and investigate whether firms have economic links. We find that, among our peer firms that could be matched, only 0.07% of them have direct supply chain links. This value, too, is higher than its counterpart (0.02%) for the whole sample, but it is still less than one in a hundred.

Finally, in the vast majority (80%) of cases, coowned firms are in *different* SIC 3-digit industries, so it is unlikely that our results are driven by the potential concerns that coowned firms are more likely to collude, as suggested in Azar (2011) and Azar et al. (2015).

The fact that there are very few direct links among our sample firms makes our experiment to test for the effects of a shared blockholder fairly clean. Indeed, unlike studies on conglomerates, we are certain that our sample firms are related only by their sharing of the same blockholder.

We do not take a stance on whether blockholders have effective ability to exercise the control.[1] Cronqvist and Fahlenbrach (2011) argue that blockholders such as mutual funds influence investment, financial, and executive compensation policies of firms they control. Yet, it has been recently argued that many mutual funds do not monitor and rather sub-delegate voting to services like ISS. Here, we rely on the findings of Iliev and Lowry (2012) who show that funds with higher stakes in the firm are more likely not to follow ISS recommendations and to actively vote themselves.

4. Sensitivity to Coowned Firms' Conditions

We start by testing whether the market links firms with the same major blockholders (peers). As posited by our hypothesis, the value of a firm should be sensitive to the value and cash flow shocks of the other coowned firms. We break the analysis into four parts. First, we show that their credit risks are correlated. Second, we establish that the conditions of the peers affect the financial constraints of

[1] Indeed, another argument which does not rely on blockholders exercising the control delivers the same predictions. If the blockholder is perceived to have good skills in picking the companies, its stake plays a role of certification: the fact that a reliable blockholder has invested in the firm suggests the firm is of good standing.

the firm by looking at the investment sensitivity of that firm to the cash flows of its peers. Third, we look at how negative credit shocks are transmitted across coowned firms. Finally, we show that the credit spreads of coowned firms are less sensitive to market wide shocks, presumably because they have more blockholder-specific information.

4.1. Credit Risk Links

We start by relating the credit risk of a firm to the credit risk of its peers. As our main proxy of credit risk, we use the estimated default frequency (EDF) based on the Merton structural model. We follow Bharath and Shumway's (2008) approach and estimate the EDF on a quarterly basis. As a robustness check, we also use alternative measures based either on the bond yield spread of the firm in the secondary market (using data from TRACE and Bloomberg, as described previously) or on the Standard & Poor's long-term debt rating (S&P rating). The main explanatory variable, *peer average*, is defined as the average value of the variable in question (e.g., EDF, yield spread, S&P rating) across all the other firms that share the same major blockholder with at least 10% of voting rights in each firm. We limit our sample to coowned firms, since no peer average can be defined for non-coowned firms (which, by definition, have no peers).

We report the results in Panel A of Table 3. Column (A) gives the results for regressions in which EDF is the dependent variable. We include time fixed effects and cluster the standard errors by firms (Petersen (2009)). We find that a firm's probability of distress is directly related to that of its peer firms. In particular, one standard deviation higher probability of distress of the peer firms is associated with 18% higher probability of distress of the firm. This result supports our information hypothesis as it suggests the existence of a sizable coownership effect.

Next, we offer several robustness checks of this finding. Column (B) limits our sample to one firm for each coowner and period. We pick the firm where the coowner has the smallest ownership stake. If multiple such firms exist, we pick among those the one with the smallest asset size. Although the sample is significantly reduced, our result remains significant. Column (C) shows the results when firm fixed effects are included, while column (D) reports the cross-sectional regressions with

"between" effects. In column (E), we use the major blockholders identified via WLP rather than SSI. The results are consistent across all the tests.

We also perform a "placebo test" by replicating the same analysis but replacing the peer firms with a set of randomly chosen firms. More specifically, for each actual peer firm, we choose a "placebo" peer firm that is similar to the actual peer firm in terms of being closest size in the same SIC 3-digit industry and as the actual peer firm. Column (F) shows that the placebo peers do not yield the same results as when the actual peers are analyzed.

In column (G), we focus on blockholders that are major in less than ten firms. The lower the number of firms coowned by the blockholder, the more precisely the peers' average credit conditions can be estimated and hence the more informative they are. We find that the main effect holds in this subsample as well. Column (H) reports the test in which standard errors are clustered by coowner.

Finally, we study how the coownership effect varies across different sets of firms. First, we split the sample on the basis of whether or not the firm has a credit rating. We expect the conditional correlation of EDF with peer firms to be higher when the firm is unrated. Second, we split the sample on the basis of analysts' uncertainty – i.e., the cross-sectional standard deviation in earnings forecasts across all analysts following the firm. We expect the effect to be larger when there is greater analyst disagreement about a firm's prospects. As reported in Panel B of Table 3, we find that the coownership effect is more significant when the information provided by the peers' EDF is more valuable – i.e., for unrated firms and firms about which analysts agree less.

Panel C of Table 3 gives the results for specifications based on alternative measures of credit risk: the firm's yield spreads in the secondary market and its S&P rating. The latter proxies for the "official" assessment of the firm's credit risk and ranges from 0 to 21, where 21 corresponds to AAA rating. The yield spread in the secondary market is estimated as the spread over the Treasury bond of similar maturity, as extracted from TRACE and Bloomberg data sets. The results under these alternative formulations of credit risk are consistent with those obtained when EDF is used, which strongly suggests that credit risk is linked among peer firms. One standard deviation higher S&P ratings of the peer firms corresponds to 0.2 notches higher S&P rating of the firm. One standard deviation higher yield spreads of the peer firms corresponds to 4.2% higher than the average yield spreads for the firm.

4.2. Transmission of Credit Risk Shocks

We now examine the transmission of credit risk by asking whether an increase in a firm's credit risk affects the yield spreads (in the secondary market) of its peers. It is important to note that, unlike the prior studies that rely on segment-level data (e.g., Lamont (1997), Shin and Stulz (1998)), here we can directly observe the actual negative credit shocks to peer firms and we do not need to rely on proxies based on industry-wide shocks (e.g., Bertrand et al. (2002)).

We start by looking at how sensitive a firm is to an increase in the average yield spreads of its peer firms. In particular, for each bond we perform a regression in which the dependent variable is the change in a firm's monthly yield spread and the independent variables are the shocks affecting the other firms that share the same blockholder.

The results are reported in Table 4. We employ a panel specification with fixed effects at the issuer level, and we consider different types of shocks. We take one bond per issuer, picking the one with the longest maturity. In Panels A and B, the shock is defined as the change in the average peer yield spread. In Panel A, column (A) reports the baseline regression with firm and time fixed effects; column (B) reports results for the pooled regression with time fixed effects and errors clustered at the firm level. Column (C) reports the results when blockholdings defined in terms of WLP (instead of SSI), and column (D) gives the results for placebo peer firms. Finally, in column (E), we focus on firms in which the blockholder is major in less than ten firms.

The results are consistent with our hypothesis. The yield spread of a firm is sensitive to the shocks experienced by the other coowned firms. An increase of one standard deviation in peers' average yield spread corresponds to a 2.6 bp change (16% of the average monthly change) in the firm's yield spread. These results are consistent and statistically robust across the different specifications. Even more importantly, we find no effect for the placebo firms.

Next, as in previous subsections, we investigate the effect of heterogeneity. In particular, we split the sample by whether or not the firm has an investment-grade rating[2] and, again, by the standard deviation in analyst forecasts of the firm's earnings. Table 4, Panel B, reports that the effect is

[2] We choose a different split here than before because *all* firms in the sample of publicly traded bonds are rated.

statistically significant only for the worse-rated firms and for the firms with higher standard deviation in analyst forecasts. Also, as expected, we find that the effect is stronger for negative than for positive credit risk events in the peer firms.

In the unreported results we also find that although the effect is present both for financial as well as individual blockholder-held firms the effect is both statistically and economically more significant for firms that are coowned by individual blockholders. In their case, an increase of one standard deviation in peers' average yield spread corresponds to a 10.3 bp change in the firm's yield spread. A larger effect is expected as individual blockholders are likely to hold fewer blocks, so the yield spreads in their firms are more likely to be sensitive to the information on their controlling ability.

Proceeding with the negative events, in Panel C of Table 4, we replicate the same analysis but concentrate on other credit events – for example, a credit downgrade or the violation of a covenant by (at least one of) the coowned firms. As shown in column (A), a rating downgrade by Moody's for at least one peer corresponds to a 5.3 bp increase in the firm's yield spread. Similarly, column (B) indicates that violated covenants correspond to a 6 bp increase in that yield spread. In contrast, no such effects are evident for placebo peer firms. Importantly, we do not find evidence of blockholders rebalancing a portfolio and endogenously changing a firm's block size in response to a peer firm's negative credit event. These unreported results are available on request.

Overall, the results provide strong evidence in favor of a coownership effect, suggesting that the value of a firm is sensitive to the value and cash flow shocks of its peer firms. This finding is consistent with our information hypotheses.

4.3. Coownership and Sensitivity to Macroeconomic Shocks

Finally, we test whether the effect of exogenous market shocks on yield spreads differs according to whether the firm is coowned. We focus on two types of exogenous shocks: a change in the federal funds rate and a change in the market spread. The latter is defined as the average spread between AAA-rated corporate bonds and the corresponding Treasury bond (the AAA–Treasury spread) and also as the average spread between corporate bonds with AAA and BAA ratings (the BAA–AAA spread). We study how exogenous changes to either the riskless rate (i.e., the federal funds rate) or to

either market spread (AAA–Treasury or BAA–AAA) affect the company's own yield spread as a function of coownership.

The literature has shown that, whereas interest rate shocks help explain changes in corporate bond yields, the relationship is more ambiguous in the case of yield spreads. On the one hand, Collin-Dufresne et al. (2001) and Chen et al. (2009) argue that a common component exists. On the other hand, a positive market shock to yields does reduce yield spreads. An increase in yields raises the "drift" in the bond return process, increases the distance between current firm conditions and default, and thus reduces the firm's expected default probability (Duffee (1998)). Therefore, an increase in the Fed rate should reduce the yield spread, while an increase in the market spreads should raise them.

By generating more blockholder-specific information, coownership should reduce the impact of such common shocks. We therefore expect yield spreads to be positively correlated with the interaction between coownership and federal funds rate shocks and to be negatively correlated with the interaction between coownership and either measure of market spread.

We bring these tests to the data by regressing the monthly change in yield spread for each bond issue on coownership, shocks, the interaction between shocks and coownership, and a set of control variables. We employ a panel specification with fixed effects at the firm level. The results for all the firms in the sample are reported in Table 5. In column (A), the external shock is a change in federal funds rate; in columns (B) and (C), the shock is a change in the AAA–Treasury spread and the BBB–AAA spread, respectively. Our focus is on the interaction of shocks with coownership.

Across all the different specifications, the results consistently show that coownership mitigates the impact of macro shocks. The effect is also strongly economically significant. Being coowned reduces the sensitivity of yield spreads to the change in federal funds rate by 20% of the shock's unconditional effect. Also, coownership reduces the impact of the AAA–Treasury and BAA–AAA credit spread shocks on the firm's own bond spreads by (respectively) 2% and 15%.

5. Information or Selection of Similar Stocks?

The findings presented so far provide strong evidence that the financial performance of peers matters for the borrowing conditions and financial constraints of the firm. This evidence lends support to our

information hypothesis. However, it could also be the case that blockholders select similar firms. To address this issue, we take a two-pronged approach. First, we consider the relation between comovement and changes in blockownership. Then, we look at instrumental variables estimation.

5.1. Changes in Blockholder

First, we consider whether comovement among firms is related to the dynamics of coownership. We explore how changes in coownership affect the close relationship between a firm and its peers. In particular, we expect this relationship to become weaker when the coowner stops being the major one – i.e., when it is no longer the firm's largest blockholder. Conversely, the relationship between a firm and its new peers should become stronger when the coowner becomes the major one – i.e., when the size of its stake renders it to become the firm's largest blockholder. We therefore look at firms in which the major blockholder changed during our sample period. We are interested in whether such a change leads to a change in the correlation between the firm's monthly bond yield spreads and the average monthly bond yield spreads of its peers in the secondary market of bonds.

We proceed as follows. First, we estimate such correlations for the year prior to the coowner's exit from the firm and also for the year after that exit; thus, we skip the actual year of exit. In Table 6, column (A), we document that the monthly correlations between a firm and its old peers decrease significantly after the firm's largest blockholder changes.[3] In particular, the correlation drops from 39.5% to 20.5% (i.e. drops to the same level as for the *placebo* peers).

Next, we consider the opposite event of a new coowner becoming the major blockholder of the firm. As before, we estimate the yield spread correlations for both the year prior to and after the change of coownership (again skipping the year of the acquisition and also requiring that coowner in question remain in place for at least two years). As shown in column (B) of the Table 6, the monthly correlations between the firm and its new peers rise after the acquisition from 19.7% (a level that nearly matches that of the placebo peers) to 42.3%.

[3] An analysis which firms were exited by the coowner would be interesting but is outside the scope of our research question. Our preliminary results show that the coowner has less voting power than in exiting firms than in peer firms and also these firms are more profitable than peers. We find no other significant differences.

Overall, these results support our previous findings and indicate that the market perceives that commonality among coowned firms is related to ownership.

5.2. Information or Selection?

We further investigate whether our results can be interpreted in a causal sense: that coownership leads to the correlation patterns of yield spreads. To provide further support for such interpretation, we rely on instrumental variables estimation.

Similarly to Barrot and Sauvagnat (2014), we look at firms with headquarters in the counties that experience natural disaster shocks. We gather historical headquarter data of firms (and thus corresponding counties) from the header data of 10-K filings.[4]

We focus on disasters with total estimated damage value of over $1 billion. Such disasters presumably should have had a considerable effect on the firm operations and thus should have also raised their borrowing costs. We look at the time periods where the firm's coowned peer firms are affected by the natural disaster but the firm itself is not affected by any disaster in the same month as well as the preceding month. Since the peer firms are located outside of the affected areas, we believe that the exclusion restriction holds. Any wider economic effect is captured by the time fixed effects.

We then look at whether such peer yield spread shocks that were induced by the natural disasters happening within the last 30 days transmitted into the unaffected coowned firms. Effectively, we replicate our analysis, reported in Table 4, Panel A, Column (A) instrumenting the peer yield shock with at least one occurrence of a natural disaster among the peer firms. As before, we limit the focus to coowned firms. We also restrict the analysis to the cases in which the firm has fewer than ten peer firms. We add this further restriction to concentrate on the cases the effect of peer yield shock is stronger and more informative as we found in Section 4.2. All the regressions include firm fixed effects and month fixed effects. As the identification is at the county level, we cluster standard errors at the county level.

[4] We collect the information on firms' business address from Bill McDonald's website. Hayong Yun and Bill McDonald have parsed all of the fields appearing in headers for 10-K forms available on the SEC's EDGAR website. The data includes all filings from 1994 to 2010.

We report our results in Table 7. Panel A reports the first stage regressions and focuses on the ability of the instrument to explain the instrumented variable, while Panel B reports the second stage regressions. In Column (A), we report our baseline estimation. The first stage estimations show that a major natural disaster corresponds to 16.4 bp change in the firm's yield spread. The instrument is strong with an F test statistic of 12.47. The second stage estimation shows that an exogenous shock to peer yield spreads transmit to the other coowned firms.

The result is robust. Column (B) makes a stronger restriction that the focal firm should not have experienced a natural disaster at any time in our sample to alleviate any concerns that market updates its beliefs about firm exposure in disaster prone areas to the economic losses due to any future natural disasters. Column (C) does not restrict the focal firm not experiencing a natural disaster but controls for that explicitly in the regression. Column (D) instead performs instrumental variables estimation without firm fixed effects. Similarly to the previous estimations, in Columns (E) and (F) we split the sample into the cases where firm has high and low standard deviations of analyst earnings forecasts. We find a larger effect among the firms with higher information asymmetry – i.e., among the firms with high standard deviation of earning forecasts.

These results show that even exogenous shocks to peer yield spreads get transmitted among the coowned firms, making us confident that the relationship between coowned firms is not due to just endogenous selection of similar firms by blockholders.

Conclusion

We study the financial implications for a firm when it shares a major blockholder with other firms. We argue that the presence of coownership produces informal information links among otherwise formally independent firms. We argue that if a blockholder is the major blockholder in more than one firm, the financial conditions of each one of them provides a signal about controlling ability of the blockholder and therefore, indirectly, a signal on the value of the other firms in which it is a major blockholder.

We test this hypothesis by focusing on the public US corporations over the 2001-2008 period. We first show that coownership creates indirect financial links between firms sharing the same major

blockholder. Peers' probability of distress, credit rating and yield spread are associated with the firm's probability of distress, credit rating and yield spread. Furthermore, a firm's yield spread is sensitive to credit shocks (yield spread shocks, credit downgrades, covenant violations) of the other coowned firms. Overall, these results provide strong evidence in favor of a coownership effect. They suggest that a firm's value is sensitive to the value and cash flow shocks of its peer firms.

Next, we address the issue of endogenous selection of similar coowned firms by the same blockholder. First, we investigate what happens when coownership changes. Importantly, the relationship between firms becomes weaker once the coowner is no longer the firm's largest blockholder. Also, the relationship between a firm and its new peers becomes stronger once the coowner's stake makes it the largest blockholder of the firm's shares. We augment our analysis with the instrumental variables estimation where we instrument peer firm yield changes with the major natural disasters that occurred in the counties where peer firm headquarters were located. These results show that even exogenous shocks to peer yield spreads get transmitted among the coowned firms.

We believe that our findings have important normative implications for the transparency of financial markets. Indeed, given that coownership signals other market participants about the credit standing of coowned firms and also that this effect is most important for relatively opaque firms, coownership contributes to the informational efficiency and transparency of financial markets.

Appendix 1. Variables

Variable	Description	Source
Asset size	= ln(at)	Compustat
Tangibility	= 1-intan/at	Compustat
ROA	= ebit/at, where at is lagged by a year.	Compustat
Leverage	= (dlc+dltt)/(at-dlc-dltt)	Compustat
Market-to-book ratio	= mkvalt/(at-dlc-dltt)	Compustat
Q	= (mkvalt+ dlc+dltt)/at	Compustat
Investment	= capx/ppent, where ppent is lagged by a year	Compustat
Cash flow	= (dp+ib)/ppent, where ppent is lagged by a year	Compustat
Naïve EDF	Estimated as in Bharath and Shumway (2008)	Compustat, CRSP
Analyst forecast deviation	Cross-sectional standard deviation in earnings forecasts across all analysts following the firm	I/B/E/S
S&P rating	S&P rating of the bond, either used as a dummy for every rating category or as a scale variable ranging from 0 to 21 (21 = AAA rating)	Mergent, SDC
Share of inst. Ownership	The sum of the number of shares held by all institutional investors, as reported in Thomson-Reuters 13F database, divided by the total number of shares outstanding	Thomson-Reuters 13F
Various variables with prefix "Peer"	Estimated as above and then averaged across all other firms that have the same largest blockholder as the firm	Compustat, CRSP
Issue size	Size of the face value of the bond/loan at the time of issue, normalized by the asset size of the issuing firm	SDC, LPC
Maturity	Maturity in days until the expiration of bond/loan	SDC, LPC
Covenants	Dummy variable set to 1 if the bond/loan has any covenants	SDC, LPC
Enhancement	Dummy variable set to 1 if the bond/loan has any enhancements (e.g., guarantees)	SDC, LPC
Bank loan dummy	Dummy variable set to 1 if the debt security is a loan	LPC
Offering yield spread	For *bonds*, the number of basis points over a Treasury bond of comparable maturity (for fixed-rate issues) or the number of basis points between the coupon rate and the rate of the index off which the coupon is reset (for floating-rate issues). For *loans*, the all-in spread drawn: the number of basis points over LIBOR for each dollar drawn down, estimated as the sum of the spread of the loan and any annual (or facility) fee. For both bonds and loans, the offering yield spread is winsorized at the 0.1% level.	SDC, LPC
Change in yield spread	Change in yield spread over a Treasury bond of similar maturity	Bloomberg, TRACE
Covenant violation	Dummy variable set to 1 if at least one coowned firm violates at least one covenant on its debt	Nini, Smith, Sufi (2009)
% Ownership	Largest Shapley–Shubik index for any of the firm's owners, as estimated by the procedure explained in Appendix 2	Orbis
Coowned	Dummy variable set to 1 if the largest percentage owner in the firm is also the largest percentage owner in some other firm in the sample	Orbis
Widely held	Dummy variable set to 1 if there is no owner in the firm that controls more than 5% of the firm (by either WLP or SSI, depending on the specification)	Orbis
Natural disaster	Major natural disaster with total estimated damage value of over $1 billion (in 2000 constant dollars) happening in the county of firm's headquarters	SHELDUS
Change in Fed funds rate	Change in the federal funds rate	St. Louis Fed
Change in AAA-Treasury spread	Change in the spread between the average interest rate on corporate bonds with Moody's long-term AAA rating and Treasury bonds of the same maturity	St. Louis Fed
Change in BAA-AAA spread	Change in the spread between the average interest rate on corporate bonds with Moody's long-term BAA rating and corporate bonds with Moody's long-term AAA rating of the same maturity	St. Louis Fed

Appendix 2. Shapley-Shubik Index for Oceanic Game with Pyramidal Structures

Assuming that the control in the firm *f* is ensured by the holding of 50% of votes, Shapley-Shubik index for shareholder *i* in the firm *f* is given by:

$$\gamma_i = \sum_{S \subseteq T_i} \frac{t!\,(n-t-1)!}{n!}$$

where
T_i is a collection of all coalitions *S* for which $0.5\text{-}w_i \leq w_S \leq 0.5$;
w_i is the ownership share in firm *f* by shareholder *i*;
w_S is the combined *S* ownership share in firm *f* by coalition *S*;
n is the number of all shareholders in the firm *f*;
s is the number of shareholders in *S* set.

If $x = t + 1$ and $y = n - t$, substituting the values for *t* and *n* gives: $\gamma_i = \sum_{S \subseteq T_i} \frac{(x-1)!(y-1)!}{(x+y-1)!} = \sum_{S \subseteq T_i} B(x, y)$

This follows from expressing beta functions in terms of gamma functions: i.e. $B(x, y) = \frac{\Gamma(x)\Gamma(y)}{\Gamma(x+y)} = \frac{(x-1)!(y-1)!}{(x+y-1)!}$. Applying the definition of beta function, $B(x, y) = \int_0^1 u^{x-1}\,(1-u)^{y-1} du$, we obtain $\gamma_i = \sum_{S \subseteq T_i} \int_0^1 u^{x-1}\,(1-u)^{y-1} du = \sum_{S \subseteq T_i} \int_0^1 u^{s}\,(1-u)^{n-s-1} du$

A publicly traded firm often also has small atomic shareholders, known as "oceanic" shareholders, each of whom holds a negligible share and who together are unable to group and influence the formation of coalitions. Oceanic shareholders are assumed to provide random support for the coalitions. Thus the formation of coalitions is based on a smaller share of possible votes, but winning coalitions also expect to be supported by some of the oceanic players. Assume that the combined share held by oceanic shareholders is equal to w_O and define *M* to be the set of "major" (non-oceanic) shareholders with the size *m*. Leech (2002) shows that as the number of oceanic shareholders approaches infinity in the limit γ_i becomes:

$$\gamma_i = \sum_{S \subseteq M} \int_b^a u^{s}\,(1-u)^{n-s-1} du$$

where

$$a = \max\left(\min\left(\frac{0.5 - w_S}{w_O}, 1\right), 0\right)$$
$$b = \max\left(\min\left(\frac{0.5 - (w_S + w_i)}{w_O}, 1\right), 0\right)$$

However, in firms organized under a pyramidal structure, in which the same shareholders simultaneously own shares at different levels of ownership structure, one must account for such shareholders voting consistently at each level of the ownership structure, that is their support for the coalition that finally controls firm *f* should not be considered independent at different levels of ownership.

In cases of pyramidal ownership, the set of direct and indirect shareholders in the firm *f* present at any of the ownership levels *W* can be deconstructed into three disjoint sets, as follows:

- *O* is the set of "oceanic" shareholders.
- $M = \{1,2,..,m,..,\bar{m}\}$ is the set of "major" shareholders, present at any of the ownership levels, that themselves do not have any identifiable shareholders belonging to sets *M* or *K* (e.g. individuals).

- $K = \{1,2,..,k,..,\bar{k}\}$ is the set of "indirect" shareholders, present at any of the ownership levels, that themselves are directly owned by some shareholders M^k, by some other indirect shareholders K^k and/or by some oceanic shareholders O^k.

The set of shareholders of *k*, present at any of the ownership levels of *k*, are M^{k*}, K^{k*}, O^{k*} with $M^k \subseteq M^{k*} \subseteq M$, $K^k \subseteq K^{k*} \subseteq K$ and $O^k \subseteq O^{k*} \subseteq O$. Therefore, $W^k = M^k \cap K^k \cap O^k$ and $W^{k*} = M^{k*} \cap K^{k*} \cap O^{k*}$. Since firm *f* is a member of *K*, it follows that $K = K^{f*}$, $M = M^{f*}$, and $O = O^{f*}$.

Take now the limiting case in which all oceanic shareholders are dispersed. As the number of each shareholders approaches infinity, the SSI for shareholder *i* in firm *k* converges to:

$$\gamma_i^k = \begin{cases} \gamma_i^{j^*} & if\ \exists j^* \in K^k \text{ s.t. } w_{j^*}^k > 0.5, \\ \sum_{S^{k*} \subseteq M_i^{k*}} \int_{b^k}^{a^k} u^{\bar{s}^k} (1-u)^{\bar{m}^k - \bar{s}^k - 1} du & \text{otherwise.} \end{cases} \quad (1)$$

Here
$M_i = M - \{i\}$ and $M_i^{k*} = M_i \ \cap M^{k*}$
S denotes all subsets of M_i and $S_i^{k*} = S \cap M_i^{k*}$
$\bar{m}^k$ and $\bar{s}^k$ are the sizes of M_i^{k*} and S_i^{k*}, respectively

$$a^k = \max\left(\min\left(\frac{0.5 - w_S^k - \sum_{j \in K^k} w_j^k \gamma_S^j}{w_O^k}, 1\right), 0\right)$$

$$b^k = \max\left(\min\left(\frac{0.5 - \left(w_S^k + w_i^k\right) - \sum_{j \in K^k} w_j^k (\gamma_S^j + \gamma_i^j)}{w_O^k}, 1\right), 0\right)$$

w_O^k is the sum of direct ownership shares in firm *k* by all oceanic players in O^k;
w_S^k is the sum of direct ownership shares in firm *k* by all shareholders in subset *S*;
w_i^k is the sum of direct ownership share in firm *k* by shareholder *i*;
w_j^k is the sum of direct ownership share in firm *k* by firm *j*;
γ_i^j is the Shapley–Shubik index, as estimated by (1), for shareholder *i* in firm *j*; and
γ_S^j is the sum of Shapley–Shubik indices, as estimated by (1), for all shareholders in *S*.

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Table 1. Summary statistics

This table presents summary statistics for the main variables used in the analysis. For these statistics we require nonmissing information on firm size and equity ownership (i.e., a match between Compustat and Orbis). The summary statistics are reported at the firm or security level and are averaged over time when this is appropriate.

Panel A. Firm Variables

Variable	Source	Mean	Median	S.D.	*N*
Asset size ($m)	Compustat	4111.282	297.346	35349.6	5,645
Tangibility	Compustat	0.874	0.950	0.165	5,645
ROA	Compustat	−0.084	0.036	0.808	5,633
Leverage	Compustat	0.333	0.231	0.321	5,645
Market-to-book ratio	Compustat	3.190	1.270	53.118	5,609
Investment	Compustat	0.771	0.274	9.297	5,253
Cash flow	Compustat	−3.041	0.275	74.434	5,235
S&P rating	Compustat	BB	BB	3.434	1,555
Naïve EDF	CRSP/Compustat	0.048	0	0.143	5,425
Number of analysts following the firm	I/B/E/S	4.859	2.852	5.809	5,644
Analyst forecast deviation	I/B/E/S	0.089	0.033	0.252	5,253
Share of inst. ownership	Thomson-Reuters 13F	0.442	0.450	0.289	5,395

Panel B. Debt Variables

Variable	Source	Mean	Median	S.D.	*N*
Bonds in primary market					
Issue size ($m)	SDC	320.78	225	373.07	5,213
Maturity (years)	SDC	10.64	10.0	8.69	5,213
Offering yield spread (bp)	SDC	212.13	158	132.3	5,213
Loans in primary market					
Issue size ($m)	LPC	410.181	150.856	880.534	11,775
Maturity (years)	LPC	3.68	4.0	2.76	11,775
Offering yield spread (bp)	LPC	190.86	150	159.33	11,775
Bonds in secondary market (multiple observations per bond)					
Issue size ($m)	Bloomberg/TRACE	307.3	200	360.6	84,788
Maturity (years)	Bloomberg/TRACE	15.17	9.30	14.98	84,788
Yield spread (bp)	Bloomberg/TRACE	402	247	617	84,788
Monthly yield spread change (bp)	Bloomberg/TRACE	16.5	1.9	213	80,191
Peer yield spread (bp)	Bloomberg/TRACE	359	296	323	50,227
Monthly peer yield spread change (bp)	Bloomberg/TRACE	14	4.8	108	47,831

Table 2. Multiple Blocks

This table explores the characteristics of coowned firms and their owners. The summary statistics are reported at the firm or owner level and are averaged over time when this is appropriate.

Panel A. Control

	2001	2002	2003	2004	2005	2006	2007	2008
Widely owned	2,677	2,506	2,387	2,306	2,307	2,319	2,218	2,190
Blockheld	3,468	3,290	3,143	2,962	2,927	2,825	2,779	2,649
Blockheld, %	56.4%	56.8%	56.8%	56.2%	55.9%	54.9%	55.6%	54.7%
Non-coowned	2,379	2,155	2,119	1,960	1,893	1,876	1,745	1,747
Coowned	1,089	1,135	1,024	1,002	1,034	949	1,034	902
Coowned, %	31.4%	34.5%	32.6%	33.8%	35.3%	33.6%	37.2%	34.1%

(pooled across all years, among blockheld firms)

Ownership	Mean	Median	S.D.	*N*
As estimated by weakest link principle				
Coowned firms	0.244	0.161	0.187	8,169
Non-coowned firms	0.305	0.223	0.207	15,874
As estimated by Shapley–Shubik index				
Coowned firms	0.310	0.165	0.299	8,169
Non-coowned firms	0.422	0.248	0.344	15,874

Panel B. Types of Coowners

(in 2008, only coowned firms)

Type	Number of owners	%	Number of firms	%
Mutual funds and money managers	81	39.13	580	64.59
Private equity	39	18.84	105	11.69
Hedge fund	18	8.70	46	5.12
Bank	7	3.38	16	1.78
Insurance firm	4	1.93	15	1.67
University endowment, research institute	1	0.48	8	0.89
Sovereign wealth fund, governmental agency	1	0.48	2	0.22
Other financial institution	3	1.45	8	0.89
Individuals	53	25.61	128	13.14

Panel C. Blocks per Coowner

(in 2008, only coowned firms)

Blocks per coowner	Number of cases	%
2	106	54.4
3	35	17.9
4	10	5.1
5	13	6.7
6–10	21	10.8
More than 10	10	5.1

Panel D. Direct Links between Firms (%)

	Coowned		Full sample	
Link	All pairs	At least one	All pairs	At least one
Direct ownership stakes	0.10	n.a.	0.003	n.a.
Overlap of directors	1.67	24.36	0.38	92.63
Product market relationship	0.07	1.51	0.02	19.26

Table 3. Credit Conditions in Peer Firms

Panel A. Estimated Default Frequency

We report the estimates of firm-level regressions in which the dependent variable is naïve estimated default frequency (EDF), as defined as in Bharath and Shumway (2008) and estimated on a quarterly basis. Data from 2001 to 2008 is used for the estimation. Only firms that share blockholders are considered in this analysis.

Main explanatory variable: Peer EDF, which is the average EDF for the firms controlled by the same blockholder.

Columns (A) gives results for the pooled OLS regression clustered by firm. Column (B) is the same regression as reported in column (A) but limited to one observation per coowner per quarter, that of the firm with the smallest % Ownership stake. Column (C) provides results for panel regressions with firm-level fixed effects. Column (D) estimates a "between" effect regression. In all these regressions, % Ownership is the largest Shapley–Shubik index (SSI) for any of the firm's owners (as estimated by the procedure explained in Appendix 2). Column (E) is the same regression as reported in column (A) but with % Ownership estimated using the weakest link principle rather than SSI. Column (F) uses the EDF of firms that are similar to peer firms (i.e., placebo firms). Column (G) is the same regression as reported in column (A) but with the sample limited to blockholders controlling fewer than ten firms. Column (H) gives results for the pooled OLS regression clustered by the blockholder. Quarter fixed effects are included in all specifications (but are not reported).

	(A) Baseline	(B) One obs. per coowner	(C) Fixed effects	(D) Between effects	(E) WLP for % Own.	(F) Placebo EDF	(G) Few Peers	(H) Clustered by owner
Peer EDF	0.061***	0.061*	0.033***	0.067*	0.056**	-0.009	0.065***	0.061**
	2.811	1.752	3.729	1.851	2.428	-0.689	2.92	2.086
% Ownership	0.018**	0.037	-0.068**	0.014	0.029**	0.014**	0.023**	0.018**
	2.388	1.483	-2.362	1.397	1.97	2.138	2.521	2.554
Tangibility	-0.008	0.009	0.014	-0.030*	0.001	-0.006	-0.011	-0.008
	-0.68	0.372	1.298	-1.652	0.073	-0.551	-0.719	-0.743
ROA	-0.051***	-0.015	-0.069***	-0.086***	-0.053***	-0.040***	-0.043***	-0.051***
	-6.055	-1.422	-8.972	-5.864	-5.582	-5.622	-4.342	-5.788
Leverage	0.053***	0.043***	0.028***	0.076***	0.060***	0.044***	0.048***	0.053***
	8.837	4.664	15.316	18.832	9.019	8.839	7.183	9.837
Market-to-book	-0.002***	-0.001	-0.001***	-0.006***	-0.002***	-0.002***	-0.002***	-0.002***
	-3.156	-1.645	-7.858	-6.909	-2.603	-3.253	-2.728	-3.119
Asset size	0.002	0.001	0.016***	0.001	0.001	0.003**	0.002	0.002
	1.477	0.422	6.141	0.275	0.958	2.31	1.179	1.526
Constant	0.041**	0.04	-0.029	0.312	0.030*	-0.016	0.043*	0.041**
	2.419	1.252	-1.214	0.614	1.674	-1.154	1.89	2.534
Quarter fixed effects	+	+	+	+	+	+	+	+
R^2	0.098	0.082	0.375	0.203	0.11	0.082	0.092	0.098
N	28825	6196	28825	28825	24237	31043	17656	28825

* p<0.10, ** p<0.05, *** p<0.01

Panel B. Estimated Default Frequency: Subsample Analysis

We report the estimates of firm-level regressions in which the dependent variable is naïve estimated default frequency (EDF), as defined in Bharath and Shumway (2008) and estimated on a quarterly basis. Only firms that share blockholders are considered in this analysis.

Main explanatory variable: Peer EDF, which is the average EDF for the firms controlled by the same blockholder. All regressions are constructed as in column (A) of Panel A.

Columns (A) and (B) give results for the subsamples of rated and unrated firms, respectively. Column (C) (column (D)) gives results for the subsamples of firms for which the standard deviation in analyst earnings forecasts is greater (less) than 5%. Quarter fixed effects are included in all specifications (but are not reported).

	(A) Rated firms	**(B) Unrated firms**	**(C) High analyst disagreement**	**(D) Low analyst disagreement**
Peer EDF	0.059	0.057**	0.126***	0.043*
	1.433	2.358	2.755	1.661
% Ownership	0.02	0.016*	0.028	0.004
	1.518	1.936	1.599	0.532
Tangibility	-0.011	-0.007	-0.033	0.013
	-0.548	-0.512	-1.272	1.182
ROA	-0.272***	-0.033***	-0.069***	-0.049***
	-4.265	-3.923	-4.521	-2.814
Leverage	0.043***	0.060***	0.080***	0.032***
	5.581	7.18	8.343	4.597
Market-to-book	-0.002*	-0.003***	-0.008***	-0.001
	-1.762	-4.495	-5.655	-1.634
Asset size	-0.001	0.001	0.001	0.004**
	-0.289	0.572	0.398	2.501
Constant	0.129***	0.042**	0.018	-0.001
	3.406	2.067	0.51	-0.071
Quarter fixed effects	+	+	+	+
R^2	0.087	0.129	0.154	0.07
N	11588	17237	8531	13299

* p<0.10, ** p<0.05, *** p<0.01

Panel C. Other Credit Risk Measures

We report the estimates of firm-level regressions in which the dependent variable in column (A) is yield spread on the firm's longest-maturity bond in the secondary market, as documented in TRACE and Bloomberg. The dependent variable in column (B) is S&P Rating (ranging from 0 to 21, where 21 corresponds to AAA rating), as documented in Compustat. Only firms that share blockholders are considered in this analysis.

Main explanatory variable: Peer yield spread in column (A) and Peer rating in column (B); these are the average values for the firms controlled by the same blockholder.

All regressions are constructed as in column (A) of Panel A. The subcolumns (i) give results for a pooled OLS regression clustered by firm; subcolumns (ii) give results for a panel regression with firm fixed effects; subcolumn (iii) is the same regression as reported in subcolumn (i) but limited to one observation per coowner per quarter, that of the firm with the smallest % Ownership stake.

	(A) Yield Spread			**(B) Rating**		
	(i) Pooled OLS	**(ii) Fixed effects**	**(iii) One obs. per coowner**	**(i) Pooled OLS**	**(ii) Fixed effects**	**(iii) One obs. per coowner**
Peer yield spread	0.052***	0.046***	0.032*			
	2.672	5.959	1.792			
Peer rating				0.069***	0.015***	0.062**
				3.53	3.723	2.376
% Ownership	0.62	1.261**	-23.616	-0.143	0.739**	-1.008
	1.361	2.21	-1.318	-0.436	2.001	-1.401
Tangibility	0.442***	0.332***	-0.084	0.188	0.299*	-0.276
	3.697	6.697	-0.702	0.485	1.658	-0.381
ROA	-6.335***	-5.795***	2.41	14.015***	6.088***	15.450***
	-5.332	-12.118	1.495	8.961	26.793	8.497
Leverage	0	-0.012*	0.114***	-0.581***	-0.252***	-0.381***
	0.257	-1.8	5.986	-5.766	-13.819	-2.993
Market-to-book	0.507	1.348***	1.855	0.024*	0.007***	0.007
	1	3.524	1.425	1.664	5.336	1.041
Asset size	-0.178**	0.422***	1.316***	1.195***	0.872***	1.239***
	-2.539	4.59	4.026	16.748	19.857	11.478
Bond size	-0.085	-0.088***	-0.297**			
	-0.72	-2.663	-2.423			
Maturity	-0.099	-0.101***	-0.483***			
	-0.795	-2.666	-3.852			
Enhancement	0.753***	0.131	0.157			
	3.657	1.347	0.518			
Constant	6.696***	0.751	4.017	-0.632	2.536***	0.543
	3.993	0.711	0.849	-0.888	5.318	0.475
Month fixed effects	+	+	+			
Quarter fixed effects				+	+	+
Firm fixed effects		+	+		+	
R^2	0.085	0.443	0.456	0.491	0.904	0.492
N	50227	50227	5408	10119	10119	1795

* p<0.10, ** p<0.05, *** p<0.01

Table 4. Credit Conditions in Peers

Panel A. Shocks to Secondary Market Yields

We report results from estimating bond-level regressions of monthly yield spread changes with fixed effects at the issuer level. Data from 2001 to 2008 is used. The analysis includes all bonds whose yields are reported in TRACE (the default source) or in Bloomberg (used when data for a particular bond is unavailable from TRACE). For each firm, the bond with the largest maturity is picked.

Main explanatory variable: Peer yield spread change (i.e., the change in average yield spread by other firms owned by the same owner).

Column (A) gives the baseline specification, and column (B) excludes firm fixed effects. In all these regressions, % Ownership is the largest Shapley–Shubik index (SSI) for any of the firm's owners (as estimated by the procedure explained in Appendix 2). Column (C) is the same regression as reported in column (A) but with % Ownership estimated using the weakest link principle rather than SSI. Column (D) uses the EDF of firms that are similar to peer firms (i.e., placebo firms). Column (E) is the same regression as reported in column (A) but with the sample limited to blockholders controlling fewer than ten firms. Month and rating fixed effects are included in all specifications (but are not reported).

	(A) Baseline spec.	**(B) No fixed effects**	**(C) WLP for % Own.**	**(D) Placebo shock**	**(E) Few peers**
Peer yield spread change	0.024***	0.028**	0.024***	0.006	0.022**
	2.657	1.972	2.667	0.578	2.32
% Ownership	0.419	0.04	0.338	0.278	0.338
	1.616	1.016	0.789	0.844	1.18
Leverage	-0.013	0.001	-0.013	0	-0.021
	-0.55	0.075	-0.562	0.01	-0.753
ROA	-0.550**	-0.524***	-0.548**	-0.701**	-0.715***
	-2.46	-2.917	-2.45	-2.568	-2.885
Market-to-book	0.005	0.000***	0.005	0.002	0.007
	1.581	4.485	1.587	0.482	1.509
Tangibility	-0.004	0.046	0.006	0.117	-0.227
	-0.022	0.817	0.033	0.487	-1.07
Asset size	-0.023	-0.024***	-0.023	-0.044	-0.04
	-0.54	-2.94	-0.539	-0.785	-0.807
Share of inst. ownership	-0.018	-0.074**	-0.019	0.008	-0.027
	-0.432	-2.248	-0.45	0.144	-0.553
Issue size	-0.008	0.030**	-0.009	-0.017	0.005
	-0.558	2.128	-0.624	-0.974	0.264
Maturity	0.058***	-0.006	0.058***	0.060**	0.051***
	3.251	-0.34	3.263	2.525	2.597
Enhancement	0.091**	-0.01	0.095**	0.065	0.137***
	2.048	-0.397	2.143	1.133	2.762
Constant	-0.034	-0.11	-0.012	0.058	0.169
	-0.069	-0.514	-0.025	0.091	0.297
Month fixed effects	+	+	+	+	+
Firm fixed effects	+		+	+	+
R^2	0.073	0.051	0.073	0.063	0.077
N	48873	48873	48873	29647	38520

* p<0.10, ** p<0.05, *** p<0.01

Panel B. Shocks to Secondary Market Yields: Subsample Analysis

We report results from estimating bond-level regressions of monthly yield spread changes with fixed effects at the issuer level. The analysis includes all bonds whose yields are reported in TRACE or Bloomberg; for each firm, the bond with the largest maturity is picked.

Main explanatory variable: Peer yield spread change (i.e., the change in average yield spread by other firms owned by the same owner).

All regressions are constructed as in column (A) of Panel A. Column (A) reports separately on both the positive and negative components of Peer yield spread change. Columns (B) and (C) give results for the subsamples of rated and unrated firms, respectively. Column (D) (column (E)) gives results for the subsamples of firms for which the standard deviation in analyst earnings forecasts is greater (less) than 5%.

	(A) Pos. and neg. peer yield spread changes	(B) Investment grade	(C) Non-invest. grade	(D) High analyst disagreement	(E) Low analyst disagreement
Peer yield spread change		-0.007	0.023**	0.047***	-0.014
		-0.444	2.112	3.583	-1.041
Positive peer yield spread change	0.040***				
	3.304				
Negative peer yield spread change	-0.006				
	-0.35				
% Ownership	0.419	0.086	0.667	0.488	-0.065
	1.613	0.288	1.414	1.591	-0.105
Leverage	-0.014	-0.006	0.013	-0.016	-0.103**
	-0.592	-0.072	0.473	-0.449	-2.332
ROA	-0.555**	-0.299	0.316	-0.866***	0.159
	-2.48	-0.616	1.072	-2.983	0.337
Market-to-book	0.005	-0.001	-0.001	0.012**	0.007
	1.606	-0.148	-0.223	2.023	1.541
Tangibility	-0.002	-0.259	-0.317	-0.146	-0.09
	-0.009	-0.887	-1.339	-0.434	-0.361
Asset size	-0.024	-0.033	0.015	-0.082	-0.079
	-0.564	-0.408	0.28	-1.212	-1.078
% Inst. Investors	-0.019	-0.195**	-0.089*	-0.054	0.048
	-0.451	-2.241	-1.676	-0.867	0.698
Issue size	-0.008	0.025	-0.061*	-0.01	-0.011
	-0.556	1.644	-1.797	-0.37	-0.553
Maturity	0.057***	0.134***	0.016	0.068**	0.078***
	3.241	5.964	0.649	2.305	3.206
Enhancement	0.091**	0.318***	0.063	0.154**	0.008
	2.052	4.142	1.163	2.142	0.118
Constant	-0.038	-0.38	1.192*	0.573	0.48
	-0.077	-0.386	1.814	0.689	0.613
Month fixed effects	+	+	+	+	+
Firm fixed effects	+	+	+	+	+
R^2	0.073	0.066	0.113	0.091	0.066
N	48873	15934	26433	22460	24777

* p<0.10, ** p<0.05, *** p<0.01

Panel C. Other Credit Events

We report results from estimating bond-level regressions of monthly yield spread changes with fixed effects at the issuer level. The analysis includes all bonds whose yields are reported in TRACE or Bloomberg; for each firm, the bond with the largest maturity is picked.

Main explanatory variable: Peer downgrade in column (A) and Peer covenant violation in column (B).

All regressions are constructed as in column (A) of Panel A. The subcolumns (i) give results for true peer firms; subcolumns (ii) give results for firms that are similar to peer firms (i.e., placebo firms).

	(A) Downgrade		**(B) Covenant violation**	
	(i) Peers	**(ii) Placebo**	**(i) Peers**	**(ii) Placebo**
Peer downgrade	0.053**	0.011		
	2.356	0.503		
Peer rating change	0.049	0.164***		
	0.899	4.05		
Peer covenant violation			0.060**	0.016
			2.547	0.616
% Ownership	0.342	0.135	0.256	0.139
	1.347	0.532	0.954	0.553
Leverage	0.001	0.026	-0.128***	-0.123***
	0.035	0.929	-4.395	-3.704
ROA	0.012	-0.066	0.446	0.516
	0.051	-0.268	1.253	1.329
Market-to-book	-0.001	0	0.008*	0.006
	-0.164	-0.051	1.762	0.908
Tangibility	-0.215	-0.143	0.034	-0.203
	-1.236	-0.803	0.145	-0.818
Asset size	-0.02	-0.015	0.034	0.02
	-0.491	-0.358	0.488	0.278
% Inst. Investors	-0.109**	-0.066	0.022	0.045
	-2.53	-1.46	0.278	0.577
Issue size	0.013	0.005	0	-0.047***
	0.919	0.364	0.007	-2.588
Maturity	0.057***	0.064***	0.126***	0.093***
	3.416	3.773	3.042	2.625
Enhancement	0.081*	0.089**	-0.048	-0.044
	1.891	2.021	-0.824	-0.729
Constant	-1.037**	-1.108**	-1.115	0.169
	-2.154	-2.252	-1.257	0.213
Month fixed effects	+	+	+	+
Firm fixed effects	+	+	+	+
R^2	0.096	0.09	0.125	0.081
N	41157	37434	17308	21051

* p<0.10, ** p<0.05, *** p<0.01

Table 5. Shocks to Secondary Market Yields

We report results from estimating bond-level regressions of monthly yield spread changes with fixed effects at the issuer level. Data from 2001 to 2008 is used. The analysis includes all bonds whose yields are reported in TRACE (the default source) or in Bloomberg (used when data for a particular bond is unavailable from TRACE). For each firm, the bond with the largest maturity is picked.

Main explanatory variable: Interest rate shock interacted with the indicator variable for coownership if the firm shares a blockholder with other firms.

For the exogenous shock, in column (A) we use Change in federal funds rate; in columns (B) and (C), we use Change in the AAA–Treasury spread and in the BAA–AAA spread, respectively (see text for details). The subcolumns (i) report the baseline regression, where % Ownership is the largest Shapley–Shubik index (SSI) for any of the firm's coowners (as estimated by the procedure explained in Appendix 2). Subcolumns (ii) report the same regression as reported in subcolumns (i) but with % Ownership estimated using the weakest link principle (rather than SSI); subcolumns (iii) limit the sample to blockheld firms. The issuer's financial characteristics (tangibility, profitability, asset size, leverage, market-to-book ratio) and the bond issue's specific characteristics (issue size, maturity, level of security, and rating fixed effects) are included in all specifications but are not reported.

	(A) Change in fed funds rate			(B) Change in AAA-Treasury spread			(C) Change in BAA-AAA spread		
	(i) Baseline	**(ii) WLP**	**(iii) Blockheld**	**(i) Baseline**	**(ii) WLP**	**(iii) Blockheld**	**(i) Baseline**	**(ii) WLP**	**(iii) Blockheld**
Interest rate shock (as defined in column)	-3.269***	-3.338***	-3.801***	19.909***	19.888***	23.253***	5.395***	5.597***	6.284***
	-9.536	-9.739	-7.848	8.68	8.67	7.067	9.222	9.568	7.581
Coowned	-0.014	-0.031	-0.077	-0.049	-0.067	-0.121**	-0.037	-0.055	-0.109**
	-0.308	-0.684	-1.609	-1.077	-1.492	-2.558	-0.816	-1.227	-2.298
% Ownership	0.168	-0.51	0.064	0.162	-0.464	0.023	0.163	-0.474	0.028
	0.672	-1.092	0.176	0.647	-0.992	0.063	0.651	-1.015	0.077
Widely held	0.495***	0.067		0.470***	0.048		0.476***	0.057	
	2.919	0.369		2.773	0.266		2.812	0.312	
Shock × Coowned	0.647***	0.669***	0.844***	-0.411***	-0.413***	-0.578***	-0.839***	-0.977***	-1.030***
	5.485	5.938	6.634	-2.838	-2.991	-3.711	-4.551	-5.485	-5.182
Shock × Widely held	0.450***	0.546***		-0.360***	-0.419***		-0.510***	-0.813***	
	4.235	5.344		-2.762	-3.348		-3.085	-5.057	
Firm fixed effects	+	+	+	+	+	+	+	+	+
Firm characteristics	+	+	+	+	+	+	+	+	+
Bond characteristics	+	+	+	+	+	+	+	+	+
Month fixed effects	+	+	+	+	+	+	+	+	+
N	72394	72394	35477	72394	72394	35477	72394	72394	35477

* p<0.10, ** p<0.05, *** p<0.01

Table 6. Change in Blockholders

We report univariate estimates of the bond yield spread correlation of the firm with its peer firms before the firm becomes coowned (column (A)) and after a coowner is no longer the largest blockholder (column (B)). Data from 2001 to 2008 are used. The analysis includes all bonds whose yields are reported in TRACE (the default source) or in Bloomberg (used when data for a particular bond is unavailable from TRACE). For each firm, the bond with the largest maturity is picked.

	(A) Acquisitions: correlation with new peers	**(B) Exits: correlation with old peers**
Before the change in controlling blockholder	0.197***	0.395***
	0.016	0.017
After the change in controlling blockholder	0.423***	0.205***
	0.016	0.018
Difference	0.226***	-0.190***
	0.022	0.026
N	480	383

* p<0.10, ** p<0.05, *** p<0.01

Table 7. Instrumental Variables Estimation

We report results from estimating bond-level instrumental variable regressions of monthly yield spread changes with fixed effects at the issuer level. Data from 2001 to 2008 is used. The analysis includes all bonds whose yields are reported in TRACE (the default source) or in Bloomberg (used when data for a particular bond is unavailable from TRACE). For each firm, the bond with the largest maturity is picked.

Main explanatory variable: Peer yield spread change (i.e., the change in average yield spread by other firms owned by the same owner), instrumented with major natural disaster shocks happening in the county of peer firms' headquarters. We focus on disasters with total estimated damage value of over $1 billion.

Panel A reports the first stage estimates for the instrumented variable. We only report the estimates for the instrument excluded in the second stage. Panel B reports the second stage estimates.

Column (A) gives the baseline specification where we exclude cases when the firm itself is affected by any major natural disaster in the same month as well as the preceding month. In column (B) we exclude the firms that experience a major natural disaster at any time during our sample period. Column (C) instead controls for own natural disasters explicitly. Column (D) excludes firm fixed effects. Column (E) (column (F)) gives results for the subsamples of firms for which the standard deviation in analyst earnings forecasts is greater (less) than 5%.

Panel A. First Stage

	(A) Baseline	(B) No own disasters in sample period	(C) Control for own disasters	(D) No fixed effects	(E) High analyst disagreement	(F) Low analyst disagreement
Natural disaster	0.167***	0.165***	0.169***	0.149***	0.237***	0.133**
	3.531	3.462	3.553	2.857	2.818	2.268
Controls from the second stage	+	+	+	+	+	+
Month fixed effects	+	+	+	+	+	+
Firm fixed effects	+	+	+		+	+
F test	12.47***	11.98***	12.63***	8.16***	7.94***	5.14**
N	32622	32281	32633	32645	14915	16589

* p<0.10, ** p<0.05, *** p<0.01

Panel B. Second Stage

	(A) Baseline	(B) No own disasters in sample period	(C) Control for own disasters	(D) No fixed effects	(E) High analyst disagreement	(F) Low analyst disagreement
Instrumented peer yield spread change	1.450*	1.495*	1.450*	1.496*	1.839*	0.513
	1.826	1.828	1.838	1.684	1.722	0.479
Own natural disaster			2.068*			
			1.719			
% Ownership	-0.043	-0.052	-0.042	-0.03	-0.027	-0.332
	-0.123	-0.149	-0.123	-0.238	-0.065	-0.34
Leverage	-0.034	-0.032	-0.034	-0.018	-0.012	-0.153
	-0.587	-0.557	-0.599	-0.541	-0.145	-1.462
ROA	-1.139	-1.114	-1.14	-0.132	-1.206	0.352
	-1.619	-1.552	-1.622	-0.425	-1.168	0.594
Market-to-book	0.008	0.008	0.009	0.005	0.014	0.006
	1.266	1.242	1.275	0.955	1.345	1.149
Tangibility	0.064	0.07	0.063	0.084	-0.537	-0.023
	0.177	0.191	0.175	0.905	-0.707	-0.068
Asset size	-0.037	-0.042	-0.037	-0.006	-0.224	-0.059
	-0.454	-0.516	-0.457	-0.512	-1.526	-0.549
% Inst. Investors	-0.127	-0.123	-0.128	-0.121*	-0.214	-0.051
	-1.461	-1.385	-1.465	-1.665	-1.425	-0.424
Issue size	0.027	0.027	0.027	0.052**	0.01	0.02
	0.849	0.833	0.851	2.346	0.204	0.37
Maturity	0.071	0.071	0.071	0.008	0.076	0.109*
	1.531	1.515	1.533	0.31	0.979	1.952
Enhancement	0.15	0.143	0.15	-0.033	0.236*	0.117
	1.574	1.489	1.574	-0.645	1.757	0.888
Constant				-0.851		
				-1.507		
Month fixed effects	+	+	+	+	+	+
Firm fixed effects	+	+	+		+	+
R^2	-0.586	-0.619	-0.585	-0.563	-0.996	-0.089
N	32622	32281	32633	32645	14915	16589

* p<0.10, ** p<0.05, *** p<0.01