Do Common Owners Display Coordinated Votes in Shareholder Meetings of Portfolio Companies?

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Abstract

We analyze the voting records of institutional investors to understand if their voting behavior is aimed at internalizing externalities among horizontally and vertically related portfolio firms. We relate the vote distance of pairs of institutional investors to their portfolio characteristics. We find that the portfolio similarity and the level of common ownership in the pair computed based on the set of horizontally and vertically related firms do not affect the vote distance between the institutional investors. However, we observe that the reduction in the voting distance is concentrated in situations when the pair of investors has both high portfolio similarity and a high "quantity" of common ownership. This evidence especially holds in proposals to elect directors. We conclude that the voting decisions of institutional investors do not systematically include a purpose of internalizing externalities among portfolio firms.

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1 Introduction

The last few decades have seen the growth of delegated portfolio management in which intermediaries pool funds from individuals into large and diversified portfolios. At the same time, the asset management industry has also experienced several consolidations that have allowed the emergence of few large institutional investors. These two trends have led to a dramatic rise in the frequency with which large, diversified institutional investors own shares in multiple firms, also in the same industry (Backus, Conlon, and Sinkinson 2021). As the profit maximization function of these institutional investors could translate into global portfolio value maximization, these institutions may have incentives to internalize externalities among portfolio firms to maximize the joint profit of portfolio firms. These externalities mostly occur among horizontally or vertically related firms and relate to their strategic decisions made in product markets such as the quantity of goods and services to produce, their price setting, investments, also for innovation, and entry in new markets. Among these, the possibility of softening the competition among firms in the same industry through the production of fewer units and setting higher prices for consumers has raised antirust concerns (Azar, Schmalz, and Tecu 2018) and it has generated an academic debate and there is mixed evidence in the finance common ownership literature (among others, Koch, Panayides, and Thomas 2021, Dennis, Gerardi, and Schenone 2022 and Lewellen and Lowry 2021).

In this paper, we analyze the voting decisions of institutional investors in shareholder meeting of portfolio firms and we aim to understand if institutional investors use this voting channel to achieve the internalization of externalities among portfolio firms. Our identification strategy relies on the fact that two investors with similar portfolio holdings have incentives for similar policies in portfolio firms and therefore are expected to vote similarly in shareholder meetings; instead, if two same investors had very different portfolios, they could have disagreed about the policies to implement in portfolio firms and therefore they would have been expected to vote more differently. In particular, the focus of the paper is to understand if the voting coordination in shareholder meetings specifically occurs for common owners i.e. investors that are more diversified. Below our empirical results.

We first relate the voting distance between pairs of institutional investors on proposals voted in their portfolio companies to a measure of their portfolio similarity. To this end, we use the Cosine Similarity measure and we compute it by only considering as an investment universe the firms in the same industry of the focal firm based on the 4-digit NAICS. We estimate the regression model that includes control variables, proposal and pair institution fixed effects and we find that Cosine Similarity at industry level does not affect the vote distance between pairs of institutional investors. A graphical representation shows that the lack of relationship is constant for all levels of Cosine Similarity.

Second, we re-estimate the previous regression model but using a different independent variable: instead of the Cosine Similarity, we create a new variable called Pair Common Ownership that measures the "quantity" of common ownership in the pair of institutions i.e. the variable increases when the institutions have more common firms in their portfolios. There are cases in which investors with different portfolio composition like undiversified investors and common owners have incentives to vote for similar policies in portfolio firms, one example are those aimed at reducing the competition in the sector that benefit both types of investors. For this reason, we create a measure that captures the extent to which institutions can obtain dollar gains from their common ownership positions. We find that the vote distance between pairs of institutional investors is not affected by the Pair Common Ownership measure at industry level, with the lack of relationship being constant for all levels of Pair Common Ownership.

Third, we combine the previous two independent variables, Cosine Similarity and Pair Common Ownership, and their interaction in the regression model. While the voting distance between pairs of institutional investors does not depend on the two independent variables, it does depend on their interaction whose coefficient is negative and statistically significant. Therefore, the reduction in the voting distance is concentrated in situations when the investor pair has both high portfolio similarity and a high "quantity" of common ownership.

Fourth, we repeat the above analysis by computing the explanatory variables considering the set of vertically related firms rather than those in the same industry. The regression results are in line with the horizontal case: we find that both Cosine Similarity and Pair Common Ownership at vertical level does not affect the vote distance between pairs of institutional investors. Instead, the coefficient of the interaction term is negative and statistically significant.

The previous results taken together suggest that there is limited evidence that institutional investors use the voting channel to internalize the externalities between portfolio firms and the effects are concentrated for institutions with similar portfolios and a high ”quantity” of common ownership.

We also perform additional tests to see if (1) the baseline results depend on the specific proposal types (2) the baseline results are robust to an alternative industry definition and (3) there is heterogeneity across industries.

Regarding the proposal type analysis, we decompose the full sample of proposals into categories to understand if the effects concern all types of proposals. We identify three main categories: director elections, proposals concerning the compensation of the managers and governance proposals. We find that the regression results mainly originate from proposals to elect directors while we find no effect in compensation and governance proposals.

Concering the industry analysis, we do find evidence in line with baseline results when we use the 3-digit SIC industry definition instead of the 4-digit NAICS. In the industry-by-industry analysis, we observe that the distribution of t-stats across industries has a mean close to zero and it is relatively symmetric with both right and left tails. There are more significant results than what would be expected due to chance but this is true in both the right and left tails.

This paper is related to Crane, Koch, and Michenaud 2019 as both papers relate the voting decisions of pairs of institutional investors to their portfolio composition; Crane, Koch, and Michenaud 2019 find evidence that institutional investors connected by large ownership stakes in the same portfolio firms i.e. cliques work in concert to achieve economies of scale in governance via voice and this increases their voting coordination in the first place. Instead, in this paper we shift the focus from the shareholders in corporate governance to the portfolio firms and we examine whether common owners with similar portfolio holdings display coordinated votes in situations where the externalities between portfolio firms are the highest i.e. firms that are horizontally and vertically related and we find very limited empirical evidence.

The rest of the paper is organized as follows. Section 2 presents a review of the related literature. Section 3 formulates the hypotheses to be tested. Section 4 describes sample construction, variable definitions and reports summary statistics. Section 5 presents the baseline results on the relationship between the vote distance between pairs of institutional investors and their portfolio composition. Section 6 considers additional tests. Section 7 concludes.

2 Contribution and Related Literature

This paper is related to two strands of literature. The first is the recent literature that examines the role of institutional investors in corporate governance through the lens of voting behavior. Studies in the literature show that mutual funds' proxy voting decisions are influenced by considerations such as business and social connections to management (Davis and Kim 2007; Butler and Gurun 2012; Ashraf, Jayaraman, and Ryan 2012; Cvijanović, Dasgupta, and Zachariadis 2016), peer institutions (Matvos and Ostrovsky 2008 and He, Huang, and Zhao 2019), capital gains lock-in (Dimmock et al. 2018), the reliance on proxy advisory firms (Iliev and Lowry 2014) and portfolio similarity (Crane, Koch, and Michenaud 2019 and Moskalev 2019). To the best of our knowledge, our paper is the first to relate the voting distance between institutional investors to the composition of their portfolios at industry level or considering sets of vertically related firms. We then show that there is a limited empirical relationship between the two variables with the reduction in vote distance concentrated for pairs of institutions with similar portfolios and a high ”quantity” of common ownership.

The second literature this paper is related to is the burgeoning literature on common ownership. Hansen and Lott 1996 provide a theory whereby cross-owners maximize their portfolio values by inducing their portfolio firms to internalize externalities. Recent studies examine how institutional common owners affect the strategic interaction among firms in the same sector impacting their product market competition (among others, Azar, Schmalz, and Tecu 2018, Dennis, Gerardi, and Schenone 2022, Koch, Panayides, and Thomas 2021) and their innovation activities (among others, Antón et al. 2021 and Kostovetsky and Manconi 2020); common owners also affect the relationships among vertically related firms (Freeman 2021) and the decision to merge between firms (Matvos and Ostrovsky 2008 and Anton et al. 2022). The literature has also analyzed the potential corporate governance mechanisms i.e. how common owners influence their portfolio firms. Potential active mechanisms include private meetings with managers (Shekita 2022), voting in shareholder meetings (He, Huang, and Zhao 2019) and compensation structures for managers that are less-performance sensitive (Antón et al. 2023) or with less relative performance evaluation (Kwon 2016). In this paper, we focus on the voting channel and we aim to understand if it is systematically used by common owners to influence portfolio companies and we find limited evidence that the voting mechanism is used for this purpose. Thus, our results are generally consistent with the literature that finds mixed evidence regarding the effects of common ownership on firm outcomes.

3 Hypotheses Formulation

3.1 General Setting

Consider an economy with a corporate sector populated by F firms denoted by $f = 1,2,...,F$. A firm f earns a profit $\pi_f\,(x_f, x_{-f})$ which depends on its strategic choice x_f and the strategic choices made by the other firms in the economy. These strategic decisions include the quantity of goods and services to produce, their price setting, investments, innovation and entry in new markets.

Regarding the ownership structure, there are I shareholders denoted by $i = 1,...,I$ which have cash-flow rights in the firms with β_{if} that represents the fraction of the firm f owned by the shareholder i. We assume that shareholders maximize their total payoff, π_i, that is equal to the sum of profits over their portfolio investments weighted by cash-flow rights:

$$max\,\pi_i = max\sum_{f=1}^{F}\beta_{if}\pi_f\,(x_f, x_{-f}) \tag{1}$$

It follows that a shareholder i has preferences that portfolio firms $f = 1,2,...,F$ make strategic choices x_f that maximize the objective function. These preferences are incorporated by firms that thus will maximize the Pareto-weighted sum of their shareholders' profits (Rotemberg 1984).

As it is evident from the objective function of shareholders, a shareholder with cash-flow rights only in a firm f has incentive to promote strategic choices that, in a first place, maximize the profit of the single firm. Instead, a shareholder with cash-flow rights in multiples firms $f = 1,2,...,F$ (high $\frac{\sum_k \gamma_{if}\beta_{ik}}{\gamma_{if}\beta_{if}}$) is expected to promote strategic choices in those firms that are aimed at maximizing the joint profit of the firms.

3.2 Identification strategy

The aim of our test is to verify whether it is plausible that shareholders with cash-flow rights in multiples firms maximize the joint profit of the firms, instead of the individual profit of portfolio firms. The eventual internalization of externalities among portfolio firms is at center of a debate in the finance literature, especially for the potential negative effects in the economy arising from the internalization of product markets choices among rival firms.

In this paper, we specifically focus on the potential channel of voting in shareholder meetings: while it is hard to judge the implications on the strategic choices of a firm of a given proposal, for instance the election of a director, we rely on the fact that shareholders differ in their portfolios and we exploit this heterogeneity of incentives to test if common owners vote in a coordinated way in shareholder meetings of portfolio companies. The intuition is that if two investors have similar portfolio holdings, this means that they have incentives for similar policies in portfolio firms and therefore are expected to vote similarly in shareholder meetings; instead, if two investors have very different portfolios, they may disagree about the policies to implement in portfolio firms and therefore they are expected to vote more differently.

We consider pairs of institutions and we look at the distance between their votes. For a given proposal of a portfolio company, we can observe how shareholders with different portfolio composition voted for it. If it is true that shareholders internalize externalities among portfolio firms, we expect that (1) shareholders with similar portfolios exhibit more coordinated votes and (2) shareholders with higher levels of common ownership in the same firms exhibit more coordinated votes. Regarding this second prediction, incentives for similar policies in portfolio firms may not exclusively depend on portfolio symmetry as in (1): for instance, both undiversified investors and common owners may benefit from a reduction of competition in the industry as it increases both the profit of the individual firms and the joint profit of the sector. Instead, as shown in the general setting above, institutions with higher dollar gains from their common ownership positions are more likely to have similar incentives.

To summarize, if the above predictions hold, there is a negative relationship between the vote distance and the pair portfolio composition measures. This leads to define the null hypothesis:

H0: Investors respond to common ownership incentives and incorporate them in their voting decisions

If, on the other hand, there is no relation between vote distance and pair portfolio composition measures, the alternative hypothesis should find support:

H1: Investors do not incorporate in their voting decisions their incentives arising from common ownership.

4 Data, Variables and Summary Statistics

4.1 Base dataset

We obtain mutual fund voting data for the period from 2003 through 2021 from the Institutional Shareholder Services (ISS) Mutual Fund Vote Records database. The detailed voting information becomes available following the Securities and Exchange Commission (SEC) ruling requiring all mutual funds registered in the U.S. to report their proxy votes using Form N-PX starting from April 2003. For each proposed agenda item (i.e., proposal) voted on by each mutual fund, the data report the firm that receives the proposal, the date of the shareholder meeting at which the proposal is considered, the issue being voted on (e.g., board declassification or the elimination of poison pills), the sponsor of the proposal, management's recommendation and the fund's vote. We obtain data on the aggregate votes cast for or against a given proposal as well as the voting result (i.e., "pass"or "fail") and the ISS recommendation from the ISS Company Vote Results dataset. We merge the voting data with Thomson Reuters Institutional Holdings (13F) database. Similarly to Crane, Koch, and Michenaud 2019 and Griffin and Xu 2009, we carry holdings forward up to a maximum of two consecutive quarters if an institution misses a single reporting period. We split adjust reported holdings if the split occurs between the report date and reporting date (Thomson Reuters adjusts the number of shares held for splits that occur after the report date. To recover the number of shares held at the report date, we undo this adjustment using the CRSP share adjustment factor). Because there is no common identifier for institutions across the two databases, we use a name-matching procedure to match the voting data with 13F; we then manually check whether the pairs of name strings are actual matches through eyeballing and web searches. We aggregate votes at the institution level and the unit of observation in the final data set is proposal-institution. These fund families cast about 95% of the votes covered by the voting database during our sample period. We obtained similar matching results to He, Huang, and Zhao 2019 but our dataset includes a lower proportion of funds having small holdings in portfolio companies.

4.1.1 Base variables. Since mutual fund families adopt voting guidelines at the family level and have family-level governance teams that cast votes on behalf of their affiliated funds most of the cases, we focus on the voting decision at the institution level. In this regard, Iliev and Lowry 2014 report that in over 96% of the cases, funds within a given institution vote in the same direction on governance-related proposals.

For each proxy ballot item, we create an indicator variable equal to one if the mutual fund votes ”For” and zero otherwise. We then average this variable within the institution (the fund family). Specifically,

$$Vote_{ist} = \frac{\sum_{n=1}^{N}(Vote_{nist})}{N} \tag{2}$$

where $Vote_{nist}$ is a dummy variable that equals one if fund n from family i votes ”For” on proposal s at firm f ’s shareholder meeting at time t, and N is the total number of funds in family i voting on that proposal. It follows that $Vote_{ist}$ is the fraction of votes ”For” by funds affiliated with fund family i on proposal s of firm f at time t.

As for the ownership measures, we define $OwnShare_{ift}$ and $PtfWeight_{ift}$ as the institution i ’s fractional ownership and portfolio weight, respectively, in firm f at the quarter-end immediately before the shareholder meeting that occurs at time t. We restrict the sample to observations in which institutions have a minimum fractional ownership in portfolio companies of at least 0.5%.

4.1.2 Summary statistics. Table 1a reports the summary statistics for the base dataset at institution–portfolio company's proposal level for the sample period from 2006 until 2021. They are reported for each type of proposal separately in Tables 1b, 1c and 1d. Institutions vote ”For” in the vast majority of proposals ($FundVote$ = 0.894) and it is driven by the high support on proposals to elect directors ($FundVote$ = 0.926, Table 1b) and a lower support in compensation and governance proposals ($FundVote = 0.738$ and $FundVote = 0.701$, respectively, as in Tables 1c and 1d). Regarding the ownership variables, the average $OwnShare_{ift}$ is 3.1% while a stock position normally represents a $PtfWeight_{ift}$ of 0.5% of the institution's portfolio. Around 40% of the institutions in the sample are classified as index funds providers.

4.2 Regression dataset

We construct the regression dataset by considering all unique pairs of institutions that vote on the same ballot item at a shareholder meeting of a given portfolio company. For instance, if there are three funds A, B and C voting in a given proposal of a given portfolio firm, we obtain three unique pairs (A,B), (B,C) and (C,A) and each observation corresponds to a pair of institutions. We repeat the same procedure for every proposal of every firm in the dataset.

4.2.1 Regression variables. We create our dependent variable $VoteDistance_{i-jst}$ as the absolute value of the difference between the votes of the two institutions in the pair.
Specifically,

$$VoteDistance_{i-jst} = \left|Vote_{ist} - Vote_{jst}\right| \tag{3}$$

where $VoteDistance_{i-jst}$ captures how close the votes casted by institutions i and j are when voting in a portfolio firm on given proposal s. This variable assumes values between 0 and 1 included and the vote distance increases as the institutions in the pair vote more differently on the same proposal. If two institutions have the same fraction of votes "For" by funds affiliated with them in a given proposal, $VoteDistance_{i-jst}$ will have value 0. In the other extreme case when two institutions vote in opposite way i.e. one institution votes "For" with all its affiliated funds and the other does not vote "For" with any of its fund, $VoteDistance_{i-jst}$ will assume value 1.
We consider two main independent variables: $CosSim_{i-jt}$ defined as the Cosine Similarity between the portfolios of institutions i and j and $PairComOwn_{i-jt}$ defined as the Pair Common Ownership that captures the extent to which the institutions i and j own the same firms.
The first measure is the cosine similarity between the portfolios of institutions i and j in the quarter t and it is computed as the dot product of the pair's portfolio weight vectors normalized by the

vectors' lengths, according to the formula below:

$$CosSim_{i-jft} = \frac{\mathbf{w_{it}} \cdot \mathbf{w_{jt}}}{\|\mathbf{w_{it}}\| \, \|\mathbf{w_{jt}}\|} \tag{4}$$

where $\mathbf{w_{it}}$ and $\mathbf{w_{jt}}$ are the institution i and j's vectors of portfolio weights in the quarter t. Because all elements in the portfolio weight vectors are non-negative, this measure of portfolio similarity is bounded in the interval [0,1]. Intuitively, the portfolio similarity between two institutions is closer to one when their holdings are more similar and equals zero when they are entirely different.

The second measure, the $PairComOwn_{i-jt}$, is given by summing the products of the pair's fractional ownership in each portfolio firm, weighted by their market capitalization. It is defined as follows:

$$PairComOwn_{i-jft} = \sum_{k \in K} OwnShare_{ikt} * OwnShare_{jkt} * \frac{MktCap_{kt}}{TotMktCap_t} \tag{5}$$

where K is the set of portfolio firms other than f, $OwnShare_{ikt}$ is the institution i 's fractional ownership in a firm k, $MktCap_{kt}$ is the market capitalization in USD of a firm k and $TotMktCap_t$ is the total USD market capitalization of the K firms in the quarter t. $PairComOwn_{i-jft}$ assumes higher values when the pair of institutions holds the same portfolio firms and with a high fractional ownership.

The previous two variables capture different aspects of the portfolios of the pair of institutions. While the $CosSim_{i-jt}$ measures the degree of symmetry between their portfolios, the $PairComOwn_{i-jft}$ measures the "quantity" of common ownership in the pair i.e. the variable increases when the institutions have more common firms in their portfolios. For our analysis, we consider both measures: it is possible that non-diversified investors and common owners, that have very different portfolio, may have incentives to promote similar policies in portfolio firms and therefore to vote similarly: for instance, a reduction of competition in the industry increases its total profit but could also benefit individual firms. Given that the specific focus of our paper is to understand if common owners i.e. investors that are more diversified display coordinated votes in shareholder meetings, the measures capture different aspects and we jointly consider them.

These variables are computed at the quarter-end immediately before the shareholder meeting that occurs at time t.

Horizontally and vertically related firms We consider two different sets of firms for the calculation of the two independent variables defined above: (1) horizontally related firms i.e. firms in the same sector or industry and (2) vertically related firms i.e. firms that are related in the supply chain.

To define the sectors, we consider the 4-digit North American Industry Classification System (NAICS) which covers 269 different sectors in the average quarter of the sample period. For robustness, in the additional tests we consider an alternative definition of the sectors based on the 3-digit Standard Industrial Classification (SIC).

Instead, to define supply chain links we rely on the vertical textual network industry relatedness classification (VTNIC) provided by Fresard, Hoberg and Phillips (Frésard, Hoberg, and Phillips 2020) that combines the U.S. Bureau of Economic Analysis (BEA) input-output tables with the parsing of the product descriptions from the firm 10Ks. We consider firm-pairs that have vertical relatedness scores in the top 0.2% of all pairwise scores in the given year; on average, a given firm is vertically related to other 12 firms.

As control variables, we consider the geometric average of $OwnShare_{ift}$ and $PtfWeight_{ift}$ between the two institutions.

4.2.2 Summary statistics. Table 2 presents the summary statistics of the regression dataset at the pair institution–portfolio company's proposal level for the full sample period from 2006 until 2021. The average value of $VoteDistance$ is 0.094 meaning that institutions vote very similarly in the vast majority of cases and this reflects the high consensus in director elections (as shown in the summary statistics of the base dataset in Table 1b, institutions vote "For" in more than 90% of cases). Regarding the main independent variables, $CosSim(NAICS)$ has an average of 0.563 while the average is 0.659 for $CosSim(Vert)$ and this difference arises because the set of vertically related firms is smaller compared to those in the same sector.

5 Empirical design and Results

We relate the vote distance for pairs on institutions to their joint ownership of portfolio firms. We first consider the regressions concerning the joint ownership of horizontally related firms and then those on the joint ownership of vertically related firms.

5.1 Horizontally related firms

The baseline regression model is at pair institution–portfolio company's proposal level and takes the following form:

$$VoteDistance_{ijst} = \alpha + \beta\, CosSim\,(NAICS\ 4 - Digit)_{i-jft} + \lambda X_{i-jst} + \delta_{i-jt} + \delta_s + \epsilon \tag{6}$$

where the institutions in the pair are indexed by i and j, proposals are indexed by s, firms by f and quarters by t. The dependent variable $VoteDistance_{ijst}$ is the vote distance between the pair of institutions i and j in a proposal s in their portfolio firm f; the main explanatory variable is $CosSim(NAICS\ 4-Digit)_{i-jft}$ that captures the similarity in the portfolios of the two institutions and it is computed by only considering as an investment universe the firms in the same NAICS 4-Digit industry of the focal firm f. X_{i-jst} is a vector of controls and includes the geometric average of $OwnShare_{ift}$ between the two institutions and the geometric average of $PtfWeight_{ift}$. δ_{i-jt} is the pair institutions times year fixed effect while δ_s is the proposal fixed effect. Standard errors are robust to heteroscedasticity and clustered at the pair institutions level.

With proposal fixed effects, the identification comes from variations across pairs of fund families with different $CosSim(NAICS\ 4-Digit)_{i-jft}$ for a given proposal. These fixed effects control for any observed or unobserved heterogeneity across proposals (e.g. issues being voted upon and recommendations by proxy advisors) as well as that across firms at which the proposals are being voted on, such as firms' prior performance, ownership structure, governance quality, and stock liquidity (e.g. Back et al. 2018). These fixed effects enable us to rule out differences in proposals and time-varying firm attributes as potential explanations for the results.

Pair institutions fixed effects exploit the variation in $CosSim\,(NAICS\ 4-Digit)_{i-jft}$ across firms within a given pairs of institutions. It controls for time-invariant heterogeneity within the pair institutions (e.g., whether the fund families in the pair are activists or passive indexers and the general tendency of pair institutions to votes with or against management) and basically capture the average vote distance between two institutions across proposals.

We also re-estimate the previous regression model but using a different independent variable: instead of the $CosSim\,(NAICS\ 4-Digit)_{i-jft}$, we use the $PairComOwn\,(NAICS\ 4-Digit)_{i-jft}$.

Then we introduce our third specification that includes in the regression model both of the previous independent variables, $CosSim(NAICS4-Digit)_{i-jft}$ and $PairComOwn(NAICS4-Digit)_{i-jft}$ and also their interaction.

5.1.1 Results. Table 3 presents the regression results. Columns 1, 2 and 3 consider the baseline regression model with proposal and pair institution times year fixed effects while Columns 4, 5 and 6 include shareholder meeting and pair institution times year fixed effects; while the set of fixed effects is less strict in this second specification of the model, it enables greater sample and variation of the variable of interest. The coefficient of $CosSim\,(NAICS\ 4-Digit)_{i-jft}$ in Columns 1 and 4 is close to zero and it is not statistically significant. Also the coefficient of $PairComOwn\,(NAICS\ 4-Digit)_{i-jft}$ in Columns 2 and 5 is close to zero and it is not statistically significant as well. Instead, the more complete model in Columns 3 and 6 has the interaction term $CosSim\,(NAICS\ 4-Digit)_{i-jft}xPairComOwn\,(NAICS\ 4-Digit)_{i-jft}$ that is negative and statistically significant.

These results are further examined in Figure 1. The first graph plots the average vote distance net of control variables and fixed effects i.e. residuals of the regression at different percentiles of the $CosSim\,(NAICS\ 4-Digit)_{i-jft}$ while the second represents the $PairComOwn\,(NAICS\ 4-Digit)_{i-jft}$. Basically, the regressor has been divided into 20 percentiles and, for each percentile, the average value of $VoteDistance$ has been calculated. As the line shows, the lack of relationship is constant for all levels of the main independent variables.

Through a joint interpretation of the tables and graphs, we conclude that while the voting distance between pairs of institutional investors does not depend on the two independent variables, $CosSim\,(NAICS\ 4-Digit)_{i-jft}$ and $PairComOwn\,(NAICS\ 4-Digit)_{i-jft}$, it does depend on their interaction. Therefore, a pair of institutional investor displays coordinated votes only when there is high portfolio similarity at industry level between them and there is a high ”quantity” of common ownership in the pair.

5.2 Vertically related firms

In the section, we repeat the previous analysis by computing the two explanatory variables considering the set of vertically related firms i.e. firms that are related in the supply chain rather than those in the same industry. The independent variables, $CosSim\,(Vert)_{i-jft}$ and $PairComOwn\,(Vert)_{i-jft}$ are now defined based on the vertical textual network industry relatedness classification (VTNIC) provided by Fresard, Hoberg and Phillips to identify supply chain links.

5.2.1 Results. Tables 4 presents the regression results. Columns 1, 2 and 3 consider the baseline regression model with proposal and pair institution times year fixed effects while Columns 4, 5 and 6 include shareholder meeting and pair institution times year fixed effects; Unlike for the industry level measures, the coefficient of $CosSim\,(Vert)_{i-jft}$ in Columns 1 and 4 is negative and statistically significant. Instead, the coefficient of $PairComOwn\,(Vert)_{i-jft}$ in Columns 2 and 5 is close to zero and it is not statistically significant. Regarding the more complete model in Columns 3 and 6 with the interaction term $CosSim\,(Vert)_{i-jft}xPairComOwn\,(Vert)_{i-jft}$, its coefficient is negative and statistically significant.

We conclude that a pair of institutional investor displays coordinated votes when there is high portfolio similarity when only vertical holdings are considered and, especially, when there is also a high ”quantity” of common ownership in the pair.

6 Additional tests

6.1 Proposal Types

We split the full sample of proposals into categories that may reflect the potential channel through which institutional investors can affect the policies of portfolio firms and their strategic decisions in product markets. The first group ”Director elections” includes proposals that relate to the election directors and supervisory board members and proposals to remove existing directors. Directors have a crucial role in setting up the vision, mission and goals of the organization; they recruit, supervise, retain and evaluate the Chief Executive Officer (CEO) and other managers of the firm. Through the election of directors, institutional investors can transfer their preferences about the firm policies to the managers. The second subset ”Compensation proposals” includes proposals to structure i.e. bonus, stock option plans, etc. and approve the remuneration of the managers with advisory vote on Say on Pay. Compensation contracts can be used to align managerial incentives with those of the shareholders; choices regarding the sensitivity of the remuneration to the performance of the firm and its dependence on the relative performance with respect rival firms affect the behavior of managers in product markets and thus their strategic decisions (Antón et al. 2023). The third group is made up of governance proposals that includes various topics such as the introduction of independent board members, the declassification of the board of directors, takeover provisons, etc.

We repeat the previous regression analyses for each type of proposal separately. Tables 5a, 5b and 5c report the results for director elections, compensation proposals and governance proposals, respectively. The main independent variables, $CosSim_{i-jft}$ and $PairComOwn_{i-jft}$ are computed based on the 4-digit NAICS. On the other side, Tables 6a, 6b and 6c consider the set of vertically related firms to compute the independent variables.

In proposals concerning the election of directors, we find that the coefficient of the independent variables is negative for $CosSim_{i-jft}$ and the interaction term $CosSim_{i-jft}xPairComOwn_{i-jft}$. Instead, the coefficient of $PairComOwn_{i-jft}$ is close to zero and not statistically significant. Overall, the regression regarding this type of proposals, confirm that portfolio similarity plays a role at reducing the vote distance, and this effect is especially stronger in the interaction term.

Instead, we do not find a clear pattern regarding compensation and governance proposals. The coefficients of the two independent variables and their interaction term are not stastistically significant in most of the regression.

Figures 2 and 3 plot the average vote distance net of control variables and fixed effects at different percentiles of $CosSim\,(NAICS\ 4-Digit)_{i-jft}$ and $PairComOwn\,(NAICS\ 4-Digit)_{i-jft}$, respectively. As it is shown, the lack of relationship is valid for all levels of the independent variables. We thus conclude that the evidence in the full sample is driven by the proposals to elect directors while compensation and governance proposals present mixed evidence.

With reference to measures at vertical level, Table 6a shows that the coefficient of $CosSim_{i-jft}$ is negative while those of $PairComOwn_{i-jft}$ and the interaction term are not statistically significant. These results are in line with the full sample with the difference that the interaction coefificent is not statistically significant. Instead, the evidence for compensation and governance proposals in Tables 6b and 6c is mixed, to note that the coefficient of $PairComOwn_{i-jft}$ is negative and statistically significant in the regression speficication concerning compensation proposals.

6.2 Alternative industry definition

In the section, we repeat the previous analysis by computing the two explanatory variables considering an alternative industry definition widely used, the 3-digit SIC instead of the 4-digit NAICS. The independent variables are now $CosSim\,(3-digitSIC)_{i-jft}$ and $PairComOwn\,(3-digitSIC)_{i-jft}$. Table 7 reports the regression results. Columns 1, 2 and 3 consider the baseline regression model with proposal and pair institution times year fixed effects while Columns 4, 5 and 6 include shareholder meeting and pair institution times year fixed effects; the coefficient of $CosSim\,(NAICS\;4-Digit)_{i-jft}$ in Columns 1 and 4 is close to zero and it is not statistically significant while the coefficient of $PairComOwn\,(NAICS\;4-Digit)_{i-jft}$ in Columns 2 and 5 is negative and statistically significant as well as the interaction term $CosSim\,(NAICS\;4-Digit)_{i-jft}xPairComOwn\,(NAICS\;4-Digit)_{i-jft}$ in Columns 3 and 6.
Overall, regression results are in line with baseline Table 3. Both analyses confirm that the reduction in vote distance is especially driven by the interaction term.

6.3 Industry-by-Industry analysis

The previous results show limited empirical evidence that the vote distance between pairs of institutions depends on their pair portfolio composition. However, the empirical literature of common ownership finds mixed evidence across industries and for this reason we investigate if our results are concentrated in some industries or not. For instance, Koch, Panayides, and Thomas 2021 stated that collusion via common ownership is expected to be facilitated in concentrated industries and industries without large privately held, family-held, or dual-class firms. Also, industries where a higher proportion of firms were prosecuted for collusion in the past may be more ex ante vulnerable. It is indeed possible that the general non-significance of results in global regressions simply reflects the concrete difficulty of influencing product market outcomes in some industries.

Table 8a shows the summary statistics with reference to the distribution across industries of the coefficients and t-stats of the three independent variables, $CosSim\,(NAICS\ 4-Digit)_{i-jft}$, $PairComOwn\,(NAICS\ 4-Digit)_{i-jft}$ and their interaction $CosSim(NAICS\,4-Digit)_{i-jft}xPairComOwn(NAICS\,4-Digit)_{i-jft}$. With reference to the t-stats, their distributions are represented in 4. The mean and median of the coefficients of $CosSim(NAICS4-Digit)_{i-jft}$ and the interaction coefficients are negative while positive for $PairComOwn(NAICS4-Digit)_{i-jft}$. However, the t-stats are basically centered around zero suggesting that these variables have, on average, no impact on the vote distance, consistently with the previous analysis. As for other properties of the distributions in question, T-stats become significant in more than 10% of the industries, more than what would be expected due to chance but this is true in both the right and left tails.

7 Conclusions

In this paper, we analyzed the actions of institutional investors to understand whether they are compatible with the internalization of the externalities among portfolio firms. We examined their voting records in shareholder meetings and we find that the vote distance between pairs of institutional investors is not affected by their similarity in portfolios and their level of common ownership. We considered portfolio measures both at the industry level and vertical level. However, the reduction in the voting distance is concentrated in situations when the investor pair has both high portfolio similarity and a high "quantity" of common ownership. This evidence especially holds in proposals to elect directors. We conclude that the voting decisions of institutional investors do not systematically depend on the purpose of internalizing externalities among portfolio firms. This points to the importance of other alternative governance channels for explaining why common ownership may carry real effects.

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Figure 1. Plot of the Average Vote Distance (Full dataset)

These line graphs plot the average vote distance net of control variables and fixed effects i.e. residuals of the regression at different percentiles of the two main independent variables, Cosine Similarity and Pair Common Ownership, computed based on the 4-digit NAICS.

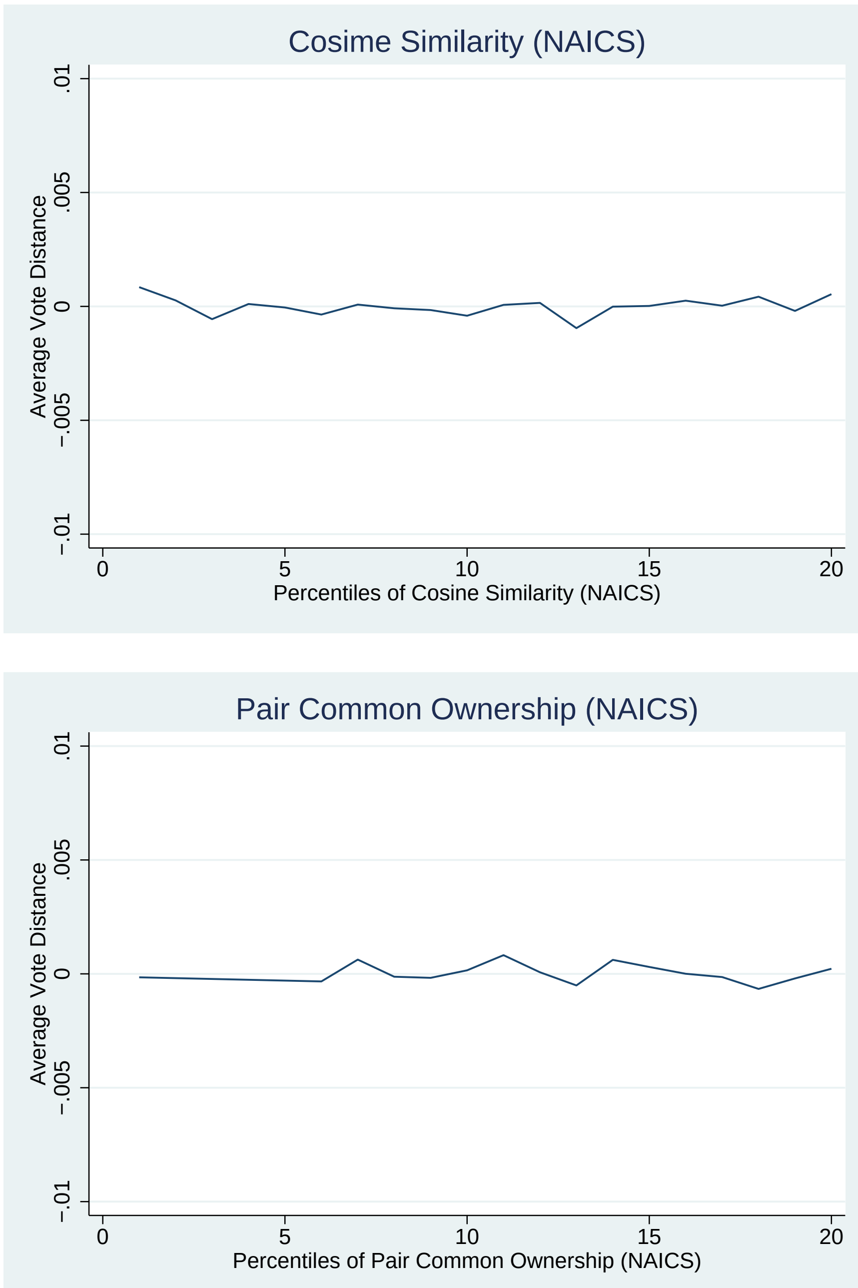


Figure 2. Plot of the Average Vote Distance (Sub datasets) - Cosine Similarity

These line graphs plot the average vote distance net of control variables and fixed effects i.e. residuals of the regression at different percentiles of the Cosine Similarity variable computed based on the 4-digit NAICS. This is done for each type of proposal separately.

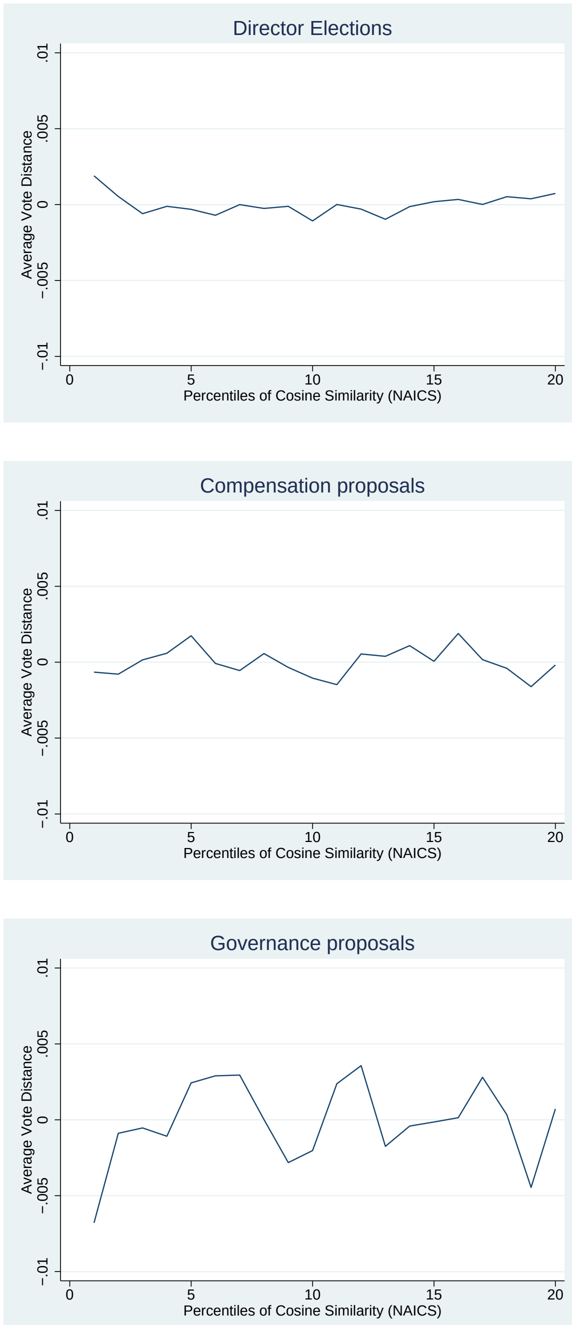
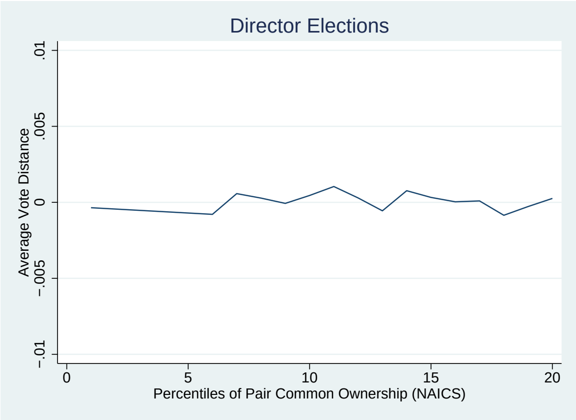
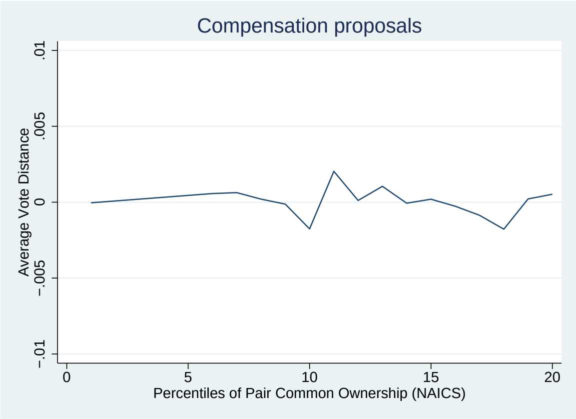


Figure 3. Plot of the Average Vote Distance (Sub datasets) - Pair Common Ownership

These line graphs plot the average vote distance net of control variables and fixed effects i.e. residuals of the regression at different percentiles of the Pair Common Ownership variable computed based on the 4-digit NAICS. This is done for each type of proposal separately.





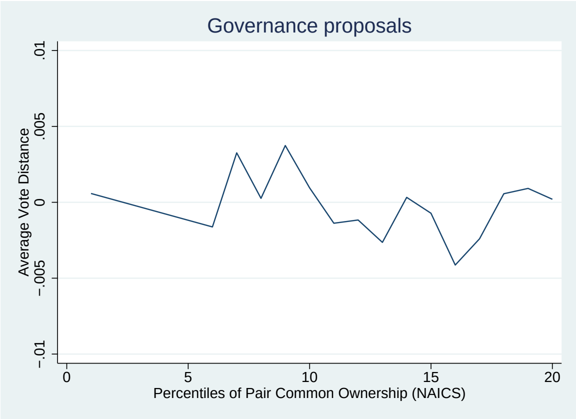
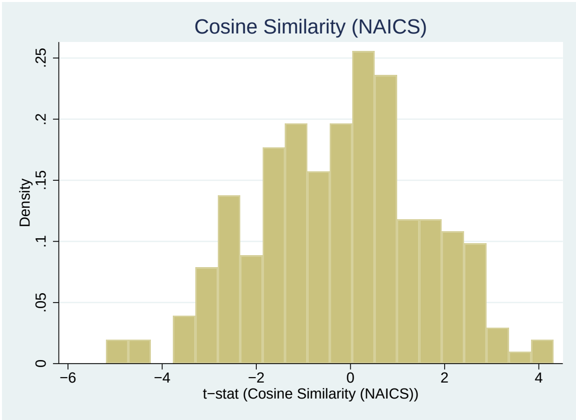
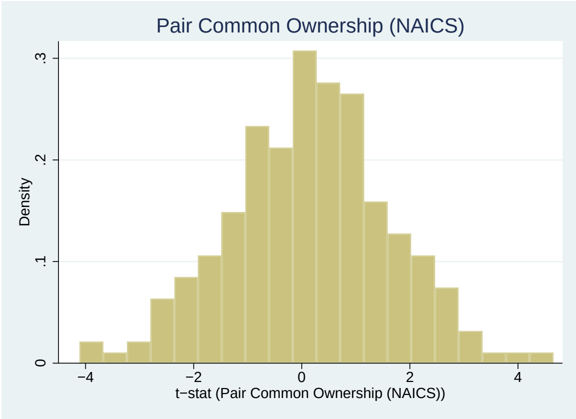


Figure 4. Plot of the distribution of the t-stats across industries

This graph plots the distribution of t-stats for the three major independent variables based on regressions performed at the 4-digit NAICS level. The first graph represents it for the Cosine Similarity coefficient, the second for the Pair Common Ownership and the third for the interaction term of the two previous variables.





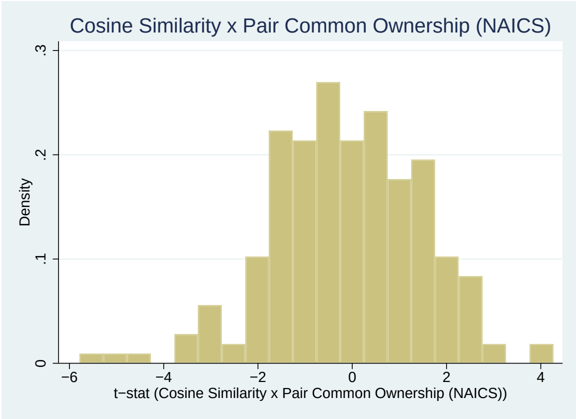


Table 1. Summary statistics - Full sample of institutions

This table presents summary statistics for our base dataset at the pair institutions-portfolio company's proposal level. The sample period starts from 2003 and ends in 2021. Variables are defined in Appendix A.

(a) Full sample

Variable	Mean	S.D.	P25	P50	P75	N
Vote	0.894	0.301	1.000	1.000	1.000	3,272,624
OwnShare	0.031	0.031	0.009	0.017	0.041	3,272,624
PtfWeight	0.005	0.022	0.000	0.001	0.003	3,272,624
Index	0.395	0.398	0.000	0.273	0.800	3,272,624

(b) Director Elections

Variable	Mean	S.D.	P25	P50	P75	N
Vote	0.926	0.253	1.000	1.000	1.000	2,306,831
OwnShare	0.030	0.032	0.009	0.017	0.041	2,306,831
PtfWeight	0.005	0.022	0.000	0.001	0.003	2,306,831
IndexFund	0.395	0.398	0.000	0.273	0.800	2,306,831

(c) Compensation proposals

Variable	Mean	S.D.	P25	P50	P75	N
Vote	0.738	0.435	0.026	1.000	1.000	285,031
OwnShare	0.032	0.033	0.010	0.019	0.045	285,031
PtfWeight	0.005	0.021	0.000	0.000	0.002	285,031
IndexFund	0.404	0.399	0.000	0.333	0.810	285,031

(d) Governance proposals

Variable	Mean	S.D.	P25	P50	P75	N
Vote	0.701	0.444	0.034	1.000	1.000	57,220
OwnShare	0.029	0.029	0.009	0.016	0.038	57,220
PtfWeight	0.007	0.020	0.000	0.001	0.006	57,220
IndexFund	0.366	0.373	0.000	0.250	0.700	57,220

Table 2. Summary statistics - Regression dataset

This table presents summary statistics for our regression dataset at the pair institutions-portfolio company's proposal level. The sample period starts from 2003 and ends in 2021. Variables are defined in Appendix A.

Pairs of institutions: Full dataset

Variable	**Mean**	**S.D.**	**P25**	**P50**	**P75**	**N**
VoteDistance	0.094	0.276	0.000	0.000	0.000	18,847,195
Characteristics (Geometric Average):						
OwnShare (g.a.)	0.024	0.018	0.012	0.0192	0.030	18,847,195
PtfWeight (g.a.)	0.003	0.006	0.000	0.001	0.003	18,847,195
Index (g.a.)	0.205	0.307	0.000	0.000	0.004	18,847,195
Pair Portfolio composition measures:						
PairComOwn (4-digit NAICS)	0.001	0.001	0.000	0.000	0.001	18,847,195
CosSim (4-digit NAICS)	0.563	0.363	0.192	0.623	0.933	18,847,195
PairComOwn (Vert)	0.001	0.001	0.000	0.000	0.001	8,263,655
CosSim (Vert)	0.659	0.401	0.197	0.946	1.000	18,847,195

Table 3. Regressions of Voting Distance on pair portfolio measures (Horizontal)

This table reports the results of multivariate OLS regressions explaining the vote distance of a pair of institutions in proposals voted in shareholder meetings of portfolio companies based on their holdings in horizontally related companies. All specifications include pair institutions times year fixed effects. Standard errors are robust to heteroscedasticity and clustered at the pair institutions level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1) VoteDistance	(2) VoteDistance	(3) VoteDistance	(4) VoteDistance	(5) VoteDistance	(6) VoteDistance
CosSim (4-digit NAICS)		-0.000	0.000		-0.000	0.000
		(-0.55)	(0.51)		(-0.57)	(0.50)
PairComOwn (4-digit NAICS)	-0.069		0.877***	-0.073		0.870***
	(-0.43)		(2.60)	(-0.46)		(2.60)
CosSim (4-digit NAICS) x PairComOwn (4-digit NAICS)			-1.550***			-1.545***
			(-3.50)			(-3.52)
OwnShare (g.a.)	-0.100***	-0.100***	-0.099***	-0.099***	-0.099***	-0.098***
	(-5.89)	(-5.92)	(-5.78)	(-5.87)	(-5.90)	(-5.76)
PtfWeight (g.a.)	0.074	0.077	0.071	0.069	0.072	0.066
	(0.97)	(1.03)	(0.96)	(0.91)	(0.97)	(0.90)
Pair Institutions#Year FEs	YES	YES	YES	YES	YES	YES
Proposal FEs	YES	YES	YES	NO	NO	NO
Shar. Meeting FEs	NO	NO	NO	YES	YES	YES
N	18,830,350	18,830,332	18,830,332	18,846,865	18,846,811	18,846,811

Table 4. Regressions of Voting Distance on pair portfolio measures (Vertical)

This table reports the results of multivariate OLS regressions explaining the vote distance of a pair of institutions in proposals voted in shareholder meetings of portfolio companies based on their holdings in vertically related companies. All specifications include pair institutions times year fixed effects. Standard errors are robust to heteroscedasticity and clustered at the pair institutions level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1) VoteDistance	(2) VoteDistance	(3) VoteDistance	(4) VoteDistance	(5) VoteDistance	(6) VoteDistance
CosSim (Vert)		-0.001**	0.001		-0.001**	0.001
		(-2.01)	(0.85)		(-2.02)	(0.83)
PairComOwn (Vert)	-0.320		0.494	-0.325		0.488
	(-0.89)		(0.99)	(-0.91)		(0.98)
CosSim (Vert) x PairComOwn (Vert)			-1.824**			-1.822**
			(-2.15)			(-2.17)
OwnShare (g.a.)	-0.095***	-0.100***	-0.095***	-0.094***	-0.099***	-0.094***
	(-3.92)	(-5.89)	(-3.93)	(-3.89)	(-5.88)	(-3.90)
PtfWeight (g.a.)	0.039	0.070	0.034	0.034	0.065	0.029
	(0.21)	(0.90)	(0.18)	(0.18)	(0.85)	(0.16)
Pair Institutions#Year FEs	YES	YES	YES	YES	YES	YES
Proposal FEs	YES	YES	YES	NO	NO	NO
Shar. Meeting FEs	NO	NO	NO	YES	YES	YES
N	8,253,402	18,627,844	8,253,402	8,263,514	18,642,824	8,263,514

Table 5. Regressions of Voting Distance on pair portfolio measures (Horizontal)- Sub datasets

This table reports the results of multivariate OLS regressions explaining the vote distance of a pair of institutions in proposals voted in shareholder meetings of portfolio companies based on their holdings in horizontally related companies. All specifications include pair institutions times year fixed effects. Standard errors are robust to heteroscedasticity and clustered at the pair institutions level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

(a) Director elections

	VoteDistance		VoteDistance	
	Coefficient	t-stat	Coefficient	t-stat
CosSim (4-digit NAICS)	-0.002**	-2.47	-0.002**	-2.50
PairComOwn (4-digit NAICS)	-0.194	-0.83	-0.193	-0.84
CosSim x PairComOwn (4-digit NAICS)	-1.863***	-3.64	-1.859***	-3.65
N	13,302,242		13,313,827	
	(Proposal FEs)		(Shar. Meeting FEs)	

(b) Compensation proposals

	VoteDistance		VoteDistance	
	Coefficient	t-stat	Coefficient	t-stat
CosSim (4-digit NAICS)	0.002	1.50	0.001	1.51
PairComOwn (4-digit NAICS)	-0.454	-1.44	-0.454	-1.44
CosSim x PairComOwn (4-digit NAICS)	1.402*	1.89	1.400*	1.89
N	1,613,200		1,613,786	
	(Proposal FEs)		(Shar. Meeting FEs)	

(c) Governance proposals

	VoteDistance		VoteDistance	
	Coefficient	t-stat	Coefficient	t-stat
CosSim (4-digit NAICS)	0.006*	1.79	0.006*	1.84
PairComOwn (4-digit NAICS)	1.184	1.08	1.164	1.06
CosSim x PairComOwn (4-digit NAICS)	-3.388	1.22	-3.386	1.22
N	355,860		355,921	
	(Proposal FEs)		(Shar. Meeting FEs)	

Table 6. Regressions of Voting Distance on pair portfolio measures (Vertical) - Sub datasets

This table reports the results of multivariate OLS regressions explaining the vote distance of a pair of institutions in proposals voted in shareholder meetings of portfolio companies based on their holdings in vertically related companies. All specifications include pair institutions times year fixed effects. Standard errors are robust to heteroscedasticity and clustered at the pair institutions level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

(a) Director elections

	VoteDistance		VoteDistance	
	Coefficient	t-stat	Coefficient	t-stat
CosSim (Vert)	-0.002**	-2.42	-0.002**	-2.41
PairComOwn (Vert)	-0.115	-0.26	-0.115	-0.26
CosSim x PairComOwn (Vert)	-1.329	-1.32	-1.327	-1.33
N	5,805,000		5,812,164	
	(Proposal FEs)		(Shar. Meeting FEs)	

(b) Compensation proposals

	VoteDistance		VoteDistance	
	Coefficient	t-stat	Coefficient	t-stat
CosSim (Vert)	-0.001	-0.74	-0.001	-0.74
PairComOwn (Vert)	-1.451**	-2.22	-1.450**	-2.22
CosSim x PairComOwn (Vert)	-0.449	-0.34	-0.447	-0.34
N	714,397		714,777	
	(Proposal FEs)		(Shar. Meeting FEs)	

(c) Governance proposals

	VoteDistance		VoteDistance	
	Coefficient	t-stat	Coefficient	t-stat
CosSim (Vert)	0.006*	5.01	0.006*	4.98
PairComOwn (Vert)	1.906	1.10	1.932	1.12
CosSim x PairComOwn (Vert)	-6.192	-1.28	-6.137	-1.27
N	164,215		164,244	
	(Proposal FEs)		(Shar. Meeting FEs)	

Table 7. Regressions of Voting Distance on pair portfolio measures (Horizontal) - Alternative definition

This table reports the results of multivariate OLS regressions explaining the vote distance of a pair of institutions in proposals voted in shareholder meetings of portfolio companies based on their holdings in horizontally related companies. All specifications include pair institutions times year fixed effects. Standard errors are robust to heteroscedasticity and clustered at the pair institutions level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1) VoteDistance	(2) VoteDistance	(3) VoteDistance	(4) VoteDistance	(5) VoteDistance	(6) VoteDistance
CosSim (3-digit SIC)		-0.000	0.001		-0.000	0.000
		(-0.26)	(0.87)		(-0.25)	(0.88)
PairComOwn (3-digit SIC)	-0.402**		0.740**	-0.411**		0.727**
	(-2.25)		(2.23)	(-2.32)		(2.21)
CosSim (3-digit SIC) x PairComOwn (3-digit SIC)			-1.822***			-1.818***
			(-4.36)			(-4.38)
OwnShare (g.a.)	-0.099***	-0.101***	-0.097***	-0.098***	-0.099***	-0.096***
	(-5.73)	(-5.92)	(-5.60)	(-5.71)	(-5.91)	(-5.58)
PtfWeight (g.a.)	0.074	0.075	0.069	0.069	0.070	0.065
	(0.97)	(1.01)	(0.94)	(0.91)	(0.95)	(0.88)
Pair Institutions#Year FEs	YES	YES	YES	YES	YES	YES
Proposal FEs	YES	YES	YES	NO	NO	NO
Shar. Meeting FEs	NO	NO	NO	YES	YES	YES
N	18,830,350	18,830,350	18,830,350	18,846,865	18,846,865	18,846,865

Table 8. Industry-by-Industry analysis

These tables report the analysis of the distribution of the results of the industry-by-industry regressions based on the 4-digit NAICS classification and covering the period from 2003 to 2021. The first table presents the summary statistics while the second and third present the correlation analysis. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

(a) Summary statistics

Variable	**Mean**	**S.D.**	**P5**	**P25**	**P50**	**P75**	**P95**	**N**
Coefficients:								
CosSim	-0.367	9.497	-9.527	-4.132	-0.104	2.881	12.488	214
PairComOwn	0.004	0.049	-0.040	-0.009	0.003	0.013	0.056	215
CosSim x PairComOwn	-77.811	1182.104	-80.523	-11.891	-0.707	8.986	74.938	214
T-stats:								
CosSim	-0.223	1.783	-3.120	-1.474	-0.0429	0.867	2.641	214
PairComOwn	0.156	1.496	-2.547	-0.871	0.194	1.095	2.520	215
CosSim x PairComOwn	-0.092	1.599	-2.915	-1.127	-0.040	1.024	2.584	214

(b) Correlation among Coefficients

Correlation	CosSim	PairComOwn	CosSim x PairComOwn
CosSim	1.000	-0.071	-0.243*
PairComOwn	-0.071	1.000	0.002
CosSim x PairComOwn	-0.243*	0.002	1.000

(c) Correlation among T-stats

Correlation	CosSim	PairComOwn	CosSim x PairComOwn
CosSim	1.000	-0.077	0.113
PairComOwn	-0.077	1.000	0.122
CosSim x PairComOwn	0.113	0.122	1.000

Appendix A. Variable Definitions

(a) Base Dataset (Institution level)

Variable	Definition
Vote	Vote is the fraction of votes "For" by funds affiliated with the institution on a given proposal of a portfolio firm.
OwnShare	OwnShare is the fractional ownership of a stock in an institution in the quarter before the shareholders' meeting.
PtfWeight	PtfWeight is portfolio weight of a stock in an institution in the quarter before the shareholders' meeting.
Index	Index is the fraction of index funds affiliated with the institution.

(b) Regression Dataset (Pair Institution level)

Variable	Definition
VoteDistance	VoteDistance is the absolute value of the difference between the Vote of two institutions in the same proposal of a portfolio company.
OwnShare (g.a.)	OwnShare (g.a.) is the geometric average of OwnShare for the pair of institutions.
PtfWeight (g.a.)	PtfWeight (g.a.) is the geometric average of PtfWeight for the pair of institutions.
Index (g.a.)	Index (g.a.) is the geometric average of Index for the pair of institutions.
PairComOwn (4-digit NAICS)	PairComOwn (4-digit NAICS) is the sum of OwnShare (g.a.) in a given 4-digit NAICS industry weighted by their market capitalization for the pair of institutions.
CosSim (4-digit NAICS)	CosSim (4-digit NAICS) is the dot product of the pair's portfolio weight vectors normalized by the vectors' lengths restricted to a given 4-digit NAICS industry.
PairComOwn (Vert)	PairComOwn (Vert) is the sum of OwnShare (g.a.) in a set of vertically related firms weighted by their market capitalization for the pair of institutions.
CosSim (Vert)	CosSim (Vert) is the dot product of the pair's portfolio weight vectors normalized by the vectors' lengths restricted to a given set of vertically related firms.