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Overlapping Ownership Along the Supply Chain

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Abstract

I find overlapping institutional ownership (OIO) in a customer and supplier increases the duration of their supply chain relationship. Results are stronger when vertical holdup is more severe. A quasi-natural experiment around mergers of financial institutions provides causal evidence of OIO improving relationship survival rates. Concurrent with longer-lived relationships, valuations and innovation increase, consistent with OIO effects on relationship longevity being beneficial. I find evidence of OIO strengthening relationships via an internalization channel: With more OIO, partners cooperate more, with the supplier extending more trade credit. Overall, results indicate OIO strengthens vertical relationships by alleviating holdup problems.

I. Introduction

Collaboration between trade partners can result in valuable supply chain synergies. However, holdup costs can prevent these synergies from ever taking place—each party is reluctant to invest in the relationship for fear that once investments are made, the other party will act opportunistically to capture all relationship rents. Resolving this holdup in order to facilitate cooperation between vertical trade partners is a classic problem. We know ownership links between the two firms can help align supply chain goals and strengthen the relationship: a large literature focuses on vertical integration and situations in which a merger with a trade partner is advantageous (e.g., Coase (1937), Fan and Goyal (2006), Lafontaine and Slade (2007), and Garfinkel and Hankins (2011)), and Fee, Hadlock, and Thomas (2006) show that corporate equity stakes mitigate supply chain conflicts.

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While these ownership links can effectively strengthen vertical relationships in some cases, they are likely not the best solution for many supply chain partnerships, even when holdup is a problem. For example, while vertical integration may be beneficial when a customer purchases the bulk of a supplier's output, it likely would not be practicable when the customer purchases only a portion of the supplier's capacity. While corporate equity stakes can be effective, they rarely occur (Fee et al. (2006)), and establishing equity stakes is costly, complex, and requires disclosure, making them expensive and fairly illiquid (Billett, Elkamhi, and Floros (2015)).

As an alternative to these more direct ownership mechanisms, overlapping institutional ownership (OIO), the extent to which supply chain partners share institutional investors, could alleviate vertical holdup problems if the overlapping owners help align supply chain goals. In this article, I find causal evidence that OIO strengthens supply chain ties, leading to longer, stronger relationships.

My empirical approach is as follows: Baseline results show that customer–supplier pairs with greater OIO have longer relationships as measured by improved survival rates, particularly when the potential for holdup problems is more severe. To address endogeneity between ownership overlap and vertical relationships, I exploit plausibly exogenous shocks to OIO arising from mergers of financial institutions. When an institutional blockholder of one trade partner merges with an institution holding a large stake in the other trade partner, creating a large OIO position, the two firms are more likely to continue their supply chain relationship.

Results hold in a series of robustness tests. Recent discussion in the literature emphasizes the need to focus on investors with overlapping stakes significant enough to incentivize firm managers (e.g., Harford, Jenter, and Li (2011), Gilje, Gormley, and Levit (2020)). In this spirit, I repeat the baseline results with OIO aggregated only i) across investors holding at least 1% of each firm's shares outstanding, ii) across investors whose portfolios are 1% comprised by the overlapping stake, or iii) across long-term investors, finding consistent results. Thus, the effects documented throughout the article are not simply the result of small, short-term investments in a customer–supplier pair, but are driven by owners with sizable stakes in both firms. Additionally, findings do not appear to be driven by the surge in passive index ownership, as results hold when I exclude "Big 3" (BlackRock, StateStreet, and Vanguard) ownership from my OIO measure. Results around institution mergers are robust to alternative control group definitions, and hold when I exclude financial crisis years (Lewellen and Lowry (2021)).

Baseline results and causal evidence from institution mergers show OIO strengthening supply chain relationships, leading to enhanced survival rates. These results are consistent with OIO alleviating costly supply chain holdup, which should generate greater supply chain value. An alternative explanation, however, could be that ownership ties prop up suboptimal relationships, causing them to survive longer than is economically beneficial. To shed light on which interpretation is more likely, I show that concurrent with increasing relationship length, OIO is associated with higher supply chain valuations (measured by market-to-book ratios) and greater patenting activity. Increased innovation and valuations suggest an overall pattern more consistent with OIO beneficially reducing holdup problems and creating supply chain value than being harmful.

Finally, I consider the mechanisms through which OIO affects supply chains. Theoretically, we would expect synergistic effects of OIO on vertical relationships due to the portfolio-level focus of their investors, as modeled by Hansen and Lott (1996). They show that maximizing the portfolio value of owners with interests in multiple firms may not always translate into maximizing individual firm value.[1] When firms within the overlapping owners' portfolios can affect each other's profits (as is the case between a customer and supplier) a portfolio-level focus helps align the incentives of the commonly-held companies. While in the absence of OIO a value-maximizing firm may act opportunistically in ways that harm a supply chain partner, OIO should cause firms to internalize the effect of their actions on their partners, reducing the risk of opportunistic behavior and enhancing trust. Thus, the clearest theoretical channel through which OIO should affect supply chains is one of internalization, with supply chain partners collaborating more effectively due to the trust engendered by their aligned incentives. I find support for the internalization channel by documenting increased provision of trade credit, evidence of greater trust between supply chain partners due to OIO.

Additionally, overlapping institutional owners' influence could occur somewhat more directly through multiple channels, including active engagement, voting, and board representation. For example, ample recent literature shows evidence of direct engagement between institutional investors and their portfolio companies' management (see, e.g., Dimson, Karakas, and Li (2015), McCahery, Sautner, and Starks (2016), and Bradley, Jame, and Williams (2022)). Particularly pertinent to supply chain-related communications, Zhang (2022) finds evidence of management learning from institutional investors with supply chain information at investor conferences. Shareholder proposals related to supply chain sustainability are also common, reflecting another way institutional investors could plausibly influence vertical relationships.[2]

My article contributes to a growing literature intersecting corporate finance and supply chain issues. Prior literature has documented other mechanisms reducing supply chain holdup: For example, Chu, Tian, and Wang (2019) show improved supplier innovation when the firm is geographically close to its customer, while Costello (2013) shows that supply contract design can alleviate holdup when firms are geographically distant. Dasgupta, Zhang, and Zhu (2021) find network ties among supply chain partners' directors or officers help resolve holdup and induce more innovation. More broadly, prior studies examine supply chain issues in contexts such as mergers and acquisitions (Shahrur (2005), Fan and Goyal (2006), Garfinkel and Hankins (2011), and Ahern and Harford (2014)), accounting disclosure and conservatism (Ellis, Fee, and Thomas (2012), Hui, Klasa, and Yeung (2012)), earnings management (Raman and Shahrur (2008), Dou, Hope, and Thomas (2013)), capital structure and the financing costs (Kale and Shahrur

[1]Previous articles had also noted that the interests of shareholders may not always be firm value maximization (Long (1972), Ekern and Wilson (1974), Merton and Subrahmanyam (1974), Radner (1974), Nielsen (1976), Grossman and Stiglitz (1977), and Hart (1979)).

[2]See, e.g., "Unilever to Put its Climate Change Plans to a Shareholder Vote," *Reuters*, Dec. 13, 2020; Gray, A., and P. Temple-West, "Investor Rebellion at Procter & Gamble Over Environmental Concerns," *Financial Times*, Oct. 13, 2020; Hodges, J., and W. Matthis, "Why Company Carbon Cuts Should Include 'Scope' Check," *Bloomberg*, Feb. 11, 2020.

(2007), Brown, Fee, and Thomas (2009), Cen, Dasgupta, Elkamhi, and Pungaliya (2016), Dhaliwal, Judd, Serfling, and Shaikh (2016), and Campello and Gao (2017)), and distress spillover (Hertzel, Li, Officer, and Rodgers (2008), Boissay and Gropp (2013), and Jacobson and von Schedvin (2015)). I contribute to this literature stream by showing that institutional investment along the supply chain helps strengthen supply chain interactions between the commonly held firms.

Empirical analysis examining OIO effects on supply chain issues is limited. Dai, Liang, and Ng (2021), who document ESG spillover across the supply chain, find stronger subsample results for partners with OIO. The study closest to mine is a contemporaneous article in the operations literature by Cheung, Haw, Hu, Swink, and Zhang (2020) who show correlations between the presence of OIO and suppliers' operating performance. Our articles are very distinct in contribution, as I study OIO effects on supply chain partnership survival versus their emphasis on supplier profitability, and my analysis employs a quasi-natural experiment to provide causal evidence of OIO beyond the correlations they document.[3] Other articles have considered the effects of OIO in different contexts, particularly in acquisitions (Hanson and Lott (1996), Matvos and Ostrovsky (2008), and Harford et al. (2011)) and industry competition (e.g., He and Huang (2017), Azar, Schmalz, and Tecu (2018), and Azar, Raina, and Schmalz (2021)).[4] While the effects of OIO on acquisitions and industry competition are predicted to decrease overall welfare due to reduced acquisition efficiency and industry collusion, OIO across the supply chain is more likely value-enhancing if it alleviates holdup costs. Further, while owners may hesitate to take observable actions promoting industry collusion, efforts regarding supply chain strength would typically not tempt regulatory scrutiny.

Other articles suggest innovation spillovers as a possible bright side to OIO: Kostovetsky and Marconi (2020) and Geng, Hau, Michaely, and Nguyen (2021) find evidence of OIO increasing innovation diffusion and reducing patent litigation risk, while Antón et al. (2021) find that the direction of OIO effects on innovation depends on industry dynamics. In a somewhat similar vein, my study also suggests a (different) arena in which OIO can be welfare-enhancing. Finally, other articles have addressed impacts of OIO on firms' voluntary disclosure policies (Jung (2013), Park, Sani, Shroff, and White (2019), and Pawliczek, Skinner, and Zechman (2022)) or abnormal accruals (He et al. (2020)). My article uniquely contributes to this broad stream of literature by showing how OIO strengthens and lengthens supplier–customer relationships.

[3]Specifically, our studies differ along multiple dimensions: Their unit of analysis is the supplier rather than the customer–supplier relationship, showing higher average OIO across the supplier's customers correlate with improved gross margins; they do not consider relationship survival and pair-level outcomes, the focus of my study. My supplemental analysis supports their finding of OIO and higher supplier valuations, but I also show higher customer and pair-level valuations, and increased innovation for both firms. Finally, in terms of identification, their results manifest only between firms to show a correlation between OIO and supplier margins, while I show a *causal* effect of OIO on supply chain strength with a quasi-natural experiment and tighter time-varying, within-firm variation.

[4]Other articles in this area include Azar (2012), (2017), Cici, Gibson, and Rosenfeld (2015), He, Huang, and Zhao (2019), Lopez and Vives (2019), He, Li, and Yeung (2020), Koch, Panayides, and Thomas (2021), He, Liang, Wang, and Xia (2024), and Antón, Ederer, Giné, and Schmalz (2023).

II. Background: Supply Chain Holdup

A large literature spanning the economics, finance, and management literatures has described the dynamics of supply chain partnerships, documented problems that can inhibit collaboration, and suggested solutions to create trust and align supply chain goals (see, e.g., Williamson (1971), (1979), (1985)). In many cases, supply chains can benefit from relationships that go beyond simple arms-length transactions due to the possibility of relationship rents created through relationship-specific investment (RSI) and information sharing. Such rents could come from, for example, suppliers investing in production technology tailored to their customers' input needs, customers providing more timely demand forecasts, inventory coordination, or collaborative innovation. However, because RSI creates assets that are inherently more valuable within the relationship than outside of it, and because of incomplete contracting in the context of complex assets (e.g., Grossman and Hart (1986)), RSI exacerbates the risk of opportunistic behavior – once costly investment is made, the firm's customer (supplier) could exploit its partner's economic dependence on it and demand a greater share of the relationship rents. This risk of opportunism by a profit-maximizing counterparty can destroy or preclude effective collaboration between partners.

However, a "bonding mechanism" can align the economic incentives of a customer and supplier, such that the risk of opportunism is alleviated by their shared goals. Overlapping ownership could provide such a bonding mechanism due to the portfolio-level focus of owners with stakes in both firms. As shown by Hansen and Lott (1996), maximizing portfolio value may not always mean maximizing individual firm value, if firms in the portfolio have the ability to influence each other's profits, as in the case of supply chain partners. Thus, while a firm-maximizing customer (supplier) may optimally choose to act opportunistically at its supplier's (customer's) expense, a customer (supplier) whose owners also have stakes in its partner should internalize the effects of its actions on that partner. The partner, in turn, will be more willing to invest in the relationship, recognizing their aligned incentives and lower risk of opportunistic behavior.

If overlapping ownership causes firms to internalize the effects of their actions on their supply chain partners, then OIO should generate more trust, alleviate holdup problems, and result in more collaborative, longer-lasting supply chain relationships, particularly in situations with an ex ante higher risk of supply chain holdup. The focus of this article is to empirically examine this hypothesis.

III. Data and Methodology

A. Data

To identify customer–supplier relationships, I use the Compustat Segment Customer data. Statement of Financial Accounting Standard (SFAS) No.14 requires firms to report all customers comprising 10% or more of their total sales, though many firms opt to report significant customers below this threshold as well. The Segment database includes the names of customers as well as the supplier's sales to

these customers.[5] My sample of Segment data runs from 1976 to 2010, and includes 20,792 supplier–customer pairs. I merge the Segment data with firm-level controls from Compustat.

Data on institutional ownership are from the Thomson Reuters 13F database. This database includes portfolio holdings of institutional investors with over 100 million in assets under management, including pension funds, endowments, insurance companies, bank trusts, mutual fund families, hedge funds, and independent advisors. The Thomson ownership data report institutions' holdings at the end of each calendar quarter. I merge Thomson with CRSP's quarterly database for shares outstanding and stock price data.

B. Measuring Ownership Overlap

To construct measures of OIO, I first identify institutions that hold shares in both the supplier and customer at a given point in time (measured quarterly with the 13F filings). These institutions form the group of overlapping owners. To create continuous measures capturing the magnitude of OIO, I use two variables from prior literature, which I label OVERLAP_VALUE and OVERLAP_PRODUCT. For both measures, a higher value reflects the magnitude of the overlapping ownership stakes. The first OIO measure is OVERLAP_VALUE, the proportion of value outstanding held by overlapping owners:

$$\frac{\Sigma_k (V_{s,k} + V_{c,k})}{V_s + V_c}, \tag{1}$$

across k overlapping owners, where V denotes the value of either the customer or supplier, calculated as number of shares × share price. OVERLAP_VALUE is used by Antón and Polk (2014), who address how OIO affects the commonality of stock returns. My second OIO measure is OVERLAP_PRODUCT, the product of the proportion of supplier shares held by overlapping owners and the proportion of customer shares held by overlapping owners:

$$\left(\frac{\Sigma_k H_{c,k}}{H_c} \times \frac{\Sigma_k H_{s,k}}{H_s}\right), \tag{2}$$

across k overlapping institutional owners, where H represents shares of the customer or supplier, denoted c and s, respectively. This variable was previously used by Hansen and Lott (1996) to measure OIO in the target and acquirer in mergers and acquisitions. I calculate OIO measures for each quarter, then take averages to create an annual figure. In all specifications, OIO is measured with a 1-year lag.[6]

[5] In the raw Segment data, customer names are in text format and must be matched to their Compustat gvkeys for coding. I thank Edward Fee, Janet Gao, and Yixin Liu for graciously providing matched customer–supplier data.

[6] The annual aggregation is based on the supplier's fiscal year, since the Segment data are reported by the supplier. Because 13F ownership data are measured at calendar-year quarters, I aggregate the 4 quarters immediately prior to the supplier's fiscal year-end and lag 1 year (e.g., an observation with a

One potential concern with these OVERLAP measures is that they could spuriously capture the effect of high institutional ownership in the customer–supplier pair; that is, a high level of joint institutional ownership in both firms may affect the relationship.[7] To address this concern, I construct measures of pair-level institutional ownership (JOINT_INST_OWN) parallel to the two overlap measures, and include as a control the joint ownership measure matching the OIO measure construction. Particularly, I construct JOINT_INST_VALUE to parallel OVERLAP_VALUE, as

$$\frac{\Sigma_i(V_{s,i}+V_{c,i})}{V_s+V_c}, \tag{3}$$

across i institutional investors, where V denotes the value of either the customer or supplier, calculated as number of shares × share price. This measure parallels the construction of OVERLAP_VALUE, but is calculated without respect to whether the institutional owners hold shares in both customer and supplier. Specifications with OVERLAP_VALUE include JOINT_INST_VALUE as a control.

Similarly, in specifications using OVERLAP_PRODUCT as the OIO measure, I control for JOINT_INST_OWN with JOINT_INST_PRODUCT, calculated as

$$\left(\frac{\Sigma_i H_{c,i}}{H_c} \times \frac{\Sigma_i H_{s,i}}{H_s}\right), \tag{4}$$

across i institutional investors, where H represents shares outstanding for each firm (subscripted with s and c). All specifications with OVERLAP_PRODUCT include JOINT_INST_PRODUCT as a control.

C. Dependent Variable

Analyzing the effects of OIO on vertical relationships requires a measure of relationship strength. I focus on relationship survival as my main variable of interest, using an indicator for the customer–supplier relationship ending as my main dependent variable. RELATIONSHIP_END captures the longevity of the relationship by reflecting relationship duration. To some degree, it also reflects the magnitude of the relationship due to the nature of the sample: since the supplier only reports sales to major customers, all customer–supplier relationships in the sample involve significant transactions. To construct RELATIONSHIP_END, I follow Fee et al. (2006), and follow a customer–supplier pair from the first time it appears in the sample through the last time it appears, marking this last year as the termination of their relationship. Thus, RELATIONSHIP_END is an indicator equal to 1 if an observation is the last year a customer–supplier pair appears in my sample and 0 if the relationship continues. Also following Fee et al., I mark the last year as missing if that year is also the last year either firm appears in Compustat or the last year of my sample, since in these cases I can no longer observe whether

supplier fiscal year-end in May 2005 will be matched with lagged OIO measures computed by averaging quarterly OIO across June 2003, Sept. 2003, Dec. 2003, and Mar. 2004).

[7] I thank an anonymous reviewer for this observation.

the relationship continues. While the indicator does not perfectly capture when supplier sales to the customer stop (in some cases, the relationship may no longer be reported because the sales concentration percentage has fallen below the reporting threshold), it does capture the last year of significant trade between the two firms, and is likely highly correlated with the true relationship end, as noted by Fee et al. (2006).[8]

An alternative dependent variable could capture relationship magnitude using transaction size, which I examine in Table A2 in the Supplementary Material. However, I do not rely on this measure heavily to measure relationship strength, because transaction size is driven by operating and downstream demand factors distinct from the customer–supplier relationship.[9]

D. Control Variables and Specifications

Throughout my analysis, I include control variables likely to affect relationship survival. All else equal, we would expect customer–supplier relationships with larger transactions to last longer, so I control for the sales dependence (SALES_DEP) of the supplier on the customer, measured as sales to the customer as a proportion of total supplier sales. When transaction size is not reported in a given year but the relationship has not ended, I use the most recently reported sales dependence. Trade relationships also likely last longer when alternative vertical partners are scarce, so I control for the industry concentration, HHI, of the supplier and of the customer, calculated at the 3-digit SIC level. Bargaining power could also affect trade relationships, so I control for market share (MKT_SHARE); the log of firm assets (SIZE); and profitability (PROFIT) for both firms. I also control for the log of relationship tenure (REL_LENGTH). To capture unobservable, time-invariant characteristics of the firms and their relationships, linear probability model (LPM) specifications use a combination of firm (for both customer and supplier) and year or industry × year (for both the customer's industry and the supplier's industry) fixed effects. Alternatively, in Cox hazards model specifications, I allow the baseline hazards to differ across both supplier and customer industries. In hazards models, REL_LENGTH is absorbed, due to the nature of the specification (Lemeshow, May, and Hosmerow (2011)).

E. Summary Statistics

Table 1 reports summary statistics for the variables of interest and the control variables, measured at the customer–supplier-year observation level. Firm-level characteristics show that customers tend to have higher market share and are larger and more profitable than their suppliers, consistent with patterns documented in extant studies (e.g., Fee et al. (2006), Banerjee, Dasgupta, and Kim (2008)). This reflects the nature of the sample: since suppliers are required to report customers

[8]To the extent that RELATIONSHIP_END captures the end of transactions imperfectly, this mismeasurement should only introduce noise and not bias into the analysis.

[9]For example, while the decision by Ford Motor Company's management to continue purchasing seat belts from supplier Autoliv Inc. is likely influenced by the strength of their supply chain relationship, the *quantity* of seat belts purchased will not increase linearly with relationship strength, since consumer demand and production needs are primary determinants of quantity.

TABLE 1

Summary Statistics

Customer and supplier firm data in Table 1 come from the Compustat Segment file, and are limited to observations with institutional ownership observable for both firms. The sample period is 1981–2009. Observations are at the customer–supplier-year level. HHI is the Herfindahl index computed for Compustat firms at the 3-digit SIC code level. MKT_SHARE is calculated as the firm's revenues as a percentage of its industry's total revenues. SIZE is the log of total book assets in millions of dollars. PROFIT is operating income before depreciation and amortization scaled by total assets. RELATIONSHIP_END is an indicator for the final year a customer–supplier observation is reported. SALES_DEP is the sales from the supplier to the customer as a proportion of total supplier sales. REL_LENGTH is the log number of years since the customer–supplier pair first appeared in the Compustat sample. OVERLAP_VALUE is the proportion of total market value held by overlapping 13F investors, while OVERLAP_PRODUCT is the product of the proportion of supplier shares held by overlapping shareholders and the proportion of customer shares held by overlapping shareholders. JOINT_INST_VALUE is the proportion of combined customer and supplier market value held by institutional owners and JOINT_INST_PRODUCT is the product of the supplier's and the customer's institutional ownership share. Ownership measures are constrained to be between 0 and 1, and variables are winsorized at the 1st and 99th percentiles.

Variable	No. of Obs.	Mean	Std. Dev.	25th Pctl.	Median	75th Pctl.
Supplier Characteristics						
HHI	29,843	0.159	0.121	0.072	0.123	0.202
MKT_SHARE	29,843	0.030	0.082	0.000	0.002	0.013
SIZE	29,843	4.798	2.009	3.370	4.647	6.133
PROFIT	29,843	0.057	0.209	0.016	0.105	0.169
Customer Characteristics						
HHI	29,843	0.181	0.150	0.086	0.132	0.208
MKT_SHARE	29,843	0.205	0.203	0.049	0.150	0.277
SIZE	29,843	9.593	1.831	8.556	9.796	10.795
PROFIT	29,843	0.142	0.071	0.093	0.143	0.181
Relationship Characteristics						
RELATIONSHIP_END	29,843	0.155				
SALES_DEP	29,843	0.192	0.156	0.101	0.140	0.225
REL_LENGTH	29,843	1.426	0.866	0.693	1.609	2.079
OVERLAP_VALUE	29,843	0.149	0.154	0.028	0.088	0.239
OVERLAP_PRODUCT	29,843	0.060	0.093	0.001	0.013	0.079
JOINT_INST_VALUE	29,843	0.531	0.194	0.386	0.531	0.666
JOINT_INST_PRODUCT	29,843	0.196	0.204	0.034	0.129	0.293

comprising over 10% of their sales, the sample includes smaller suppliers and larger customers. Pair-level characteristics show that the unconditional probability of a relationship ending in a given year is 15.5%. A customer accounts for 19.2% of the supplier's sales on average and the average REL_LENGTH (in logs) is 1.43 (4.16 years). The average level of OVERLAP_VALUE is 0.149, representing 15% of value outstanding, compared with 53.1% of value outstanding held by all institutional investors (JOINT_INST_VALUE, representing both overlapping and non-overlapping ownership). The average level of OVERLAP_PRODUCT is 0.060, compared with 0.196 for JOINT_INST_PRODUCT.

To put the OIO measures into perspective, Panel A of Table A8 in the Supplementary Material reports parallel measures for a set of "pseudo pairs" formed by pairing the suppliers (customers) observed in the sample with other downstream (upstream) firms in the same 4-digit SIC code and similar in size to the observed partners. I then report summary statistics for OIO among these pseudo pairs over the tenure of the customer–supplier pair they are matched to. OIO is significantly higher in observed customer–supplier pairs than in the pseudo pairs of similar firms not in observed vertical relationships.[10] If OIO strengthens supply

[10]True pairs' OVERLAP_VALUE is around 0.04–0.05 higher than that of pseudo pairs; OVERLAP_PRODUCT is around 0.03–0.04 higher, depending on the construction of the pseudo pairs.

chain relationships, we might reasonably expect higher OIO between supply chain partners than between otherwise similar firms.

Strong supply chain relationships could also encourage more OIO. Panel B of Table A8 in the Supplementary Material shows in a univariate framework that OIO increases significantly after supply chain partners establish a relationship. A difference-in-difference (DiD) analysis of changes in OIO around relationship formation for true versus pseudo pairs further confirms this (Table A9 in the Supplementary Material). Within the baseline sample of existing customer–supplier relationships, Table A1 in the Supplementary Material shows that OIO is positively predicted by REL_LENGTH, JOINT_INST_OWN, and SUPPLIER_SIZE; OIO is negatively predicted by profitability (of either firm).

IV. Baseline Results

A. Univariate Evidence

Figure 1 shows preliminary graphical evidence of OIO lengthening supply chain relationships. The figure plots the probability of a supply chain relationship ending for each year of the decade from 2000 to 2009 for three groups based on pair-level OIO: "Low," "Medium," and "High" OIO (based on within-year terciles). In every year, relationships are less likely to end for pairs in the highest tercile of OIO versus low OIO, and the probabilities decrease monotonically with OIO. This univariate analysis provides an early indication of shared institutional ownership enhancing survival rates.

B. Multivariate Results

Turning to multivariate analysis, baseline regression results are reported in Table 2, showing the association between OIO and relationship survival using either OVERLAP_VALUE (columns 1, 2, and 5) or OVERLAP_PRODUCT (columns 3, 4, and 6). Columns 1–4 are LPMs and columns 5 and 6 are hazards

FIGURE 1

Relationship End by OIO Across Years

Figure 1 plots the probability of a supply chain relationship ending by year, for 4 OIO buckets: "Zero" (no OIO); "Low" (lowest within-year tercile of OIO among pairs with positive overlap); "Medium" (middle within-year tercile of OIO among pairs with positive overlap); and "High" (highest within-year tercile of OIO among pairs with positive overlap).

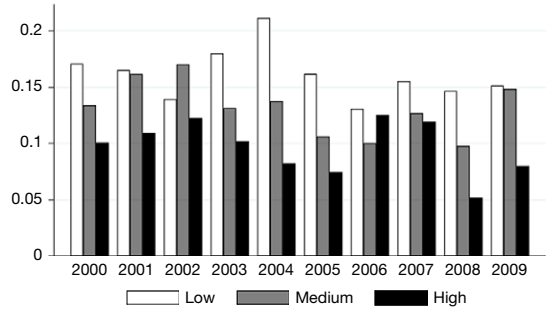

TABLE 2

Baseline Results

Table 2 shows regressions of RELATIONSHIP_END on ownership overlap. Columns 1–4 use linear probability models, while columns 5 and 6 are Cox proportional hazards models. Columns 1, 2, and 5 use OVERLAP_VALUE (proportion of total market value of the supplier and the customer held by overlapping shareholders) to measure owner overlap, while columns 3, 4, and 6 use OVERLAP_PRODUCT (proportion of supplier's shares outstanding held by overlapping shareholders × the proportion of customer's shares outstanding held by overlapping shareholders). JOINT_INST_OWN captures the combined institutional ownership of the two firms, calculated parallel to the OVERLAP measures. In columns 1, 2, and 5, JOINT_INST_OWN is the proportion of combined customer and supplier market value held by institutional owners, while in columns 3, 4, and 6, JOINT_INST_OWN is the product of the supplier's and the customer's institutional ownership share. All overlap measures are lagged 1 year. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. *t*-statistics are shown in parentheses, computed from standard errors double-clustered by customer and supplier in the LPM models or clustered by customer–supplier pair in hazards specifications.

	Linear Probability Models				Hazards Models	
	1	2	3	4	5	6
OVERLAP	−0.119***	−0.111**	−0.172**	−0.175**	−0.481**	−0.631*
	(−2.66)	(−2.46)	(−2.41)	(−2.27)	(−2.52)	(−1.69)
REL_LENGTH	0.034***	0.027***	0.034***	0.027***		
	(5.59)	(4.68)	(5.54)	(4.65)		
SALES_DEP	−0.470***	−0.471***	−0.468***	−0.469***	−2.674***	−2.680***
	(−14.17)	(−13.67)	(−14.07)	(−13.57)	(−16.86)	(−16.88)
JOINT_INST_OWN	0.089***	0.081***	0.023	0.044	0.426***	0.155
	(3.82)	(3.24)	(0.71)	(1.24)	(4.86)	(1.06)
SUPPLIER_HHI	−0.049	0.007	−0.048	0.007	−0.755***	−0.791***
	(−0.95)	(0.10)	(−0.91)	(0.11)	(−3.90)	(−4.05)
CUSTOMER_HHI	−0.077	−0.149	−0.066	−0.142	0.274	0.384*
	(−0.97)	(−1.54)	(−0.83)	(−1.49)	(1.41)	(1.96)
SUPPLIER_MKT_SHARE	0.003	0.026	0.003	0.027	−1.819***	−1.832***
	(0.06)	(0.33)	(0.05)	(0.36)	(−4.29)	(−4.28)
CUSTOMER_MKT_SHARE	−0.019	0.004	−0.024	−0.003	−0.855***	−0.981***
	(−0.26)	(0.05)	(−0.33)	(−0.04)	(−5.52)	(−6.42)
SUPPLIER_SIZE	−0.032***	−0.035***	−0.033***	−0.037***	−0.061***	−0.073***
	(−4.80)	(−4.94)	(−5.15)	(−5.35)	(−4.42)	(−5.93)
CUSTOMER_SIZE	0.002	0.002	0.002	0.003	−0.006	0.007
	(0.19)	(0.19)	(0.23)	(0.26)	(−0.49)	(0.67)
SUPPLIER_PROFIT	−0.099***	−0.096***	−0.097***	−0.095***	−0.759***	−0.752***
	(−4.50)	(−4.33)	(−4.47)	(−4.30)	(−12.37)	(−12.41)
CUSTOMER_PROFIT	−0.135**	−0.141*	−0.122*	−0.134*	−0.901***	−0.840***
	(−2.05)	(−1.95)	(−1.89)	(−1.86)	(−4.44)	(−4.17)
Overlap measure	Value	Value	Product	Product	Value	Product
Supplier FEs	Yes	Yes	Yes	Yes		
Customer FEs	Yes	Yes	Yes	Yes		
Year FEs	Yes		Yes			
Supplier ind. × year FEs		Yes		Yes		
Customer ind. × year FEs		Yes		Yes		
Supplier ind. strata					Yes	Yes
Customer ind. strata					Yes	Yes
R^2	0.189	0.199	0.188	0.199		
No. of obs.	28,868	28,263	28,868	28,263	29,843	29,843

models. LPMs include firm fixed effects for both the customer and supplier, as well as year or industry × year fixed effects, with standard errors double-clustered by customer and supplier. The hazards models are stratified so that the baseline hazards differ across supplier industry and customer industry, with standard errors clustered at the customer–supplier relationship level. Among control variables, results show the relationship is less likely to end when the SALES_DEP of the supplier is high and more likely as time within the relationship passes (RELATIONSHIP_END). Other control variables generally indicate that relationships last longer when the supplier is larger or when either firm is more profitable. Signs on other firm-level variables are insignificant or mixed across specifications.

Across all specifications in Table 2, the coefficient on OVERLAP is negative and significant, indicating higher OIO associates negatively with RELATIONSHIP_END. In terms of magnitude, moving from 1-standard-deviation below the mean for OVERLAP_VALUE to 1-standard-deviation above the mean corresponds to a 3.42% reduction in the probability of the relationship ending (based on the column 2 coefficient). This is significant, relative to the unconditional probability of the relationship ending of 15.5%. Similarly, moving from 1-standard-deviation below the mean for OVERLAP_PRODUCT to 1-standard-deviation above the mean corresponds to a 3.26% reduction in the probability of the relationship ending (based on the column 4 coefficient). Conversely, coefficients on JOINT_INST_ OWN indicate that pair-level institutional ownership, without respect to overlapping stakes, accelerates the end of the relationship (though coefficients are only statistically significant in the value-based specifications). This effect is consistent with stronger incentives for firm-level (vs. supply chain partnership-level) value maximization from institutional investors without overlapping stakes. To explore this further, in Table A2 in the Supplementary Material, I report a falsification test replacing OVERLAP with NON_OVERLAP, calculated identically to the OVERLAP measures, but across institutional investors *not* holding overlapping shares in both firms. NON_OVERLAP positively predicts RELATIONSHIP_END in all columns, and is statistically significant in the value-based specifications. Thus, it is overlapping ownership, specifically, that associates with longer-lived relationships, and not institutional ownership in general.

In Table A3 in the Supplementary Material, I show OIO is also positively associated with the sales magnitude of the relationship, using pair-level sales scaled by supplier assets as the dependent variable. However, as previously discussed, I do not use this dependent variable throughout the article because transaction size is driven by many demand and production factors unrelated to supply chain stability.

Baseline Robustness

The baseline results in Table 2 confirm a positive association between OIO and vertical relationship strength. I perform several robustness tests to alleviate concerns about a spurious correlation. For brevity, these results are discussed here but tabulated in Table A4 in the Supplementary Material. First, I show that, while OIO measures in the baseline results are aggregated across all overlapping owners, the results are not driven by small, insignificant stakes in the two firms: in columns 1 and 2, results hold when OIO is computed only across overlapping owners holding 1% of each firm's shares; in columns 3 and 4, results hold when I require overlapping owners to hold 1% of each firm and to blockhold (5% stake) at least one of the firms;[11] and in columns 5 and 6 results persist when OIO is computed only across overlapping owners for which the combined stake in the customer and

[11]Double blockholdings (5% of *each* firm's shares) are rare (under this strict definition, less than 10% of my sample has positive OIO). If I require overlapping owners to hold a 5% in both companies, coefficients are *economically* similar to those in the baseline specification, but not statistically significant.

supplier represents at least 1% of their portfolio. Because we would also expect longer-term owners to have more influence over supply chain considerations, I show in columns 7 and 8 that results hold when I compute OIO only over owners that have held both firms at least 5 quarters (the median). Finally, we would not expect results to be driven primarily by passive institutions. In columns 9 and 10, following He et al. (2023), I exclude the "Big 3" (BlackRock, State Street, and Vanguard) that comprise the majority of passive index ownership of U.S. firms, and obtain results similar to the baseline findings.

C. Heterogeneity in Supply Chain Holdup

Table 2 reports a negative correlation between OIO and the end of a supply chain relationship, suggesting OIO strengthens vertical relationships. If so, we would expect stronger results in the face of greater supply chain frictions. Holdup problems are more severe when the transacted products are more specialized or more complex, or when information asymmetry between the partners is more severe (Williamson (1979), (1985), Lafontaine and Slade (2007)). I examine cross-sectional variation in these three areas in Table 3.

First, the potential for holdup problems is greater when transacted products are more specialized. Since specialized products are tailored to the customer's input needs, they often require RSI, which increases the risk of opportunistic behavior. Following prior literature, I measure product specificity using Rauch's (1999) industry specificity categories (e.g., Giannetti, Burkart, and Ellingsen (2011), Campello and Gao (2017), and Dass, Kale, and Nanda (2015)). Panel A of Table 3 splits the sample into suppliers selling specialized products (differentiated goods or services) and suppliers selling standardized goods, respectively. Comparing the OVERLAP_VALUE specifications in columns 1 and 2, results are robust in the specialized product subsample, but much smaller and statistically insignificant in the standardized product subsample, with a statistically significant difference in magnitudes. The pattern holds qualitatively in the OVERLAP_PRODUCT specifications as well, though the differences are not as striking.

Holdup costs are greater with complex transacted products, because of the difficulties in contractually sharing rents due to incomplete contracting (Grossman and Hart (1986)). I follow the literature in examining product complexity via the supplier's R&D focus (e.g., Fee et al. (2006), Kale and Shahrur (2007), Ellis et al. (2012), Dass et al. (2015), and Favara, Gao, and Giannetti (2021)). I split the sample based on the supplier's firm-level accumulated knowledge capital, following Favara et al. (2021).[12] I examine cross-sectional variation in complexity in Panel B of Table 3, splitting the baseline sample into pairs with "High" (above industry-median knowledge capital that year) complexity or "Low" (below industry–year median) complexity. With high product complexity (odd-numbered columns), OIO relates to significantly lower probabilities of the relationship ending, but with low product complexity (even-numbered columns), the sign of the coefficient switches to positive in one specification and is

[12]Following their construction, knowledge capital is calculated from firms' past R&D expenses, applying the perpetual inventory method with a 15% depreciation rate.

TABLE 3

Cross-Sectional Variation in Holdup Costs

Table 3 displays regressions of RELATIONSHIP_END on OVERLAP, with subsample splits based on product specificity, supplier R&D intensity, and information asymmetry. Panel A splits the sample into suppliers providing differentiated goods or services ("Special," odd-numbered columns) vs. suppliers selling standardized goods ("Standard," even-numbered columns), based on Rauch's (1990) industry classifications. Panel B splits the sample by high vs. low R&D suppliers (above vs. below the industry–year median of R&D capital). Panel C splits the sample by pairs that are geographically "distant" (>250 miles apart for U.S.-based pairs) vs. "close" (<250 miles apart). In each panel, OIO is measured by OVERLAP_VALUE (proportion of total market value of the supplier and the customer held by overlapping shareholders) in columns 1 and 2 and by OVERLAP_PRODUCT (proportion of supplier's shares outstanding held by overlapping shareholders × the proportion of customer's shares outstanding held by overlapping shareholders) in columns 3 and 4. All reported regressions are linear probability models. All overlap measures are lagged 1 year. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. *t*-statistics are shown in parentheses, computed from standard errors double-clustered by customer and supplier.

Panel A. Product Specificity

Sample:	Special	Standard	Difference	Special	Standard	Difference
	1	2	1 – 2	3	4	3 – 4
OVERLAP	−0.163***	0.003	−0.166*	−0.228***	−0.217*	−0.011
	(−3.21)	(0.03)	(−1.75)	(−2.58)	(−1.69)	(−0.07)
Overlap measure	Value	Value		Product	Product	
Controls	Yes	Yes		Yes	Yes	
Supplier FEs	Yes	Yes		Yes	Yes	
Customer FEs	Yes	Yes		Yes	Yes	
Year FEs	Yes	Yes		Yes	Yes	
R^2	0.196	0.178		0.196	0.177	
No. of obs.	19,174	6,243		19,174	6,243	

Panel B. R&D Intensity

Sample:	High	Low	Difference	High	Low	Difference
	1	2	1 – 2	3	4	3 – 4
OVERLAP	−0.149**	−0.002	−0.147	−0.316***	0.013	−0.329**
	(−2.07)	(−0.04)	(−1.58)	(−2.82)	(0.12)	(−2.11)
Overlap measure	Value	Value		Product	Product	
Controls	Yes	Yes		Yes	Yes	
Supplier FEs	Yes	Yes		Yes	Yes	
Customer FEs	Yes	Yes		Yes	Yes	
R^2	0.199	0.213		0.199	0.211	
No. of obs.	9,424	9,487		9,424	9,487	

Panel C. Geographic Distance

Sample:	Distant	Close	Difference	Distant	Close	Difference
	1	2	1 – 2	3	4	3 – 4
OVERLAP	−0.112*	0.009	−0.122	−0.185*	−0.102	−0.084
	(−1.84)	(0.11)	(−1.14)	(−1.92)	(−0.65)	(−0.48)
Overlap measure	Value	Value		Product	Product	
Controls	Yes	Yes		Yes	Yes	
Supplier FEs	Yes	Yes		Yes	Yes	
Customer FEs	Yes	Yes		Yes	Yes	
Year FEs	Yes	Yes		Yes	Yes	
R^2	0.190	0.211		0.189	0.211	
No. of obs.	15,431	5,681		15,431	5,681	

statistically insignificant. Differences are statistically significant in the OVERLAP_PRODUCT specifications.

Finally, holdup problems are also more severe with greater information asymmetry between partners. Information sharing is important for RSI, but (absent OIO) supply chain partners may be reluctant to share information for fear of the information reaching competitors or of the partner using the information to extract relationship rents. The presence of overlapping owners could potentially alleviate

informational frictions by aligning incentives and alleviating this distrust. Accordingly, I examine whether the effects of OIO are stronger for customer–supplier pairs facing more information asymmetry, using geographic distance as a measure of information asymmetry.[13] In the context of supply chain relationships, geographic distance exacerbates holdup problems (Costello (2013)), while geographic proximity facilitates innovation spillover (Chu et al. (2019)). Panel C of Table 3 splits the baseline sample into pairs that are geographically distant and geographically close. "Close" pairs are headquartered in zip codes less than 250 miles apart and "Distant" pairs are more than 250 miles apart.[14] When supply chain partners are geographically distant (odd-numbered columns), OIO retains the negative correlation with RELATIONSHIP_END. Conversely, when partners are geographically close (even-numbered columns), the coefficients on OIO are small, flip signs, and are statistically indistinguishable from 0.

Overall, OIO appears to promote longer supply chain relationships in cases where transacted products are more specific or complex, or when information asymmetry is a larger concern. Thus, in relationships with the potential for significant holdup costs, OIO appears to help align incentives of the supply chain partners.

V. Addressing Endogeneity: Institution Mergers

Baseline results show a strong correlation between OIO and vertical relationship strength. Further, the cross-sectional results in Section IV.C are consistent with a causal story, with stronger results amid greater vertical frictions. While suggestive, these results cannot confirm a causal relationship. Indeed, the relationship between OIO and relationship strength could reflect institutions investing in both firms *because* of their strong relationship, implying reverse causality. To address endogeneity concerns, I show evidence of a causal relationship by exploiting a natural experiment representing plausibly exogenous shocks to OIO, based around institution mergers: when two financial institutions merge for reasons unrelated to the firms in their equity portfolios, large OIO holdings are sometimes created. I find that when one supply chain partner's blockholder merges with an institution holding a large stake in the other supply chain partner, the two firms are more likely to sustain their vertical relationship.

The experiment is useful for providing evidence of a causal relationship between OIO and relationship duration. Of note, the relevance of the experiment centers around events expected to, ex ante, induce large changes in the overlapping ownership of *one* (the merged institution) institutional investor. Large changes concentrated in an individual owner's portfolio may have a larger effect on a supply

[13]Geographic distance has been frequently recognized in finance and accounting literatures as a measure of information asymmetry between parties, affecting, for example, monitoring effectiveness (e.g., Ayers, Ramalingegowda, and Yeung (2011), Chhaochharia, Kumar, and Niessen-Ruenzi (2012)) and investing decisions (e.g., Ivković and Weisbenner (2005), Baik, Kang, and Kim (2010)).

[14]I limit this analysis to U.S. headquartered firms. Headquarter zip codes are drawn from Compustat, which only reports the current headquarter location. Firms do not relocate headquarters often, but results are similar when using a later subsample (starting in 2000), which additionally alleviates concerns about relocations.

chain relationship due to the greater influence and relevance of a major shareholder versus an institution with a smaller overlapping stake. That is, overlapping owners holding more shares of both partners likely have greater influence over the companies and their ownership stakes are likely more prominent and relevant to the firms' management. Thus, while useful in establishing causality, the magnitude effects in this setting will not be directly comparable to the effects documented in the baseline specifications. If the *breadth* of overlapping ownership (i.e., the number of overlapping owners, regardless of stakes) is more relevant, coefficients in the experiment setting may be smaller than in the baseline. If the *depth* of overlapping ownership is important (as is likely), coefficients in the experiment setting may be larger than in the baseline specifications.

Institution Mergers

In this section, I exploit a shock creating positive changes to OIO resulting from institution mergers, following Huang (2013) and He and Huang (2017). I use the 49 mergers listed in Appendix A of He and Huang to construct my sample. Using the holdings report date just prior to the merger announcement, I merge holdings data for both parties to the merger with customers and suppliers in my sample whose relationship began prior to the merger. I keep all cases in which one of the merging institutions blockholds (>5% stake) either the customer or supplier. A customer–supplier pair is then labeled "treated" if the other merger party holds a large stake (>1%) in the other trade partner, implying a sizable OIO block after the merger. Control observations are cases where one of the firms is blockheld by a merger party but the other merger party does not own the other partner (or holds less than 1% of its shares outstanding).[15] I limit the control group to never-treated customer–supplier pairs (e.g., Gormley and Matsa (2011), Baker, Larcker, and Wang (2022)) in which both firms have a 1% institutional investor just prior to the merger announcement. My sample includes 87 treated merger-pair combinations, of 1,864 merger-pair combinations (4.7%). I define the "pre" period as the 3 years prior to the merger announcement year and the "post" period as the 3 years after the merger's completion, excluding the actual merger year from the analysis. Importantly, I do not condition treatment status on whether the relationship ended before or after the merger; instead, I define treatment without respect to termination year, and thus include all pairs existing in the pre-period. Thus, my sample includes treated pairs whose relationship ends before the merger, treated pairs whose relationship ends after the merger, and control pairs ending either before or after.

In Table 4, to illustrate that the merger events lead to increased OIO for treated pairs, I report DiD tests showing the effects of the merger on the acquiring institution's overlapping ownership stake. For these tests, OVERLAP_VALUE and OVERLAP_PRODUCT are the dependent variables, but defined only on the acquirer's holdings of the two firms.[16] All specifications use supplier, customer,

[15] A more draconian treatment definition would be a case of a customer's 5% blockholder merging with a supplier's 5% blockholder; however, the number of treated pairs fitting this definition is extremely limited. Even so, results are qualitatively consistent using this limited treatment group.

[16] This is consistent with He and Huang (2017), who measure consider overlapping ownership across all institutional investors in baseline tests, but focus on the acquiring institution to verify the validity of

TABLE 4

Institution Mergers: Overlap Effects

Table 4 displays difference-in-difference tests around institution mergers. The dependent variable is the overlapping ownership stake of the acquirer, OVERLAP_VALUE (columns 1, 3, and 5) or OVERLAP_PRODUCT (columns 2, 4, and 6). The sample includes customer–supplier pairs whose relationship began prior to the merger announcement, in which both firms had an institutional owner with a 1% minimum stake, and in which one of the firms was blockheld (≥5% stake) by either the acquirer or target before the merger. TREATED is an indicator equal to 1 when one merger participant blockheld one partner firm and the other merger participant held a minimum 1% stake in the other partner firm. POST equals 1 in the 3 years after the merger, and equals 0 in the 3 years prior to the merger (merger year excluded). Supplier, customer, and event fixed effects are included in every specification, year fixed effects in columns 1–4, and industry × year (for both customer and supplier industries) in columns 5 and 6. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. *t*-statistics are shown in parentheses, computed from standard errors clustered by merger event.

	Dependent Variable: OIO					
	1	2	3	4	5	6
TREATED × POST	0.022***	0.001***	0.022***	0.001***	0.017***	0.001***
	(2.71)	(6.26)	(2.73)	(6.07)	(3.56)	(8.85)
TREATED	0.001	−0.000	0.001	−0.000	0.001	−0.000*
	(0.23)	(−0.55)	(0.19)	(−0.89)	(0.35)	(−1.69)
POST	−0.004***	−0.000***	−0.004***	−0.000***	−0.002*	−0.000*
	(−2.80)	(−3.02)	(−2.90)	(−3.04)	(−1.98)	(−1.81)
Overlap measure	Value	Product	Value	Product	Value	Product
Controls			Yes	Yes	Yes	Yes
Supplier FEs	Yes	Yes	Yes	Yes	Yes	Yes
Customer FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes		
Event FEs	Yes	Yes	Yes	Yes	Yes	Yes
Supplier ind. × year FEs					Yes	Yes
Customer ind .× year FEs					Yes	Yes
R^2	0.751	0.765	0.752	0.766	0.781	0.785
No. of obs.	5,196	5,196	5,196	5,196	4,734	4,734

year, and merger event fixed effects. Columns 1 and 2 report results using only POST, TREATED, and TREATED × POST indicators, while columns 3–6 add controls. Columns 5 and 6 include industry × year fixed effects for both the customer and supplier industry. Across all specifications, the OIO stake increased significantly for treated pairs after the merger, compared with control firms. In terms of economic magnitude, the combined share of customer and supplier value held by the acquirer (OVERLAP_VALUE) increased by around 2 percentage points. This is an economically meaningful change in the supply chain pair's OIO: not only does this indicate a sizable increase in OVERLAP_VALUE, but a large change in the overlapping stake of a *single* overlapping owner.[17]

Since the mergers create large upward shifts in OIO exogenous to the supply chain partnership, they provide a good setting for testing whether OIO strengthens vertical relationships. Table 5 presents DiD tests with RELATIONSHIP_END as the dependent variable. Parallel to Table 4, column 1 includes only POST, TREATED, and TREATED × POST indicators with supplier, customer, year, and event fixed effects; column 2 adds controls, and column 3 adds industry × year fixed effects. I control for the level of OVERLAP_VALUE and JOINT_INST_VALUE just prior to the merger in columns 2 and 3; results are virtually unchanged if I

the merger experiment. As in their results, I find an increase in the acquirer's stake that is economically large.

[17]Importantly for interpretation of economic magnitudes, this increase in OVERLAP is driven by the merger, so the increase in OVERLAP also represents an increase in OIO concentration for the treated pairs.

TABLE 5

Institution Mergers: Relationship Survival

Table 5 shows difference-in-difference around institution mergers. The dependent variable is RELATIONSHIP_END, an indicator for the customer–supplier relationship ending in the observation year. The sample includes customer–supplier pairs whose relationship began prior to the merger announcement, in which both firms had an institutional owner with a 1% minimum stake, and in which one of the firms was blockheld ($\geq$5% stake) by either the acquirer or target before the merger. TREATED is an indicator equal to 1 when one merger participant blockheld one partner firm and the other merger participant held a minimum 1% stake in the other partner firm. POST is an indicator for the 3-year period after the merger, equal to 0 in the 3 years prior to the merger (merger year excluded). Columns 1 and 2 include supplier, customer, event, and year fixed effects, while column 3 adds industry × year fixed effects (for both customer and supplier industries). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. *t*-statistics are shown in parentheses and computed from standard errors clustered by merger event.

	Dependent Variable: Relationship End		
	1	2	3
TREATED × POST	−0.066***	−0.055***	−0.070***
	(−3.35)	(−2.34)	(−5.17)
TREATED	0.009	0.007	0.052
	(0.22)	(0.17)	(1.02)
POST	−0.017	−0.018	−0.012
	(−1.37)	(−1.47)	(−0.27)
PRE_MERGER_OVERLAP		−0.043	−0.084
		(−0.30)	(−0.92)
Overlap measure		Value	Value
Controls		Yes	Yes
Supplier FEs	Yes	Yes	Yes
Customer FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	
Event FEs	Yes	Yes	Yes
Supplier ind. × year FEs			Yes
Customer ind .× year FEs			Yes
R^2	0.191	0.214	0.246
No. of obs.	5,196	5,196	4,734

instead control for OVERLAP_PRODUCT and JOINT_INST_PRODUCT (see Table A6 in the Supplementary Material). Neither the TREATED nor the POST coefficients are statistically distinguishable from 0. However, importantly, the negative interaction coefficient on TREATED × POST shows that supply chain pairs that likely experienced an upward shift in OIO due to the merger are more likely to survive afterward.

In terms of economic magnitude, treated observations are around 5–7 percentage points more likely to survive than control observations after the merger event. As noted in the introduction to this section, the magnitudes of these results are not easily comparable to those in the baseline results, since the nature of the shock is such that the merger (very likely, ex ante) results in a large overlapping ownership stake by one owner (the merged institution) that did not exist prior to the merger. A large overlapping ownership stake in a customer and supplier by a blockholder would reasonably be expected to have a much larger effect on the supply chain relationship than a similar level of OIO distributed among many owners. Consistent with this, untabulated results from the full OLS sample reveal that the addition of a major overlapping investor with a 1% stake in one firm and a 5% stake in the other reduces the probability of RELATIONSHIP_END by a similar magnitude.[18]

[18]In the full sample, after gaining a major overlapping investor, so defined, a customer–supplier pair's probability of ending the relationship falls by around 4–5 percentage points.

Another way to contextualize the magnitude of this finding is to compare it to documented effects from previous studies examining other factors affecting relationship termination. For example, Fee et al. (2006) report that the existence of a corporate equity stake (ever) in a supply chain partner in the past corresponds to approximately a 6-percentage-point lower probability of the relationship ending (p. 1246); Johnson, Xie, and Yi (2014) report around a 6-percentage-point *increase* in the probability of relationship end in the year after a customer fraud event (p. 17); and Cen, Dasgupta, and Sen (2016) find the passage of business combination laws in the supplier's state lowers the probability of termination by 25% (p. 2835). Thus, while the effects of a large overlapping ownership block (implied from the institution merger) are significant, the magnitude is also comparable to other factors affecting relationship termination.

He and Huang (2017) use the institution merger setting to show product market effects arising from industry cross-ownership. It is possible that shocks to industry-level cross-ownership for the supplier or customer could conflate results from supply chain effects. To address this, Table A5 in the Supplementary Material controls for whether the merger was likely to create large industry blocks in the supplier's or customer's industry. For that table, I construct measures of industry ownership shocks parallel to the criteria used for inclusion in the treated group or control group, recording whether a merger participant's 5% (1%) block in the customer or supplier is matched by a same-industry stake meeting the same threshold in the other merger participant's holdings. I then interact an indicator for the presence of such an industry shock with the POST variable. The interaction is statistically insignificant, suggesting industry-level cross ownership does not influence supply chain partnership survival in this setting. I also present results removing all cases of potentially confounding industry shocks, and results hold. In that table, I also consider whether individual firm blockholdings by both merger participants in the supplier or customer (individually) might influence survival. I construct indicators for whether both merger parties held large holdings in the supplier or customer (individually) and interact this indicator with the POST variable. A large firm-level block increases the probability of RELATIONSHIP_END after the merger, but controlling for these effects (or removing cases where firm-level blocks by both parties exist) leaves the TREATED × POST coefficient virtually unchanged.[19]

I perform various additional robustness tests for Table 5 in Table A6 in the Supplementary Material: First, controlling for OVERLAP_PRODUCT instead of OVERLAP_VALUE does not alter the results. Second, the coefficient on TREATED × POST is virtually unchanged if I relax the restriction for control pairs that both firms have a 1% 13F shareholder. Third, I show results hold when I exclude years during and after the financial crisis (excluding years after 2006). Lewellen and Lowry (2021) highlight the importance of showing robustness to the exclusion of mergers around the financial crisis years, so strong results in the sample period prior to the crisis are reassuring. Finally, results hold if I include pairs whose relationship began after the merger announcement.

[19]See the Supplementary Material for a more thorough discussion of these results.

FIGURE 2

Dynamic DID Around Mergers

Figure 2 plots the probability of a supply chain relationship ending for treated and control pairs for the institution mergers experiment in Table 5. Treated pairs are those in which one merger participant blockheld one partner firm and the other merger participant held a minimum 1% stake in the other partner firm; control pairs are pairs in which both firms had a 1% institutional shareholder and one of the firms was blockheld ($\geq$5% stake) by either the acquirer or target before the merger, but the other merger participant did not hold 1% or more of the other partner firm. Only pairs whose relationship began prior to the merger are included. Control pairs are limited to never-treated pairs.

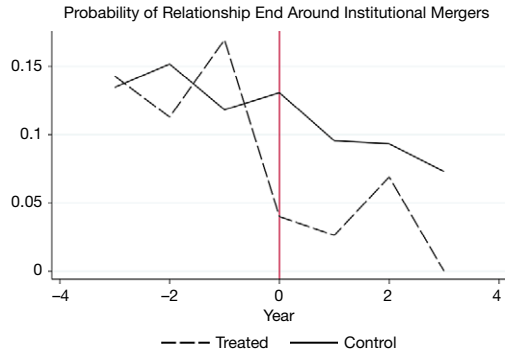

Figure 2 demonstrates graphically parallel trends in the unconditional (univariate) probability of the relationship ending for treated and control groups prior to mergers, followed by a sharp change following the events.[20]

Taken together, results around institution mergers confirm a positive effect of OIO on survival rates for customer–supplier relationships. In the next section, I show evidence suggesting the longer relationships create value in the supply chain relationship.

VI. Effects of OIO on Firm Value

Section V provided evidence that the relationship between OIO and supply chain relationship survival documented in Section IV is indeed causal. Establishing that OIO strengthens supply chain relationships is the core finding of this study, but this section also explores whether these longer relationships represent economically "good" or "bad" outcomes. The long literature on holdup costs induced by transaction costs and incomplete contracting suggests a bonding mechanism (such as OIO) between vertical partners could help align supply chain goals, alleviating mistrust and promoting more efficient, mutually beneficial supply chain cooperation. However, an alternative explanation is that overlapping owners cause nonoptimal supply chain partnerships to survive longer than is economically beneficial. While a thorough welfare analysis of OIO effects on supply chains is beyond the scope of this article, two sets of results suggest OIO creates value in the supply chain pair and benefits (or at least does not harm) each firm individually.

First, I show that supply chains with greater OIO have higher valuations, as measured by firm- and pair-level market-to-book ratios (Q). In Table 6, the

[20]Note the event-time averages are noisier for the treated group, which is smaller than the control group.

TABLE 6

Value Effects

Table 6 examines the effect of OIO on valuation using market-to-book ratios (Q). Panel A uses the institution merger setting as in Table 5 and reports difference-in-difference results around merger events. TREATED is an indicator equal to 1 when one merger participant blockheld one partner firm and the other merger participant held a minimum 1% stake in the other partner firm. POST equals 1 in the 3 years after the merger, and equals 0 in the 3 years before to the merger (merger year excluded). The dependent variable is the supplier's Q in column 1, customer's Q in column 2, and combined pair-level Q in column 3. Panel B reports OLS regressions from the baseline sample. The dependent variable is supplier's Q in columns 1 and 2, customer's Q in columns 3 and 4, and combined pair-level Q in columns 5 and 6. t-statistics are shown in parentheses and computed from standard errors clustered by merger event in Panel A and by supplier (columns 1 and 2), customer (columns 3 and 4), or customer and supplier (columns 5 and 6) in Panel B. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Valuation Effects in Mergers Setting

	Supplier Q	Customer Q	Pair-Level Q
	1	2	3
TREATED × POST	0.213	0.232***	0.218***
	(1.56)	(3.57)	(4.62)
TREATED	0.019	−0.151*	−0.106
	(0.10)	(−1.77)	(−0.92)
POST	0.038	−0.047*	−0.066**
	(0.48)	(−1.74)	(−2.57)
Overlap measure	Value	Value	Value
Controls	Yes	Yes	Yes
Supplier FEs	Yes	Yes	Yes
Customer FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Event FEs	Yes	Yes	Yes
R^2	0.702	0.834	0.816
No. of obs.	5,186	5,192	5,182

Panel B. Valuation Effects in Baseline

	Supplier Q		Customer Q		Pair-Level Q	
	1	2	3	4	5	6
OVERLAP	−0.007	−0.102	0.315*	0.088	0.268	−0.123
	(−0.03)	(−0.23)	(1.72)	(0.38)	(1.53)	(−0.49)
Overlap measure	Value	Product	Value	Product	Value	Product
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Supplier FEs	Yes	Yes	Yes	Yes	Yes	Yes
Customer FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.666	0.666	0.813	0.813	0.808	0.808
No. of obs.	28,723	28,723	28,800	28,800	28,656	28,656

dependent variable is supplier Q, customer Q, or joint pair-level Q (defined as the combined market value of the customer and supplier scaled by their combined book values). Panel A focuses on the merger setting, while Panel B uses the baseline OLS sample. In Panel A, TREATED × POST is positive across supplier, customer, and pair-level Q, and statistically significant for the customer and pair-level specifications. For the pair-level result in column 3, treated pairs after the merger have a combined Q that is 0.22 higher, representing about 17% of the sample standard deviation.

To put these magnitudes into context, other studies using this merger setting have documented effects of similar magnitude on other firm outcomes. He and Huang (2017) study common ownership of product market competitors, and report that treated firms' market share increases by 14%–18% of the sample standard deviation relative to control firms (p. 2699); similarly, in their examination of how industry common ownership affects earnings guidance, Park et al. (2019) find

merger-treated firms are 11.5% and 20.3% more likely to report earnings and capital expenditures forecasts, respectively. Thus, the magnitude of the value effects in Table 6 are similar in magnitude to other outcomes documented in the context of overlapping ownership across competing firms. In Panel B, results are weaker, but are generally consistent with a non-negative effect of value. Focusing on the better-identified merger setting, OIO appears to create value in the supply chain dyad, while not destroying value for either firm individually.[21]

Second, I show that supply chains with more OIO issue more patents. In Table 7, the dependent variable is the number of patents filed by suppliers, by customers, or by both firms combined. Panel A uses the merger setting, while Panel B uses the baseline full sample. Patenting data are from the Kogan et al. (2017) database. As the dependent variables in this table are count variables, I use Poisson regressions.[22] In both settings, the number of patents filed by the two firms combined or by the supplier is positive, and always statistically significant for the supplier. For example, in the Panel A merger results, the TREATED × POST coefficient on supplier patents indicates around 21% more patents per year for treated suppliers after the merger.[23] Thus, OIO appears to spur more innovative activity, suggesting greater supply chain collaboration between the partners.

Overall, OIO appears to not only lengthen supply chain relationships, but to simultaneously create value and spur innovation. While these results cannot explicitly show that the observed higher valuations and patents due to OIO occur *through* the simultaneous higher relationship survival rates, they indicate that these longer relationships are more likely arising from reduced supply chain frictions than from OIO prolonging bad partnerships.

VII. Additional Analyses: Economic Mechanisms and Relationship Formation

After showing positive effects of supply chain OIO on relationship survival, valuation, and innovation, a remaining question is what the precise mechanism(s) are through which overlapping institutional owners influence supply chain dyads. While providing complete, statistical evidence on all potential channels is likely impossible, I present tests consistent with one economic mechanism and discuss other possible channels. Particularly, I find evidence of supply chain partners internalizing the effect of their actions on their partners in terms of trade credit provision.

[21]From a theoretical perspective, overlapping owners with equal stakes in both firms should care only about joint value maximization of the supply chain partners and be indifferent as to whether both or only one firm would accrue benefits in terms of market valuation. Empirically, we might expect imbalances in the economic incentives of overlapping owners to play a role in which firm is the beneficiary of value improvements. Consistent with this intuition, Table A7 in the Supplementary Material presents evidence qualitatively consistent with differential individual firm value effects depending on which firm represents the larger component of overlapping owners' portfolios.

[22]See Cohn, Liu, and Wardlaw (2022) and Correira, Guimarães, and Zylkin (2020) regarding the choice of Poisson regressions for count data. For these specifications, which are more restrictive, I relax the fixed effects to customer industry and supplier industry, rather than customer firm and supplier firm.

[23]The coefficient of 0.192 indicates $e^{0.192} = 1.212$ times more patents for treated suppliers after the merger.

TABLE 7

Innovation Effects

Table 7 examines the effect of OIO on patent filing counts, using Poisson fixed effects estimations. Panel A uses the institution merger setting as in Table 5, with difference-in-difference results around merger events. TREATED is an indicator equal to 1 when one merger participant blockheld one partner firm and the other merger participant held a minimum 1% stake in the other partner firm. POST equals 1 in the 3 years after the merger, and equals 0 in the 3 years before to the merger (merger year excluded). The dependent variable is the count of patents filed by the supplier (column 1), the customer (column 2), and the supplier or customer combined (column 3). Panel B uses the baseline sample, where the dependent variable is the count of patents filed by the supplier (columns 1 and 2), the customer (columns 3 and 4), and the supplier or customer combined (columns 5 and 6). *z*-Scores are shown in parentheses and computed from standard errors clustered by merger event in Panel A and by supplier (columns 1 and 2), customer (columns 3 and 4), or customer and supplier (columns 5 and 6) in Panel B. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Patents in Mergers Setting

	Supplier	Customer	Combined
	1	2	3
TREATED × POST	0.192*	−0.428	0.041
	(1.71)	(−1.63)	(0.18)
TREATED	0.192	−0.132	−0.250
	(1.01)	(−0.51)	(−1.18)
POST	0.184	0.189***	0.191***
	(1.51)	(3.91)	(4.04)
Overlap measure	Value	Value	Value
Controls	Yes	Yes	Yes
Supplier ind. FEs	Yes	Yes	Yes
Customer ind. FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Event FEs	Yes	Yes	Yes
No. of obs.	4,956	5,195	5,289

Panel B. Patents in Baseline

	Supplier		Customer		Combined	
	1	2	3	4	5	6
OVERLAP	2.902***	2.238***	−0.015	0.497	0.279	1.284***
	(7.11)	(3.66)	(−0.07)	(1.02)	(1.25)	(2.93)
Overlap measure	Value	Product	Value	Product	Value	Product
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Supplier ind. FEs	Yes	Yes	Yes	Yes	Yes	Yes
Customer ind. FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	29,264	29,264	29,471	29,471	29,753	29,753

A. Internalization Channel

The most straightforward way overlapping ownership should influence supply chain partners is through an internalization channel. As discussed in Section II, while supply chains are frequently afflicted by holdup problems due to the risk of partner opportunism, overlapping ownership should cause the firms to internalize the effects of their actions on their supply chain partner. In other words, while a value-maximizing firm might act opportunistically at its supplier's (or customer's) expense, overlapping ownership should preclude this behavior, since damaging the partner would destroy the firm's shareholders' value. Alternatively, while a firm may otherwise forego costly investment in a supplier (or customer), overlapping ownership could alter incentives toward actions creating joint relationship value.

I find evidence of internalization in an area requiring financial cooperation between supply chain partners: trade credit. Table 8 examines a supplier's extension of trade credit to the customer. For this analysis, I use a novel dataset of pair-level

TABLE 8

Trade Credit and Internalizing Distress

Table 8 examines the effect of OIO on trade credit extended to the customer by the supplier. In both panels, the dependent variable is pair-level trade credit – the supplier's outstanding receivable balance with the customer scaled by annual sales to the customer. Panel A uses the merger setting in a difference-in-difference framework as in Table 5. Column 2 adds a triple difference, by interacting with DISTRESS, an indicator equal to 1 if the customer has a short (below 25th percentile) distance to default, following Merton (1974) and Bharath and Shumway (2008). Panel B uses the baseline setting. Columns 3 and 4 interact OVERLAP with DISTRESS. Columns 1 and 3 use OVERLAP_VALUE (proportion of total market value of the supplier and the customer held by overlapping shareholders) to measure owner overlap, while columns 2 and 4 use OVERLAP_PRODUCT (proportion of supplier's shares outstanding held by overlapping shareholders × the proportion of customer's shares outstanding held by overlapping shareholders. All overlap measures are lagged on year. *t*-statistics are shown in parentheses and computed from standard errors clustered by merger event in Panel A and double clustered by supplier and customer in Panel B. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Trade Credit in Mergers Setting

	1	2
TREATED × POST	0.043*	0.018
	(1.96)	(0.61)
TREATED	0.001	0.008
	(0.07)	(0.51)
POST	−0.037***	−0.017
	(−3.21)	(−1.41)
TREATED × POST × DISTRESS		0.096***
		(4.03)
TREATED × DISTRESS		−0.052***
		(−2.55)
POST × DISTRESS		−0.029
		(−1.36)
DISTRESS		0.010
		(0.84)
Overlap measure	Value	Value
Controls	Yes	Yes
Supplier FEs	Yes	Yes
Customer FEs	Yes	Yes
Year FEs	Yes	Yes
Event FEs	Yes	Yes
R^2	0.519	0.530
No. of obs.	934	904

Panel B. Trade Credit in Baseline Setting

	1	2	3	4
OVERLAP	0.036	0.046	0.059	0.070
	(1.01)	(0.56)	(1.51)	(0.87)
OVERLAP × DISTRESS			−0.022	−0.038
			(−0.77)	(−0.90)
DISTRESS			0.009	0.007
			(0.90)	(0.90)
Overlap measure	Value	Product	Value	Product
Controls	Yes	Yes	Yes	Yes
Supplier FE	Yes	Yes	Yes	Yes
Customer FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.420	0.420	0.423	0.423
No. of obs.	2,934	2,934	2,790	2,790

trade credit extended by suppliers to their customers. These data are hand collected from disclosures to financial statements by suppliers, as detailed in Billett, Freeman, and Gao (2022), Freeman (2022), and Ersahin, Giannetti, and Huang (2021). While this pair-level data is not available for all observations, it facilitates much better inference than would be possible using supplier firm-level measures that aggregate across all customers. The dependent variable in this table is the ratio of the supplier's accounts receivable balance with the observation customer to the

annual sales between the firms. Panel A uses the merger setting while Panel B uses the baseline OLS setting. Coefficients across all columns in both panels show a positive effect of OIO on TRADE_CREDIT, statistically significant in column 1 of Panel A, suggesting greater financial cooperation between firms when they share more OIO.

Next, since trade credit provision is particularly crucial to the customer and costly to the supplier when the customer is financially distressed, I examine interactive effects of DISTRESS, an indicator equal to 1 when the customer has a low (below 25th percentile) distance to default (Merton (1974), Bharath and Shumway (2008)). In column 2 in Panel A of Table 8, I interact DISTRESS with the DiD estimators and report a triple-difference. The interacted effect of TREATED × POST × DISTRESS is positive and statistically significant, indicating that, in treated pairs after the merger, suppliers are differentially more likely to generously extend trade credit to distressed customers. While extending trade credit to a customer in financial distress is a risky supply chain decision, it could be optimal from a joint value maximization perspective if the liquidity provision supports the customer. I also interact DISTRESS with OVERLAP measures in Panel B; while the baseline effect of OVERLAP on TRADE_CREDIT remains consistent with columns 1 and 2, the interaction term is insignificant. Overall, OIO appears to result in greater financial cooperation between firms, with some evidence of stronger effects toward distressed customers.

B. Other Potential Channels

The tests in Table 8 suggest an internalization channel of OIO. Beyond this mechanism, other channels are likely in play as well (albeit challenging to document empirically), including direct engagement,[24] board influence, and a "doing nothing" mechanism.

Direct engagement is inherently difficult to document on a broad scale, but we know institutional investors engage directly with portfolio companies, both behind-the-scenes and in more public avenues: For example, Dimson et al. (2015) analyze private firm engagements of a large institutional investor, reporting dialogues with 4,186 target companies in 2014 alone, including in-person conversations, telephone calls, emails, and letters. In their survey of institutional investors, McCahery et al. (2016) find 63% and 45% of respondents engaged in direct discussions with management and the board, respectively. Large institutional investors are upfront about their engagement with companies in their portfolios.[25] Bradley et al. (2022) show that non-deal roadshows (NDRs) (organized private meetings between management and institutional investors) lead to informed institutional trading. Their results suggest information transfer from management to investors, and it is extremely plausible that these meetings also facilitate information transfer from investors to management. Conferences (e.g., Bushee, Jung, and Miller (2011), (2017)) and investor/analyst days (Kirk and Markov (2016)) offer other

[24]See Shekita (2022) for specific anecdotal evidence of OIO influence.

[25]For example, Vanguard, coining their funds as often "near-permanent investors" of the firms in their portfolios, states that they see engagement with firms as more valuable than voting power (https://about.vanguard.com/investment-stewardship/policies-and-guidelines/).

opportunities for face-to-face interaction between management and large investors. Zhang (2022) finds evidence of management garnering supply chain information from institutional investors at investor conferences. Thus, through these types of engagement discussions with management and/or board members, institutional investors could discuss supply chain issues with the customer and/or supplier, establishing an external tie between the firms and promoting greater incentives to collaborate.

Overlapping owners could also influence portfolio firms via a board of directors seat. Azar (2012) provides evidence that OIO increases the probability of an interlocking board. Even absent an interlocking directorship, overlapping owners could influence a supply chain relationship through a director on either of the firms' boards, providing an opportunity to advise management toward policies beneficial to supply chain relationships.

Additionally, Schmalz (2018) argues "doing nothing" could be a mechanism through which OIO affects firm policies. In the supply chain context, a myopic investor could plausibly place pressure on a firm to squeeze its supplier for favorable terms, potentially resulting in short-term gains at the expense of a long-term, successful supply chain relationship. Conversely, an owner with a stake in both firms may appreciate the supply chain benefits of a more equitable approach.

C. Relationship Formation

Evidence throughout this article supports a positive role of overlapping ownership in strengthening supply chain relationships and increasing survival rates. A natural follow-up question is whether OIO can also have positive effects on relationship *formation*; that is, are two vertically related firms more likely to commence a supply chain relationship when they share the same institutional investors as shareholders?[26] In the Supplementary Material, I provide evidence qualitatively consistent with a positive effect of OIO on the probability of relationship formation (Table A10 in the Supplementary Material). While generally parallel effects on relationship survival and relationship formation are reassuring, I maintain focus on relationship survival for two reasons, one economic and one empirical:

First, economically, for overlapping owners to encourage relationship formation would likely require more direct intervention than facilitated by the more indirect internalization effect. While the presence of institutional owners with a stake in both firms could facilitate trust and implicitly encourage collaboration once the relationship is formed, establishing a new relationship with a supply chain partner is primarily about vertical "goodness of fit" between the firms, which institutional investors may not be qualified to ascertain. Second and closely related, determining an appropriate group of potential supply chain partners for a "control group" is empirically challenging and requires empiricist discretion, since industry classifications provide only a broad characterization of input and output. My approach, detailed in the Supplementary Material, matches suppliers and customers in my sample with pseudo partners in the same downstream industry and of similar size as the actual observed partner. Results in Table A10 in the Supplementary

[26]I thank an anonymous reviewer for recommending this analysis.

Material show that OIO positively predicts relationship formation. Overall, while I maintain focus on relationship survival rather than formation in the main tests, results support a parallel effect of OIO on relationship formation.

VIII. Conclusion

Supply chain partners benefit from collaboration, but without a mechanism to bond the customer and supplier, holdup problems often prevent this collaboration from taking place. I examine whether OIO can facilitate stronger relationships between customers and suppliers. I first document an association between OIO and vertical relationship strength, with cross-sectional results consistent with OIO alleviating holdup. A natural experiment designed around a series of financial institution mergers shows the causal impact of OIO on relationship survival. Supporting evidence is most consistent with relationship survival being a net positive outcome, since OIO also increases pair-level value and innovation. OIO appears to cause firms to internalize the effects of their actions on their supply chain partners, leading to greater financial cooperation via trade credit.

These results shed light on an ownership mechanism which can help smooth supply chain frictions and strengthen ties between customers and suppliers. Prior literature has focused on how vertical integration or corporate equity stakes affect supply chains (e.g., Coase (1937), Fan and Goyal (2006), Fee et al. (2006), Lafontaine and Slade (2007), and Garfinkel and Hankins (2011)); OIO differs significantly from these direct ownership links because it involves third-party ownership rather than a controlling interest of one party by the other.

Additionally, this article enhances our understanding of how OIO between firms can influence their interactions. Prior literature has addressed OIO primarily in the context of industry competition (e.g., He and Huang (2017), Azar et al. (2018), (2021), and Koch et al. (2021)), mergers and acquisitions (Hanson and Lott (1996), Matvos and Ostrovsky (2008), and Harford et al. (2011)), or firm disclosure policies (Jung (2013), Park et al. (2019), and Pawliczek et al. (2022)). My results show OIO leads to stronger vertical relationships, and supporting results are consistent with OIO reducing costly supply chain holdup.

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109023001266.

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