Common Ownership and Competition in Product Markets*

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Abstract

This paper empirically investigates the relation between common institutional ownership of the firms in an industry and competition among firms in the industry. We find that common ownership is neither robustly positively related with industry profitability or output prices nor robustly negatively related with measures of non-price competition, as would be expected if greater common ownership encouraged product market rivals to compete less aggressively. This conclusion holds regardless of industry classification choice, common ownership measure, profitability measure, non-price competition proxy, or model specification. Our point estimates are close to zero with tight bounds, and we can statistically reject even modestly-sized economic effects. We conclude that antitrust restrictions seeking to limit intra-industry common ownership are not currently warranted.

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1 Introduction

Inherent market frictions have created opportunities for intermediaries, namely institutional investors, to pool funds from individuals and form large-scale, well-diversified portfolios, thereby simultaneously allowing individuals to diversify at low cost and creating incentives for institutional investors to monitor managers of portfolio firms. Given the tremendous benefits to individual investors of low-cost portfolio diversification and delegated monitoring, investment via institutions has increased dramatically over time, e.g. Gompers and Metrick (2001) and Gillan and Starks (2007). Coincident with this increase, there has also been a dramatic rise in the frequency with which large, diversified institutional investors own shares in multiple firms in the same industry, as evidenced in Figure 1 and further characterized in Azar (2016).

Theoretical research has raised the possibility that the increase in common ownership is not without substantial attendant costs. Specifically, when product market rivals' strategic actions impose negative externalities on one another, an institution that owns stakes in multiple rivals may prefer that the firms' managers make choices that maximize the value of a portfolio comprised of the rivals as opposed to choices that maximize the values of the individual firms, e.g., see Hansen and Lott (1996); Gordon (2003); Rubin (2006); Azar (2011, 2016); López and Vives (2018); Azar and Vives (2018). In other words, institutions with holdings across rival firms may want individual firm managers to make decisions on output, pricing, capacity, advertising, research & development, etc., as if the firms were members of a cartel.

We refer to the possibility that common ownership incentivizes and facilitates coordination among rival firms to reduce competition as the industry coordination hypothesis. Consistent with this hypothesis, two recent empirical papers conclude that increased common ownership has reduced competition and caused consumers to pay higher airline ticket

prices (Azar, Schmalz, and Tecu (2018)) and higher interest rates rates on loans (Azar, Raina, and Schmalz (2016)). These provocative findings have garnered the attention of market participants, academics, and policy makers, and started an important debate about the relative costs and benefits associated with common ownership, including the potential need for antitrust remedies similar to those used in the context of full or partial horizontal mergers or cartels.

Given the immense benefits to individuals of investing via institutions, any potential antitrust-based restrictions on institutions' ability to diversify should clearly take into consideration the overall empirical relevance of any anticompetitive effects of common ownership. Azar et al. (2016, 2018) each analyzes a single, highly-regulated industry, and it is not clear whether these results are generalizable. Echoing this sentiment, Noah Phillips, Commissioner at the U.S. Federal Trade Commission recently stated, "I am interested, in particular, to see how common ownership impacts a broad set of industries, whether a clear mechanism of harm can be identified, a rationale for why managers put the interests of one set of shareholders above the others and a rigorous weighing of the pro-competitive effects of institutional shareholding."[1]

In this paper, we empirically investigate whether greater common institutional ownership within industries is systematically associated with decreased competition. Our analysis is designed to be as comprehensive as possible in terms of how rival firms are identified, how common ownership is measured, how reduced competition is manifested in industry outcomes, and how tests are structured to identify economic relations. We find that common ownership is neither robustly positively related with industry profitability and output prices nor robustly negatively related to non-price competition measures. For instance, across the 352 test statistics reported below and in the Internet Appendix regarding the relation between common ownership and industry profitability, 186 are positive with 30 significant at

[1] https://www.ftc.gov/public-statements/2018/06/taking-stock-assessing-common-ownership

conventional levels and 166 are negative with 20 significant at conventional levels. Failing to reject the null does not seem to be due to low power. Our point estimates are on average close to zero with relatively tight bands. We estimate that a one standard deviation increase in common ownership has an effect of a few hundredths of one standard deviation of profitability and is indistinguishable from zero. The tight bands allow us to reject even modestly sized economic effects. Our interpretation is further supported by prior literature which argues that the primary econometric concern in detecting collusion is not low power, but rather false positives, i.e., Type I error (Harrington Jr, 2006; Kaplow, 2013). Overall, our findings suggest that proposed policies to limit intra-industry institutional common ownership are not currently warranted.

In the context of common ownership, any reduction in competition should be observable in industry profitability, i.e., the ultimate objective of reduced competition. If, as Azar et al. (2016, 2018) contend, reduced competition occurs organically as managers' preferences for quiet lives coincide with common owners' preferences for less aggressive behavior in product markets, then we do not need pristine, local-market data regarding private communications between participants, transactions prices, marginal costs, demand conditions, etc. The parties involved have nothing to conceal. Further, if the primary benefit to the institutions are high returns from portfolio firms that can be used to increase assets under management and compensation, then the portfolio firms cannot understate their profitability and these benefits fully accrue to the managers of the institutions.

Our initial tests identify structural breaks in the time series of industries' common ownership and examine changes in profitability around such breaks. If one views sharp and persistent increases in common ownership as analogous to the establishment of other coordination mechanisms, e.g., trade associations, then this approach is similar to that of prior literature investigating formations of cartels, e.g., Levenstein and Suslow (2006). The industry coordination hypothesis predicts increases (decreases) in profitability following increases

(decreases) in common ownership from an increase in coordination (the collapse of prior coordination). We find that industries exhibiting dramatic increases or decreases in common institutional ownership do not systematically subsequently experience significant changes in markups or price-cost margins (PCMs). We also examine changes in capacity investment and market share investment, e.g., see Stigler (1968); Spence (1977); Dixit and Norman (1978); Fudenberg and Tirole (1984); Shapiro (1989); Bagwell (2007), and find no effect.[2] We extend the analysis to a multivariate setting with industry-level regressions of profitability or non-price competition proxies on common ownership, controls for other aspects of institutional ownership, and controls for differences in industry structure. The results reveal that greater common ownership is, all else equal, not robustly related to industry outcomes in a manner consistent with reduced competition.

One potential concern is that our initial tests are not well-specified. For example, some omitted variable may be correlated with both common ownership and profitability in such a way that its omission obscures the true relation between common ownership and competition. Further, the industry coordination hypothesis proposes a causal effect of common ownership, and our analysis described above estimates associations. Thus, we exploit mergers among large institutional investors as sources of plausibly exogenous variation in common ownership, e.g., see He and Huang (2017) and Lewellen and Lowry (2018). We find little evidence of a robust causal effect of common ownership on industry profitability or non-price competition proxies.

An additional potential concern is that there is a true relation between common ownership and competition but it is too weak to be identified by our initial tests. For example, the magnitudes of the effect may be too small to detect in an average effect estimated across all industries, or similarly, measurement error may bias estimates towards zero. Thus, we repeat

[2] We also do not find evidence that greater common ownership reduces input prices via increased collusive bargaining power over supplier industries, e.g., see Chipty and Snyder (1999).

our tests in subsamples of industries where coordination via common ownership is expected to be facilitated, i.e., concentrated industries, industries in which firms were prosecuted for collusion during the sample period, and industries without firms that have less incentive to coordinate, namely, large private, family, or dual-class firms. We also repeat tests on the subsample of industries for which there have not been substantive changes to industry classification codes over long periods of time. This both reduces measurement error and focuses the analysis on a setting in which coordination is facilitated as cartels are more likely to persist in stable industries (Levenstein and Suslow (2006)). We also conduct analysis on a subsample of industries for which any potential selection bias due to requiring firms to have public equity is smaller, i.e., a subsample of industries for which at least 95% of the firms with publicly-traded equity or publicly-traded debt are included. Across these analyses, we find no robust evidence of a relation between common ownership and industry profitability.

In addition to selecting ex ante subsamples of industries for analysis, we also generate industry-specific estimates. Across these 7,738 estimates, we find that a one standard deviation increase in common ownership increases profitability by 0.016 standard deviations on average. The median effect, 0.003, is even smaller. The t-statistics distribution is symmetric but with heavy tails with 857 of the 7,738 estimates (11%) having t-statistics>1.96 and 813 (11%) having t-statistics<-1.96. As such, if one argues that common ownership should be discouraged among a specific set of industries, there is a roughly equally sized set for which we should apparently encourage common ownership.

Last, using a subsample of manufacturing industries for which we can obtain data on output prices, input costs, and quantities produced, we examine the link between changes in common ownership and output prices. Analyses using similar data sources and empirical specifications have documented significant industry price increases following large changes in leverage (Phillips (1995)), horizontal mergers (Bhattacharyya and Nain (2011)), and partial acquisitions (Nain and Wang (2018)). We find no consistent evidence that increased common

ownership is, all else equal, associated with larger increases in industry prices.

Taken together, our results are inconsistent with increased common ownership generally resulting in reduced competition. Despite contradicting recently published research, this finding is plausible for several reasons. First, it is consistent with theoretical research predicting no relation under certain conditions, e.g., see Malueg (1992), Davidson and Deneckere (1984), López and Vives (2018). Second, potential prosecution under existing antitrust laws should have a strong deterrent effect as would reputational concerns.[3] Third, unlike in full or even partial horizontal mergers, coordination problems in common-ownership-based cartels would appear so large as to make their widespread implementation difficult to initiate and sustain in many industries. Fourth, institutional investors are heterogeneous in how they create value for shareholders. Some institutions, e.g. passive index funds, are less likely to engage and take strategic actions that facilitate coordination among portfolio-firm managers, e.g., see Lewellen and Lewellen (2018), Bebchuk, Cohen, and Hirst (2017), and Bebchuk and Hirst (2018).

Our findings are important for both academic researchers and policymakers. In April of 2016, the Obama administration's Council of Economic Advisers issued a brief citing increased common ownership as an area of concern meriting future consideration by U.S. antitrust authorities.[4] The Organisation for Economic Co-operation and Development has also issued a brief to member countries citing increased concerns regarding common ownership.[5]

[3] If communications between firms took place through common institutional owners, then these institutions would be violating the Sherman Act. Corporate law firms are apparently aware of the potential exposure of their institutional investor clients to price fixing charges when these clients hold positions in multiple firms in the same industry, e.g., see http://www.kirkland.com/siteFiles/kirkexp/publications/2375/Document1/FTC%20Examines%20Interlocking%20Directorates.pdf and https://corpgov.law.harvard.edu/2016/05/24/antitrust-executive-order-and-common-ownership. To the best of our knowledge, no common institutional blockholder of U.S. firms has been party to a case filed by the U.S. Department of Justice due to violations of antitrust laws (http://www.justice.gov/atr/antitrust-case-filings).

[4] https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160414_cea_competition_issue_brief.pdf

[5] http://www.oecd.org/competition/common-ownership-and-its-impact-on-competition.htm

Elhauge (2015) concludes that "horizontal shareholdings" are likely to lead to anticompetitive practices and should be undone. Posner, Scott Morton, and Weyl (2017) proposes a policy limiting institutions' holdings in an industry to small stakes or to only a large stake in a single firm. Our results challenge these views by providing what is, to our knowledge, the first evidence on the systematic empirical relation between common ownership and industry competitiveness. The implications of our results are consistent with O'Brien and Waehrer (2017), Patel (2018), Rock and Rubinfeld (2017), Ginsburg and Klovers (2018), and Lambert and Sykuta (2018), which conclude that, based on the evidence to date, it would be premature to establish policies limiting the extent to which institutional shareholders can diversify. Institutional investors have also recently voiced opposition to claims by academics that common ownership and portfolio diversification should be limited on the basis of antitrust concerns, e.g., see Novick (2017). Based on our findings of no widespread influence of common ownership on industry competition, policies limiting common ownership do not currently appear warranted. Of course, it would be a mistake to extrapolate our findings to substantially higher levels of common ownership than in our sample. In the limit, if all firms become commonly owned by one institution, then the anticompetitive behavior predicted by the industry coordination hypothesis should become apparent.

2 Contribution and Related Literature

Our paper primarily contributes to the literature investigating the effects of ownership structure on product market competition. We extend the empirical results in Azar (2011) by examining the effect of common ownership on not only markups, but also PCMs, industry-level output prices, and non-price competition. We document that increased common ownership is associated with higher industry profitability in a few isolated instances but that this relation is not robust to many reasonable alternatives or to using a quasi-natural experiment

to address endogeneity concerns. Our results also relate to those of Azar et al. (2018, 2016); Kennedy, O'Brien, Song, and Waehrer (2017); Dennis, Gerardi, and Schenone (2017); Gramlich and Grundl (2017). One important contribution of our paper is ascertaining how well the results of these single-industry studies generalize to industries beyond banking and airlines, especially those industries where there are fewer barriers to entry, less variability and discrimination in pricing, and less regulatory oversight.[6] Our results are more consistent with those of Kennedy et al. (2017); Dennis et al. (2017); Gramlich and Grundl (2017) in that we find that the significant relations between common ownership and industry competition are not robust.

Our results illustrate that it is important to assess robustness of reported results to specific choices of industry classification, common ownership measure, profitability measure, and empirical specification. There are a few reasonable combinations of these choices that generate results consistent with common ownership being positively related to profitability. However, there are many more equally reasonable combinations of choices of industry definition, common ownership measure, and profitability measure that generate results inconsistent with common ownership relating positively to profitability. Lewellen and Lowry (2018) reaches a similar conclusion regarding the robustness of results to the alternative approaches used to isolate exogenous variation in common ownership. Thus, "cherry picking" of reported results is clearly a potential concern in the common ownership literature.

He and Huang (2017) investigates whether same-industry firms cross-held by institutional investors gain competitive advantages relative to other firms in the industry that are not cross-held. They find that cross-held firms experience significantly greater growth in market share. Further, cross-held firms also exhibit higher PCMs than competitors that are not

[6] U.S. Government Agencies charged with the dual mandates of promoting and regulating air travel and banking are often cited as examples of "regulatory capture," e.g., Stigler (1971). Thus, firms in these industries may also enjoy greater latitude to engage in coordination on prices due to expectations that their regulators may intervene on their behalf to argue for why coordination is necessary or to prevent price-fixing charges by antitrust authorities.

cross-held. Semov (2017) finds that pairs of commonly held firms within an industry hold less cash, use more debt, and increase product similarity consistent with common ownership reducing the aggressiveness of competition between pairs of commonly owned firms. Given that the analyses in He and Huang (2017) and Semov (2017) are at the firm-pair level, the implications of the observed relations between cross-holdings, market-share growth, and PCMs for the overall level of competition and profits in the industry are not apparent as these relations are entirely consistent with both increased and decreased industry-level competition and profits. Thus, our results complement and substantially augment those of He and Huang (2017) and Semov (2017) by examining industry-level effects of common ownership.

Our paper is also related to the growing literature on the mechanisms through which increased common ownership may influence competition. Recent evidence suggests that common owners increase the benefits to individual managers from competing less aggressively. Market-based means of inferring collusion do not generally reveal the specific mechanisms used to reduce competition, i.e., the content and nature of any communications between firms. Antón, Ederer, Giné, and Schmalz (2018) finds that greater common ownership in an industry is more frequently accompanied by CEO compensation contracts that place less weight on own-firm performance and more weight on rival-firm performance, consistent with common owners incentivizing CEOs to compete less aggressively, e.g., see Kraus and Rubin (2010). However, it should be noted that Kwon (2016) reaches the exact opposite conclusion. Also, He, Huang, and Zhao (2017) finds evidence consistent with common owners reducing the negative governance externalities present among firms that compete to attract and retain managerial talent via reduced monitoring.

Our paper is also related to the literature on the effects of increased common ownership on other corporate policy choices. Kini, Lee, and Shen (2018) finds that greater common ownership prompts firms in an industry to alter their respective products so that they are closer substitutes. Xie and Gerakos (2018) finds that common ownership facilitates agree-

ments between brand-name and generic drug manufacturers where the generic manufacturer delays introducing a generic substitute for the name-brand drug. Kostovetsky and Manconi (2017) finds that greater common ownership among firms is associated with higher intensity of patent citations among firms consistent with common ownership facilitating the diffusion of innovation. Freeman (2016) documents that greater common ownership of customer and supplier firms is associated with greater trading relationship longevity. Sertsios, Ferrés, Ormazabal, and Povel (2018) notes that firms generally reduce leverage to increase the stability of collusive arrangements, including potentially those coordinated via common ownership.

Given the potential parallels between increased concentration via common ownership and via horizontal merges, our paper is related to the literature examining horizontal mergers, e.g., see Farrell and Shapiro (1990b); Eckbo (1983); Fee and Thomas (2004); Shahrur (2005). Similarly, our findings are also related to the literature examining firm-level cross-holdings of rival firms, e.g., see Reynolds and Snapp (1986); Farrell and Shapiro (1990a); Flath (1991); Malueg (1992); Reitman (1994); O'Brien and Salop (1999); Gilo, Moshe, and Spiegel (2006); Nain and Wang (2018). Our paper is also related to the literature on institutional cross-ownership in mergers and acquisition transactions, e.g, see Matvos and Ostrovsky (2008); Harford, Jenter, and Li (2011).

Our findings are relevant to the literature investigating the causes of the observed slowdown in productivity in the U.S. since the early 2000's, e.g., see Fernald (2015), Syverson (2017), etc. Attendant with this slowdown has been a substantial weakening over recent decades in the relation between corporate investment and measures of profitability and valuation. Gutiérrez and Philippon (2016) empirically investigates several explanations for the seeming reluctance of firms to invest despite high valuations and profitability. They conclude that increased common ownership of an industry (and an associated reduction in competition) is a factor in the apparent underinvestment. Our findings suggest that common ownership is not associated with significant reductions in net capacity investment, even in

concentrated industries.

3 Hypotheses Development and Empirical Design

Hansen and Lott (1996) demonstrates that investors who hold completely diversified portfolios of firms operating in imperfectly competitive product markets may reject individual-firm share value maximization as a corporate policy. Instead, investors with holdings of rival firms prefer a policy of portfolio-value maximization in which individual firm managers internalize negative between-firm externalities, in particular, those associated with output prices, marketing expenditures, investments in capacity, etc. Gordon (2003), Azar (2011), and Azar (2016) extend this framework to situations where shareholders are not completely diversified and their portfolios differ from each other, as well as to situations where shareholders are also consumers. Even under such circumstances and given certain maintained assumptions, shareholders may prefer in equilibrium that individual firm managers jointly pursue corporate policies similar to those pursued by a monopolist who maximizes a weighted average of individual shareholder utilities. Reynolds and Snapp (1986), Farrell and Shapiro (1990a), and O'Brien and Salop (1999) also demonstrate that greater common ownership of industry rivals can yield more collusive product market outcomes.[7]

In short, common institutional owners appear to have both the incentives and the means, i.e., direct access to top executives and influence over CEO compensation, to convey information regarding rivals to individual firm managers and influence managerial choices towards less competitive outcomes. Hence, greater common ownership among rival firms by institutions could lead to greater intra-industry coordination among the rivals, a possibility that we refer to as the industry coordination hypothesis.

[7] Brander and Lewis (1986) show that, in an oligopoly setting where firms use increased financial leverage to strategically commit to aggressive behavior in the product market, lenders also have incentives to act as coordinating agents so that firm managers internalize the negative intra-industry externalities associated with increased leverage.

Malueg (1992) demonstrates that cross-ownership may not actually facilitate collusion depending on the demand structure in the product market. Specifically, cross-ownership of rivals is shown to not only reduce the gains from deviating from a collusive arrangement but also to soften the punishment in the event of a deviation. Davidson and Deneckere (1984) shows a similar result in the context of full horizontal mergers. López and Vives (2018) demonstrates that, in industries exhibiting sufficiently large R&D spillovers, greater common ownership may increase competition via enhanced incentives for firms to invest in cost-reducing R&D. Thus, greater common ownership creates conflicting forces for colluding and the null to the industry coordination hypothesis is meaningful, i.e., theory also predicts modest increases in common ownership may not significantly alter product market competition.

The industry coordination hypothesis predicts that greater common ownership among institutions will be associated with higher industry profitability, a proposition that we test below. Increased profitability could result from coordination among industry participants to restrict output and raise prices to monopoly levels, e.g., see Stigler (1964) . Alternatively or additionally, increased profitability could result from coordination among rivals to reduce spending on non-price competition, e.g., see Shapiro (1989). Thus, the tests below examine profitability, expenditures typically associated with non-price competition, and output prices.

Non-price, strategic interactions among firms in imperfectly competitive product markets include actions taken over capacity investment, inventories, product choice and quality, R&D, advertising, extension of trade credit, and distribution, e.g., Sutton (1991). For instance, expenditures on advertising and selling have long been characterized as having both a constructive function, i.e., informative to customers and reducing search costs, as well as a combative function, i.e., socially wasteful, serving only to redistribute customers from one firm to another. As Dixit and Norman (1978) notes, "to the extent that the oligopoly is noncooperative, we should expect advertising levels chosen by sellers to be even more ex-

cessive than is the case with monopoly, since advertising under oligopoly to some extent simply shifts demand from one seller to another. This demand-diverting effect is formally like an external diseconomy for group profits; competing oligopolists neglect the effect and advertise more than their joint interests warrant." The industry coordination hypothesis predicts that greater common ownership will facilitate coordination among rivals to reduce spending on purely combative advertising, i.e., market-share competition. All else equal, industry firms have an incentive to maintain constructive advertising. Thus, we expect that any observed negative relation between common ownership and advertising should be modest in magnitude as it is primarily just the combative expenditures that are predicted to be reduced.

Strategic considerations are also present for firms' choices of investment in capital stock, and industry spending on capacity is higher than when capital stock can only be used to minimize costs for a given level of own-firm production, e.g., see Shapiro (1989). The industry coordination hypothesis predicts that greater common ownership will facilitate coordination among rivals to reduce spending on additional capacity.

The divergence between shareholders' preferences for individual share value maximization vs. portfolio value maximization depends on the negative externalities firms' actions impose on rivals, e.g., Hansen and Lott (1996). Firms in more concentrated industries are generally characterized as facing more frequent strategic interactions with their rivals than in more competitive industries, e.g., see Spence (1979), Fresard (2010), Hoberg and Phillips (2010), etc. Thus, a further testable implication of the industry coordination hypothesis is that an observed relation between common ownership and product market competition should be stronger in concentrated industries.

Gordon (2003) notes that a closely held firm usually has a small number of owners each of whom invest a substantial fraction of their portfolio in the firm. Such owners would primarily care only about the value of their firm. Thus, in the cross-section, the effects

of common ownership on price and non-price competition should be, all else equal, more evident in industries without a significant proportion of output by closely-held firms, i.e., large privately-held firms, family firms, or firms with dual class share structures.

There is a large theoretical and empirical literature investigating the factors that determine the formation and dissolution of cartels. As Levenstein and Suslow (2006) describes, the list of potential factors is quite long. However, in the cross-section, the effects of common ownership on competition should be, all else equal, more evident in industries with more factors favorably inclined towards collusion, i.e., in industries in which individual firms were formally prosecuted for collusion.

4 Sample, Variables, and Summary Statistics

4.1 Sample Selection

We obtain quarterly institutional holdings for the sample period starting with the first quarter of 1985 and ending with the fourth quarter in 2012 from the 13F filings in the Thomson Reuters database.[8] We obtain portfolio firms' quarterly financial statement data from the merged CRSP/Compustat database. We require firms to have total assets of at least $1 million, net sales of at least $250,000, and net sales greater than EBIT.

We group portfolio firms into industries based on their historic four-digit NAICS codes. Compustat assigns firms NAICS codes (HNAICS) starting in 1985. To ensure that our various measures of common ownership (defined below) can be calculated for a meaningful

[8] We end the sample in 2012 due to problems with the Thomson data after this period, see https://wrds-www.wharton.upenn.edu/pages/support/research-wrds/research-guides/research-note-regarding-thomson-reuters-ownership-data-issues/. We filter out cases in which the manager reports multiple positions in the same stock on the same report date, using only the holdings with the latest filing date. We adjust reported holdings for splits that occur between the report date and filing date. We include hand-collected holdings data for BlackRock 2010Q1, 2010Q2, and JP Morgan 2003Q4 and 2008Q3. To account for reporting gaps, holdings are carried forward one quarter in cases in which the institution skips a reporting period (Griffin and Xu, 2009).

series of industry quarters, we require each industry to have a series of at least twenty consecutive quarters with at least two firms.[9] There are 269 industries that meet the sample screens. While in papers with other aims, e.g., investigating firm performance relative to rivals or calculating diversification discounts, it is common to require more firms in an industry for inclusion. However, given that fewer firms in an industry facilitates coordination among the firms including punishment for deviations, we set our screen at the minimum number of firms that allow us to calculate industry averages.

To assess robustness of results to the choice of industry classification method, we replicate our tests using industries defined by three-digit SIC codes from Compustat, e.g., see Kahle and Walkling (1996), and the product-description industry classifications (300 industries) from Hoberg and Phillips (2016). Historic SIC codes (HSIC) are available from Compustat starting in 1988 and Hoberg and Phillips (2016) (H&P) codes are available starting in 1996 when electronic 10-k SEC filings became widely available.[10] Thus, samples based on these codes are shorter time series than those using NAICS codes. There are 264 four-digit SIC industries and 261 H&P industries that meet the sample screens.

4.2 Variable Descriptions

There are tradeoffs associated with different common ownership measures, and there does not seem to be consensus among researchers as to which measure best represents common ownership, e.g., see Gilje, Gormley, and Levit (2018). Thus, we use the five measures used by regulators and in prior literature. First, similar to Azar (2011), density of common

[9] For firm-years with assigned NAICS codes that are less than six digits, we replace the NAICS codes for those years with the most recently reported 6-digit code assigned to that firm prior to shortening the code to four digits. Federal statistical agencies in the U.S. formally adopted NAICS for classifying business establishments into industries in 1997. Code definitions are held constant between Economic Censuses which are conducted in all years ending with a 7 or a 2. Thus, 20 quarters is the minimum number of quarters for which an industry's definition could not change. We allow industry definitions to change over our sample for one to many and many to one changes. However, we retain earlier industry definitions when there is a one to one change to maximize series lengths.

[10] http://hobergphillips.tuck.dartmouth.edu/

ownership (Density) is defined as the ratio of the number of firm-pairs that are connected in an industry over the maximum possible number of firm-pairs in that industry. Two firms are connected when there is an institutional investor (a blockholder) that owns at least 5% of each of the two firms. This measure captures the intensity of pair connections between firms in the industry. Using 5% blockholdings for some of our measures incorporates institutions' incentives and means to influence corporate policy choices.

Second, percentage of common funds (PCF) is defined as the number of blockholders that own two or more companies in the industry over the total number of blockholders in that industry. This definition of common ownership is similar to those in Cohen and Frazzini (2008) and Anton and Polk (2014) in their analyses of common mutual and institutional funds among firms. PCF reflects the strength of tendencies of institutional blockholders to hold multiple firms in the same industry.

Third, percentage of common stocks (PCS) is defined as the maximum number of stocks in an industry with at least one common blockholder divided by the total number of stocks in the industry. This measure captures the degree of connectivity in each industry resulting from block ownership by a common institution.

Fourth, MHHI Delta is as defined in Bresnahan and Salop (1986) and O'Brien and Salop (1999). While the HHI reflects the number and relative market shares of firms in an industry, MHHI Delta reflects the extent to which firms in an industry are connected by common ownership and voting rights among institutional investors. MHHI Delta is the marginal increase in industry concentration attributable to common ownership and voting control of the firms in the industry by institutional owners. Specifically, MHHI Delta in a given quarter and industry is defined as

$$MHHI\ \ Delta = \sum_{j} \sum_{k \neq j} s_j s_k \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}}, \tag{1}$$

where j and k index firms in the industry, i indexes institutions, s is the firm's market share, γ is the fraction of voting rights controlled by the institution, and β is the fraction owned. In calculating MHHI Delta and C (defined below), voting rights are based on the sum of the institution's shared and sole voting shares. Furthermore, only institutions' positions (the sum of shared, sole, and non-voting shares) greater than 0.5% are considered, and positions are rescaled to add up to 100%.

Fifth, C is the average across all pairs of firms in an industry of the "common ownership incentive term" which, as defined in Kennedy et al. (2017), equals $\frac{\sum_i \gamma_{ij}\beta_{ik}}{\sum_i \gamma_{ij}\beta_{ij}}$ for the jk firm-pair. The common ownership incentive term reflects the extent to which firms in an industry are connected by common ownership and voting control among institutional investors but does not depend on the respective market shares of firms in the industry.

To measure industry profitability, we use two distinct measures. The first measure, Markup, is computed from quarterly, firm-level Compustat information. We calculate Markup as the average for all firms j in industry i in period t where firm-level markup is defined for firm j at time t as:

$$Markup_{j,t} = \frac{Sales_{j,t}}{Sales_{j,t} - EBIT_{j,t}}, \tag{2}$$

where $EBIT_{j,t}$ is earnings before interest and taxes for firm j at time t. Thus, markup is the average within an industry of firms' ratios of revenues over costs.[11] This same definition is also used in Azar (2011).

The second measure, price-cost margin (PCM), is also computed from quarterly, firm-level Compustat information. In particular, following Domowitz, Hubbard, and Petersen (1987) and Phillips (1995), for each industry i for each period t, $PCM_{i,t}$ is defined as:

[11] It should be noted that the denominator measures average cost and not marginal cost. The measure does not reflect interest expense or the cost of equity capital.

$$PCM_{i,t} = \frac{Sales_{i,t} - Cost\ of\ Goods\ Sold_{i,t} + \Delta Inventories_{i,t}}{Sales_{i,t} + \Delta Inventories_{i,t}} \tag{3}$$

where changes in inventory are added back to margins to reflect changes in input prices not yet reflected in current sales.

4.3 Summary Statistics

Table 1 presents summary statistics, at the industry level, for the variables used in our study. Average quarterly levels and changes for the five measures of institutional common ownership are reported. As is also evident from Figure 1, average quarterly changes in common ownership are positive over the sample period regardless of how common ownership is measured. While not reported in the table, the common ownership measures are positively correlated. However, the correlations vary substantially from 0.06 to 0.76 across the five measures. Summary statistics for the remaining industry-level variables used in our analyses, including the profitability measures, are also reported. Markups average 1.110. The average PCM is 0.292 over the sample period. The correlation between Markups and PCMs is 0.20. For our regression specifications, we use a number of control variables. These are described in detail in Appendix A. Firm-level scaled financial variables are winsorized at the 1st and 99th percentiles. Summary statistics for the samples formed using alternative industry definitions are reported in the Internet Appendix.

Much of our analysis is also conducted on subsamples of industries in which coordination is, a priori, more likely or certain selection biases are lessened. We identify where collusion via common ownership is expected to be facilitated, i.e., concentrated industries, industries in which firms were prosecuted for collusion during the sample period, and industries without large privately-held, family-held, or dual-class firms. We define concentrated industries as those in the top tercile of the time series average HHI and code an indicator variable,

Concentrated, to be one for these industries and zero for all others. We identify industries with large private firms using the 2008 list of Forbes largest private firms. The list contains the 241 private firms in the US with estimated sales greater than $1 billion. We assume that these firms were present in their respective industries for all years in our sample period, e.g., Cargill, Inc. We identify industries with family firms or dual class firms using the data from Anderson and Reeb (2003) and Anderson, Duru, and Reeb (2009); Anderson, Reeb, and Zhao (2012) which, respectively, identify family firms among the firms in the S&P 500 and family or dual class firms among the largest 2,000 firms in Compustat. The private, family, and dual class identifiers are not available for all firms and all years of our sample. Thus, we use the series for the years they are available, frontfill and backfill data for firms in the series, and classify firms not in the series as not being family or dual class firms. We code an indicator variable that takes a value of one if an industry has any large Private, Family, or Dual Class firms present and zero otherwise. We also identify industries in which individual firms were formally prosecuted for collusion by U.S. authorities using the Private International Cartels (PIC) dataset.[12] We code an indicator variable, Cartel, that takes a value of one if an industry participant was prosecuted for collusion sometime during our sample period.

We also conduct our tests in subsamples of industries for which potential selection bias due to requiring firms to have public equity is smaller and subsamples of industries for which substantive changes have not been made to industry codes, e.g., Ali, Klasa, and Yeung (2008). Given the industries in our sample are as defined and constituted by the firms on the merged CRSP/Compustat database, the industries do not generally reflect the actions of firms without public equity. We can observe the operations of some firms without public equity, e.g., those with only public debt, by forming industries requiring that firms

[12]Private International Cartels spreadsheet by John M. Connor, Professor Emeritus, Purdue University, Indiana, US (2018).

only be on Compustat but not CRSP. To investigate the influence of potential selection bias from excluding firms without public equity, we report results for the subsamples of industries where CRSP/Compustat firms in an industry "cover" at least 95% of the firms in the industry based on Compustat alone. We code an indicator variable, Coverage, that takes a value of one when coverage is at least 95% of firms.[13] Changes in industry classifications codes (one to many and many to one) result in changes in common ownership that are not necessarily driven by changes in institutional holdings. Also, cartelization is positively related to industry stability, e.g., Levenstein and Suslow (2006). Thus, we conduct our tests on the subsample of industries for which changes to NAICS codes across quinquennial economic censuses did not affect a four-digit code during the entire sample period. We code an indicator variable, Balanced Panel, to take a value of one for all four-digit NAICS industries for which code changes were not applicable and the industry has at least 110 consecutive quarters with at least two firms.

4.4 Additional Descriptive Statistics Regarding Changes in Common Ownership

Table 2 reports several details of instances during the sample period in which an industry experienced a significant increase in Density during a particular quarter. We define a significant increase as a quarterly change in Density that exceeds by two standard deviations the industry's average time series change for the entire sample period. While we will use this sample as part of an operating performance event study below, several details for this sample are reported here to further characterize the industries and institutional investors that have contributed to the overall increases in common ownership exhibited in Figure 1.

Panel A reports the industries and quarters in which large increases in Density occurred

[13] As detailed in Section 6, we also use a subsample of manufacturing industries that includes data on many private firms.

for a random sample of 10 of these events. We also report the institution(s) deemed "responsible" for the change. Specifically, in the right column of Panel A, we report the institutions with the largest increase in the number of block positions in firms in that industry during that quarter. Panel B reports the institutions that are most frequently "responsible" for significant increases in common ownership across the entire sample. We also report the institution type following Bushee (1998) and Bushee and Goodman (2007). Not surprisingly, the list includes several of the largest institutions. Fidelity, BlackRock, and Barclays are each present in more than 100 events. As is evident in Panel C, there is considerable variation in the industries involved, with nearly all NAICS 2-digit sectors in our sample experiencing significant increases among their four-digit subindustries.[14] Manufacturing industries (sectors 31-33) account for 39% of the observed significant increases.

5 Results

5.1 Structural Break Analysis

We initially investigate whether significant increases and decreases in common ownership of industries are followed by changes in industry participants' operations. We identify significant changes in common ownership in two ways. First, any quarterly change that is more than two standard deviations beyond the industry's mean quarterly change is defined as significant. Second, we identify structural breaks in a simple model in which common ownership is a function of a time varying level and an error term: $y_t = \mu_t + \epsilon_t$, where y_t is one of the five measures of common ownership, $\mu_t = \mu_{t-1} + \eta_t$, and ϵ_t and η_t are i.i.d. mean zero random variables. Any level shift that is statistically significant at the 5% level is determined to be a structural break in common ownership. Changes in operations are

[14] NAICS sector "Management of Companies and Enterprises" is the only sector in our sample without a significant increase in common ownership.

measured as the industry average over the four quarters subsequent to the ownership change (quarter t=1 to t=4) minus the industry average over the four quarters immediately prior to the change (quarter t=-4 to t=-1).

With five measures of common ownership, two measures of industry profitability, and two methods for identifying events, the event study analysis results in 20 test statistics for events involving large increases in common ownership. As reported in Table 3, in only three cases out of 20 do industries that experience large increases in common ownership subsequently exhibit significantly increased markups or PCMs. Thus, while it is possible to observe a relation supportive of the industry coordination hypothesis under several reasonable permutations of ownership measure, etc., the predominant evidence is inconsistent with the industry coordination hypothesis.

While Figure 1 illustrates that the overall trend has been towards greater common ownership, we also examine events where individual industries experience large decreases in common ownership over a short period. There are indeed somewhat fewer industries that have experienced large decreases than large increases. However, large decreases followed by reduced profitability suggests a breakdown in coordination, i.e., implies the prior existence of coordination. There are 20 test statistics for large decreases. In the only instance in which large decreases in common ownership are significantly related to industry profitability, the relation is positive, contrary to the predictions of the industry coordination hypothesis.

Table 4 reports event study results within certain subsamples. Given that the industry coordination hypothesis is mostly concerned with sustained increases in common ownership, we limit the reported results to large increases identified as structural breaks.[15] Increases in common ownership in concentrated industries are not significantly associated with increased industry profitability. Also, industries without large privately-held, family-controlled, or dual

[15]Results for decreases in common ownership and events identified on the basis of time series standard deviations are similar to those reported.

class firms do not exhibit significant increases in profitability following increased common ownership. Even in industries in which firms have been prosecuted for collusion sometime during our sample period, increases in common ownership are not associated with increased profitability. For the subsample of industries where the CRSP/Compustat coverage of firms is the most complete, there are three of ten instances where increases in common ownership result in significant subsequent increases in industry profitability. Also, two out of ten tests reveal a significant increase in profitability following increased common ownership in the subsample free of changes in industry definitions over the entire sample period. Event study results (reported in the Internet Appendix) using industries defined by three-digit SIC codes and H&P 300 fixed industry classifications are quite similar to those for NAICS and lead us to draw similar conclusions.

Taken together, the findings reported in Tables 3, 4, and the Internet Appendix indicate that large changes in common ownership over short periods of time are not reliably associated with changes in Markups or PCMs, even in subsamples of industries where conditions favor coordination, in a manner consistent with the predictions of the industry coordination hypothesis.

With the obvious caveat that any changes in the intensity of non-price competition due to increased common ownership have not apparently resulted in significantly increased industry profitability, we also examine changes in non-price competition. Results of these tests are reported in the Internet Appendix. Following increases in common ownership, we do not consistently observe significant reductions in net capacity investment, i.e., in capital expenditures net of depreciation. This finding is inconsistent with industry participants increasing the stability of collusive arrangements by decreasing participants' abilities to deviate and produce above the collusive quantity, e.g., see Jacquemin and Slade (1989). While we observe some instances of significant reductions in advertising following increased common ownership, the results are not robust to seemingly reasonable changes in industry defini-

tions. This finding is inconsistent with industry participants reducing combative advertising as would be predicted by the industry coordination hypothesis.[16]

5.2 Common Ownership and Profitability Regressions

We estimate multivariate regressions explaining industry-level Markups and PCMs with measures of common ownership, controls for other aspects of institutional ownership, and controls for differences in industry structure. Table 5 reports results of candidate regressions explaining Markups with common ownership as measured by Density and using the full sample. All specifications include quarter fixed effects. Industry fixed effects are included where indicated. Standard errors are robust to heteroscedasticity and clustered at the industry level. The first column reports results where only quarter fixed effects are included. The coefficient on Density is negative and significant at conventional levels. However, as reported in column 2, the relation between Density and Markups is insignificant in the presence of both time and industry fixed effects. Column 3 reports results when the control variables from Azar (2011) are added. Again, the coefficient on density is insignificant in contrast with a significant positive relation between Density and Markups documented in Azar (2011) and, thus, is inconsistent with the industry coordination hypothesis. Column 4 reports results when the control variables are replaced with those used to explain changes in industry profitability around full and partial horizontal mergers and large changes in leverage, e.g., see Phillips (1995), Bhattacharyya and Nain (2011), and Nain and Wang (2018). The coefficient on Density is not significant at conventional levels in the presence of these variables. Column 5 reports results when the combined set of control variables is used and the coefficient on Density is again not significant.

[16] As reported in the Internet Appendix, we confirm that changes in COGS are not significant. Thus, it does not appear as if greater common ownership of an industry generally results in greater bargaining power with suppliers as has been documented for horizontal mergers, e.g., see Fee and Thomas (2004), Shahrur (2005), and Bhattacharyya and Nain (2011).

For the remainder of the regression analysis, we use the specification from column 5 of Table 5 as our base specification and vary the measures of profitability (two), the measures of common ownership (five), and the sample used (six) resulting in a total of 60 regressions. The 60 common ownership coefficients, t-statistics, and numbers of observations from these respective regressions are reported in Table 6. Regardless of how we vary the parameters, we do not frequently observe a significant positive relation between changes in common ownership and changes in industry profitability, which is inconsistent with the industry coordination hypothesis.

As detailed in the Internet Appendix, when our base specification is run on the samples constructed with alternative industry classifications, the tenor of the results is quite similar. Specifically, the only significant common ownership coefficients when using SIC codes to define industries are actually negative, which is again inconsistent with the coordination hypothesis. While the results for the overall sample when industries are defined using H&P codes offer no support for the industry coordination hypothesis, the results when using the subsample of concentrated industries and measuring profitability with Markups are somewhat consistent with the predictions of the industry coordination hypotheses, i.e., three significantly positive coefficients on the five common ownership measures. However, changing the profitability measure to PCMs for this same subsample renders one of the three coefficients insignificant and drops the significance of the remaining two coefficients to only marginal significance.

Taken together, the evidence from the regressions does not support accepting the industry coordination hypothesis. That a certain few reasonable choices of combinations of industry definitions, subsamples, profitability measures, and common ownership measures generate evidence consistent with the industry coordination hypothesis, but the vast majority of other equally reasonable choices do not, potentially explains why several prior papers reach differing or even opposite conclusions regarding the relation between common ownership and

industry profitability.

We also run regressions explaining Net CAPX and Advertising, respectively, with common ownership and the same controls as our base specification. Using two measures of non-price competition and the same combinations of ownership measures and samples as used previously, we estimate 60 regressions in total. The 60 common ownership coefficients, t-statistics, and numbers of observations from these respective regressions are reported in Table 7. While there are several negative and significant coefficients, we do not find consistent evidence of a negative relation between common ownership and changes in capacity or market share investment as would be predicted by the industry coordination hypothesis. We note that any reductions in other spending on non-price competition (specifically SG&A, R&D, or COGS) associated with increased common ownership are also evidently not large enough in combination to result in significantly increased Markups or PCMs.

5.3 Plausibly Exogenous Changes in Common Ownership

Our event study and regression results do not rely on exogenous variation in common ownership. These tests may be misspecified if, for example, there is some variable that when omitted from empirical tests obscures the true relation between common ownership and measures of industry coordination. Furthermore, the industry coordination hypothesis stipulates a causal effect of common owners. Therefore, to more directly address the causal nature of the proposed relation, we follow He and Huang (2017), Azar et al. (2018), and Lewellen and Lowry (2018) and use changes in common ownership that are driven by mergers of financial institutions. Our identifying assumption is that any changes in common ownership due to the mergers were incidental in the decisions to merge. As the majority of the mergers were the result of consolidation in the commercial banking industry, it seems unlikely that the respective portfolio holdings of the institutional investment divisions of the merging banks played a role in the decisions to merge.

We use 48 mergers that occur during our sample period and satisfy the conditions described in Section 4.2 of He and Huang (2017). First, we compare measures of common ownership in the quarter prior to a given merger announcement to counterfactual measures computed under the assumption that the two institutions had already merged. Table 8 summarizes these differences between actual and counterfactual measures of common ownership, which we refer to as implied changes, for all mergers in our sample. We find that the implied changes in Density, PCF, and PCS are very small. However, roughly 25% of industries in the quarter prior to a merger have increases in MHHI Delta and C implied by the mergers. We define these industries with positive implied changes in MHHI Delta or C as treated.

Interestingly, Table 8 also reports that the mergers imply a drop in MHHI Delta and C in more than 5% of industries. This is counterintuitive, as one might expect a measure of common ownership to increase when owners become common.[17] This simple result alone has potential policy implications. Policymakers are currently debating whether we should limit the scale of large institutional investors. If either MHHI Delta or C is the "true" measure of common ownership and we accept that common ownership has negative anti-competitive effects that outweigh any benefits, then it is still not the case that policymakers should necessarily limit the scale of large institutions. In fact, 5% of the time (according to the mergers in our sample), policymakers should encourage mergers among large institutions in order to limit the potential negative anti-competitive effects of common ownership. Of course, an alternate implication is that neither MHHI Delta nor C is the "correct" way to measure common ownership.

If common ownership causes anti-competitive behavior, then we expect higher Markups and PCMs among treated industries after the merger. Following He and Huang (2017), we

[17] Consider an example with three institutions (A,B,C) and two firms (1,2). Assume that each institution has 10% of firm 1's ownership and voting. Regarding firm 2, institution A has zero voting and ownership, B has zero voting and 10% ownership, and C has 10% of both voting and ownership. In this case, if institutions A and B merge, common ownership as measured by MHHI Delta and C will drop.

compare industry outcomes in the three years prior to the merger announcement to those in the three years after the effective date of the merger in the following difference-in-difference specification:

$$Profitability_{j,t} = \beta_1 Treat \times Post + X_{j,t}\lambda + \alpha_t + \theta_j + \varepsilon_{j,t}, \tag{4}$$

where j indexes industries and t indexes time. Profitability is either Markup or PCM. Treat is a dummy equal to one for treated industries, Post is a dummy equal to one for quarters after the merger, $X_{j,t}$ is a vector of controls, α_t is a quarter fixed effect and θ_j is an industry effect.

Results for Markups are presented in Table 9. Column 1 presents results without controls and without industry effects. We add industry fixed effects in column 2 and various controls in columns 3 through 5. These first five columns use MHHI Delta to define treated industries. Columns 6 through 10 repeat the same specifications, but use C to identify treated industries. We observe no evidence of a causal positive relation between MHHI Delta and Markup in any of the specifications. In two of the specification using C, we find a marginally statistically significant negative relation with Markup, e.g., see Kennedy et al. (2017).

We explore this further by replacing Markups with PCMs as the dependent variable and also by examining the effects within a variety of subsamples. In Table 10, we report the coefficients of interest (β_1 from equation 4), the t-statistics, and the numbers of observations. Other coefficients are estimated but not reported. The specifications used correspond to columns 5 or 10 of Table 9, depending on whether MHHI Delta or C is used to identify treated industries. Results indicate weak evidence of a negative causal effect of common ownership on markups or margins. This is not a robust finding, however. Of the 24 reported coefficients, 15 are indistinguishable from zero. In summary, there is not an apparent causal positive relation between common ownership and industry profitability.

We have also conducted difference-in-difference analyses of capacity and market share investment, respectively. The results, reported in the Internet Appendix, provide some suggestive evidence of reduced investment in additional capacity, i.e., eight of ten coefficients negative with four of the eight significant. However, the results are not consistent across measures of common ownership or the various subsamples. Further, the results for advertising expenditures vary in both sign and significance in ways that do not support accepting the industry coordination hypothesis.

As reported in the Internet Appendix, we have also conducted the difference-in-difference profitability analysis on samples formed using alternative industry definitions. The results using SIC codes are similar in nature to those reported in Table 10. However, the results using H&P industry definitions are characterized by a generally positive and significant causal relation between common ownership and industry profitability, i.e., as predicted by the industry coordination hypothesis. The relation is not, however, more pronounced in concentrated industries as predicted.

6 Common Ownership, Prices, and Profitability in the Manufacturing Sector

One may be concerned that the industry coordination hypothesis would be evidenced in prices rather than profitability. As discussed above, we view this as unlikely given the contention in Azar et al. (2018) that there is nothing for participants to conceal. Portfolio firms would not have incentives to understate their true profitability through real or accrual-based earnings management or reporting fraudulent transaction price data to the U.S. Bureau of Labor Statistics (BLS). Nevertheless, in this section we analyze the relation between common ownership and output prices using a subsample of manufacturing industries defined by the availability of data from several sources.

We measure quarterly industry price levels by the monthly producer price index published by the BLS. Each month, the BLS collects over 100,000 actual transactions prices for selected products from roughly 25,000 manufacturing establishments. The resulting industry (NAICS) indices measure the average change over time in the selling prices received by domestic producers for their output. We adjust this series for inflation using the CPI to obtain a real producer price index (RPPI) and aggregate to the quarterly level by taking the average over the three months in each quarter. Some industry price series are not available for the entire sample period.

We use the Annual Survey of Manufactures (ASM) published by the U.S. Census Bureau to collect information on labor and materials costs. ASM data are available with annual frequency by NAICS code for the period beginning with 1997. Data on the quantity produced by an industry is obtained from the Federal Reserve. These data summarize the real output for all U.S. manufacturing facilities. These indices are available monthly and we average over the three months in each calendar quarter. If a four-digit NAICS industry does not have specific quantity data, then we use the production data for the three-digit industry to which the four-digit industry belongs. In all, 78 four-digit NAICS industries have sufficient data.

Augmented Dickey-Fuller tests developed by Choi (2001) indicate the presence of a unit root in the output price series. These tests also confirm that a unit root is not present in the first differences of these series. Thus, our reduced-form, price regression specification is as follows:

$$\Delta \ln RPPI_{j,t} = \beta_1 \Delta CommonOwnership_{j,t} + \beta_2 \Delta HHI_{j,t} + \beta_3 \Delta \ln Materials_{j,t} + \beta_4 \Delta \ln Wages_{j,t} + \beta_5 \Delta \ln Quantity_{j,t} + \alpha_t + \theta_j + \varepsilon_{j,t}, \quad (5)$$

where the Δ represents the quarterly first difference, j indexes industries and t indexes time, α_t is a quarter fixed effect and θ_j is an industry effect. Wages, the real average wage from

the ASM, is calculated as the total pay to production workers divided by the number of hours worked by production workers. Materials is the real total cost of materials from the ASM. Given Wages and Materials data are only available with annual frequency, we use the annual changes in costs for each quarter within the year.[18] Quantity reflects shocks to the demand for an industry's output. Standard errors are clustered at the industry level.

As reported in Table 11, the five respective coefficients on the common ownership measures are insignificant. Thus, after controlling for cost and demand shocks, price changes in the manufacturing sector are not robustly positively related to changes in common ownership as is predicted by the industry coordination hypothesis. In contrast, Nain and Wang (2018), using similar price data and controls, finds that more direct cross-ownership by rival firms does lead to significantly higher industry prices. Also, Bhattacharyya and Nain (2011) finds that horizontal mergers are associated with lower supplier-industry prices especially when the suppliers are particularly dependent on firms in the merging industries for sales.[19] Thus, our evidence suggests that the effects of increased industry concentration due to full and partial mergers are distinct from those due to common ownership by institutional investors. Coefficients on the control variables are mostly as expected, i.e., increases in respective input costs are associated with higher prices as are positive shocks to demand.

The regression results above do not rely on exogenous variation in common ownership and, thus, perhaps obscure a true causal relation between common ownership and output prices. Therefore, we again use changes in common ownership that are driven by mergers of financial institutions. There are 19 mergers that occur during the sample period for which we have price data. As the preperiod for each merger, we use the quarter prior to the announcement of the merger. The respective post periods over which we calculate

[18] While this results in the changes for quarters 1-3 being based on future information, reported results are robust to using lagged annual changes in Wages and Materials confirming that our choice to use information for quarters 1-3 that is not actually available until quarter 4 does not affect the reported results.

[19] Phillips (1995) finds that large changes in individual firm leverage are associated with significant changes in prices.

changes from pre-period logged prices, etc., are the fourth, eighth, and twelfth quarters after the announcement quarter. We also use the average of the three post-period quarterly prices. We again compare measures of common ownership in the quarter prior to a given merger announcement to counterfactual measures computed under the assumption that the two institutions had already merged. The difference between the actual and counterfactual measure of common ownership for each merger, which we refer to as the implied change, is the instrument for the actual changes in common ownership across the pre and post periods.[20] We include actual changes in the control variables from the OLS analysis as well as merger event fixed effects. Estimated standard errors are robust to heteroscedasticity.

Results of first stage regressions explaining actual changes in common ownership from before to after the mergers with implied changes from before the mergers and changes in control variables around the mergers are reported in the Internet Appendix. Coefficients on the implied changes in MHHI Delta are statistically significant in three of the four specifications indicating that the instrument generally satisfies the relevance condition. F-statistics range from 5.24-8.90. Coefficients on the implied changes in C are generally not significant with the exception of the changes over the shortest period, where the coefficient is negative.

Second stage results are reported in Table 12. The coefficients on instrumented changes in MHHI Delta are all negative with the changes between quarter minus one and plus eight relative to the mergers significant at the 5 percent level. The coefficients on instrumented changes in C vary in sign and are not significant in any case. The results of weak identification tests (Kleibergen-Paap Wald rk F-statistics) for the continuous IV are reported in Table 12. In untabulated results, we have also used discrete versions of the instrument, e.g., top vs. bottom terciles of implied changes, recoding all positive implied changes to equal one and all negative implied changes to equal negative one, etc. In general, the continuous IV appears

[20] As in Azar et al. (2018), we switch from a difference in difference approach to an IV approach here as we want to obtain quantitative estimates of the effects of merger induced changes in common ownership on prices to facilitate potential comparisons of results across our respective papers.

to be the most relevant instrument. If common ownership causes anti-competitive behavior, then we would expect larger price increases following mergers of institutions that increase common ownership. Thus, the evidence from this analysis does not support the prediction of the industry coordination hypothesis.

As an additional robustness check on the profitability results reported earlier, we calculate PCM_{ASM} based on separate information collected by the US Census Bureau. In particular, following Allayannis and Ihrig (2001), Ali et al. (2008), and Nain and Wang (2018), for each four-digit NAICS industry i for each period t, $PCM_{\text{ASM,i,t}}$ is defined as:

$$PCM_{ASM,i,t} = \frac{Value\ of\ Shipments_{i,t} + \Delta Inventories_{i,t} - Payroll_{i,t} - Cost\ of\ Materials_{i,t}}{Value\ of\ Shipments_{i,t} + \Delta Inventories_{i,t}} \tag{6}$$

where value of shipments is the received or receivable net selling values of all products shipped. The data used by the Bureau to calculate PCMs are from the ASM and are at the individual establishment level, including the establishments of many private firms. In all, 78 four-digit NAICS industries have sufficient data to calculate PCM_{ASM}.

As reported in the Internet Appendix, we regress PCM_{ASM} on controls for industry structure and characteristics. In short, there are no cases in which the coefficients on common ownership are significant. Again, this is in contrast to Nain and Wang (2018) that finds significantly higher PCMs following increased cross-ownership of rivals within an industry. Also, these results, which are estimated using a sample that includes many private firms, suggest that our PCM results above using samples of firms with public securities are not likely attributable to selection bias, e.g., see Ali et al. (2008).

7 Interpretation

Our results are broadly consistent with the conclusion that common ownership does not reliably affect industry profitability. However, one might view our results as the outcome of tests that lack power. Relatedly, it may be that the lack of an observed relation across all industries obscures strong relations in a small subsample of industries. In this section, we analyze the collected estimates reported throughout our paper and summarize the sizes of the effects across the various tests to resolve potential uncertainty in interpretations associated with occasionally conflicting results, e.g., see Harvey (2017). We also take a permutation-based approach and conduct a "specification curve" analysis as advocated by Simonsohn, Simmons, and Nelson (2015).

Our paper includes 352 estimates of the common ownership-profitability relation arising from various combinations of five measures of common ownership, three industry definitions, two measures of profitability, different samples, and different econometric specifications. To facilitate comparison across estimates, we first translate each estimate into an economic magnitude measured as the change in profitability in units of standard deviation per a one-standard deviation increase in common ownership. The average economic effect is an increase in profitability of 0.0241 standard deviations for a one-standard deviation increase in common ownership. If we assume that our tests have sufficient power and that our estimates are therefore very precise, then we would conclude a positive relation, but one that is economically very close to zero. This small economic effect suggests low power is not a concern. Further, we can consider the fact that some of our estimates are more precise than others. If we weight each estimate by its inverse variance, our average estimated economic effect is even closer to zero; profitability increases by 0.00035 standard deviations for a one-standard-deviation increase in common ownership. Thus, when we do estimate sizable effects at times throughout the paper, these tend to be imprecise, and our most precise estimates

are close to zero. This again supports a conclusion that low power is not driving our results.

It is difficult to correctly gauge the confidence bounds around the average of the point estimates because the individual estimates are not independent. If we were to assume independence, then the 95% confidence bounds are $(-0.0101, 0.0582)$ around the unweighted average point estimate and $(0.000318, 0.000389)$ around the weighted average. It is unlikely that we can correctly treat the dependence using clustering, for example, without modeling the sources of dependence. Therefore, we take an alternative, permutation-based approach (Simonsohn et al., 2015). We estimate the profitability-common ownership relation under various permutations of assumptions regarding samples and measures. Specifically, we randomly select one of the three industry definitions, one of the five measures of common ownership, and one of the two measures of profitability. We then randomly sample 50 industries and run a regression following the specification in column 5 of Table 5. We repeat this 500 times and plot the resulting estimates in Figure 2. Again, to facilitate comparison, the variables in each permutation are standardized such that each estimate can be interpreted in terms of standard deviations. The solid curve in the top portion of Figure 2 plots these estimates ranked from smallest to largest.

More estimates are negative (277) than positive (223), and the median point estimate is -0.00073. To compare this with what is expected under the null, we repeat the permutation approach described above, but first randomly assign institutional ownership. We assign the entire structure of ownership of an industry to another randomly selected industry. We repeat the permutation procedure 200 times, each time reshuffling ownership across industries. Randomly assigning common ownership constructs the distribution under the null, and requires no assumptions regarding dependence. Instead, we only assume that ownership is exchangeable, i.e., any industry could have the ownership structure of any other industry. At the median, the 95% confidence interval is (-0.00298, 0.00285). Therefore, the median relation between industry profitability and common ownership is slightly negative

but not statistically different from zero. However, the bounds around the estimate are very tight such that we can statistically reject any meaningful economic effects. Other point estimates are also not significant, and, as shown in Figure 2, the entire specification curve lies within the 95% confidence interval.

In addition to examining the median relation, Simonsohn et al. (2015) also suggests other joint significance tests. For example, we can compare the fraction of estimates that are of the dominant sign, which in this case is negative. As mentioned, 277 of the 500 permutations produce a negative estimate. Among the 200 randomized samples, 73 produce at least 277 negative estimates, generating a p-value of 0.365 for this joint significance test. Therefore, we have no statistical evidence of a relation between profitability and common ownership. At the bottom of Figure 2, we plot the characteristics of each specification. There are few perceptible patterns. Estimates in the left (right) tail tend to use PCM (Markup) as the measure of profitability. Density tends to produce estimates in the center of the distribution rather than the tails, and MHHI Delta tends to produce estimates in the tails rather than the center. Again, this suggests that choices of profitability and common ownership measures can affect the likelihood of observing significant relations.

Finally, we also estimate the common ownership-profitability relation individually for each industry. These tests no longer use cross sectional variation, but rather estimate a contemporaneous association in the time series. We do this for each industry definition and for each unique combination of common ownership and profitability measures. We use the same control variables as in column 5 of Table 5 (other than the industry fixed effect), and we standardize the variables. This generates 7,738 coefficients of interest and corresponding t-statistics. The coefficients and t-statistics are summarized in the distributions presented in Figure 3. These are, not surprisingly, centered close to zero. The average economic effect across all industries is an increase in profitability of 0.0156 standard deviations for a one-standard-deviation increase in common ownership. The median effect is 0.003. The

distribution of t-statistics indicates that there are more significant results than what would be expected due to chance; however, this is true in both the right and left tails. Approximately 11% (11%) of the estimates are positive (negative) and significant at the five-percent level.

In Table IA 19, we list the industries that tend to most frequently produce t-statistics in the tails of the distribution. On the right (left) side of the table we report the industries that most frequently appear in the right (left) tail, i.e., $t > 1.96$ ($t < 1.96$). There are no obvious patterns evident from a comparison of the industries in the respective columns.[21] For instance, pipeline transportation of natural gas frequently exhibits a positive relation while pipeline transportation of crude oil frequently exhibits a negative relation. Interestingly, the commercial airline industry is among the industries exhibiting frequent positive relations between common ownership and profitability, e.g., see Azar et al. (2018). This suggests that the overall conclusions we draw from our sample of many industries are based on an empirical design that generates results consistent with those of published single-industry studies.

In sum, our conclusion of no relation between common ownership and profitability does not seem to be due to low-powered tests. If we had perfectly precise estimates, we would conclude that the economic effect of common ownership on profitability is close to negligible. Further, no specific combination of industry definition, profitability measure, or common ownership measure seems to dominate others. At the median, we estimate an effect that is indistinguishable from zero; however, the bounds around the estimate are tight. We can, therefore, statistically reject even modestly-sized economic effects.

8 Conclusion

We find that greater common institutional ownership within an industry is not reliably associated with significantly higher industry profitability, the presumed end-result of reduced

[21] In unreported results, we also find no patterns in profitability measures, industry definitions, or common ownership measures across the distribution.

competition among industry participants. While we find isolated instances in which reasonable a priori choices of industry classifications, profitability measures, common ownership measures, and empirical specifications generate results consistent with common ownership significantly increasing intra-industry coordination and profitability, the vast majority of other reasonable a priori choices on these dimensions do not yield results consistent with increased coordination. Further, this conclusion holds in subsamples of industries where coordination via common ownership is expected to be facilitated, in subsamples of industries for which potential selection bias due to requiring firms to have public equity are smaller, and in subsamples of industries for which there have not been substantive changes to industry codes. This conclusion continues to hold when we use the plausibly exogenous variation in common ownership that results from mergers of institutional investors. We also find that common ownership does not reliably increase intra-industry coordination among rival firms on non-price competition or on prices themselves. Our failure to reject the null of no relation between common ownership and industry profitability does not appear to be due to low powered tests. The effects we estimate are close to zero with tight bounds. Our estimates are sufficiently precise such that anticompetitive effects of common ownership would be identifiable were they to exist.

Our results are inconsistent with increased common ownership decreasing product market competition. Our evidence indicates that the results of single-industry studies concluding increased common ownership decreased competition in the airline and banking industries, e.g., Azar et al. (2016, 2018), do not generalize. Increased common ownership has not ushered in a new era of widespread anticompetitive behavior similar to that observed in the U.S. during the late 19th century. With the obvious caveat that our results are conditional on the extent of common ownership observed over our sample period and, thus, may not extrapolate to substantially higher levels of common ownership, we conclude that antitrust restrictions seeking to limit intra-industry common ownership are not currently warranted.

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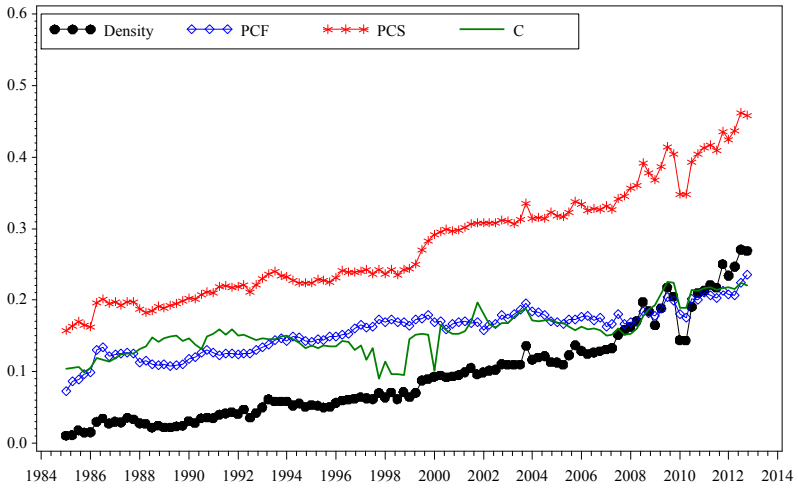
Appendix A: Variable Definitions

Variable	Definition
Density	The ratio of the number of firm-pairs that are connected in an industry over the maximum possible number of firm-pairs in that industry. Two firms are connected when there is a blockholder that owns at least five percent of each of the two companies.
PCF	The number of blockholders that own two or more companies in the industry over the total number of blockholders in that industry.
PCS	The maximum number of stocks in an industry with at least one common blockholder divided by the total number of stocks in the industry.
MHHI Delta	MHHI Delta is the marginal increase in HHI attributable to common institutional ownership, common institutional voting control, and the market shares of the firms in the industry.
C	Common ownership incentive term reflects the extent to which firms in an industry are connected by common ownership and voting control among institutional owners but does not depend on the respective market shares of firms in the industry.
Markup	Markup is the average of an industrys firms ratios of revenues over costs.
PCM	The price cost margin is the sum of sales minus cost of goods sold and the change in inventories divided by the sum of sales and the change in inventories.
Net CAPX	Total capital expenditures net of depreciation scaled by industry total assets.
Advertising	Total advertising expenditures scaled by industry total sales.
Off Degree	The number of pair connections between firms that do not belong to the same four-digit NAICS industries owned by the common blockholders.
Firms with Blocks	The fraction of firms in the industry that have at least one institution that owns more than five percent of the firm.
1/No. Firms	The reciprocal of the number of firms in the industry.
HHI	The sum of squared market shares of the firms in the industry.
ln(Assets)	The natural logarithm of the total assets for the industry.
Sales Growth	The percent change in total industry sales in quarter t from the total industry sales in quarter t-1.
Capital Intensity	Total industry assets divided by total industry sales.
R&D Intensity	Total industry R&D expenditures divided by total industry assets.
R&D Missing	Dummy variable set to one if total industry R&D expenditures are missing.
Leverage	Industry total debt divided by the sum of total debt and total market equity.
Concentrated	Industry-level indicator variable set to one if the industry's time-series average HHI is in the top tercile.
Private, Family, Dual	Industry-level indicator variable set to one if there is a large private firm, a family-owned firm, or a dual class firm in the industry.
Cartel	Industry-level indicator variable set to one if a cartel was prosecuted in the industry during our sample period.
Coverage	Industry-level indicator variable set to one if at least 95% of Compustat firms in the industry are in the CRSP/Compustat merged database.
Balanced Panel	Industry-level indicator variable set to one if the industry has at least 110 consecutive quarters and no significant changes in NAICS industry definition.
RPPI	RPPI is the real producer price index obtained from the Bureau of Labor Statistics. These respective industry indices are available monthly and we average over the three months in each calendar quarter.
Wages	The real average wage from the ASM is calculated as the total pay to production workers divided by the number of hours worked by production workers.
Materials	The real total cost of materials from the ASM.
Quantity	The Federal Reserve's Index of Industrial Production. These respective industry indices are available monthly and we average over the three months in each calendar quarter.

Figure 1: Common Ownership Time Series

Data are from Thomson Reuters 13F, CRSP, and Compustat for the period starting with the first quarter of 1985 and ending with the fourth quarter of 2012. At the firm-level, we require firms to have total assets of at least $1 million, net sales of at least $250,000, and net sales greater than EBIT. Industries are defined using 4-digit NAICS codes. We require industries to have at least two firms in every industry-quarter for a minimum of 20 consecutive quarters to remain in the sample. There are 269 industries that meet the sample screen. Variables are defined in Appendix A. Figure (A) presents cross-sectional average Density, PCF, PCS, and C over time. Figure (B) presents cross-sectional average MHHI Delta over time.

(A) Density, PCF, PCS, and C



(B) MHHI Delta

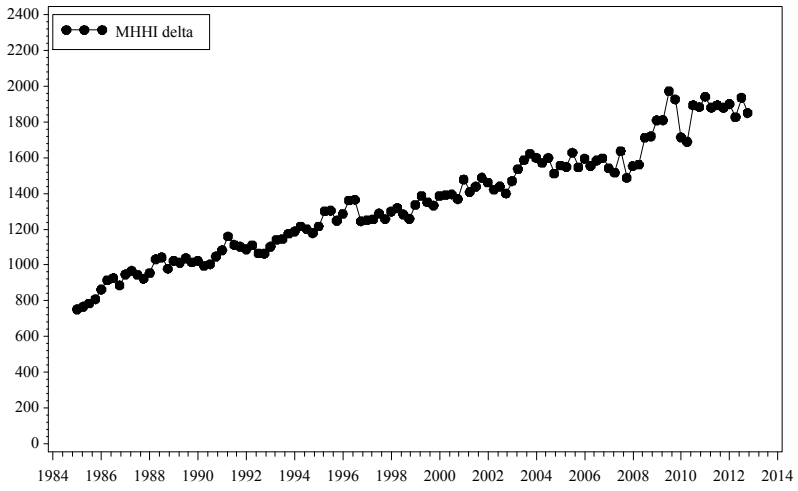


Figure 2: Specification Curve

The figure below plots point estimates and 95% confidence intervals for 500 permutations of industry definition, common ownership measure, and profitability measure. Each permutation is estimated over a random sample of 50 industries and includes the same control variables as in column 5 of Table 5. The resulting 500 estimates are plotted in the solid line in order from the smallest sized effect to the largest. At the bottom we plot the characteristics of each specification.

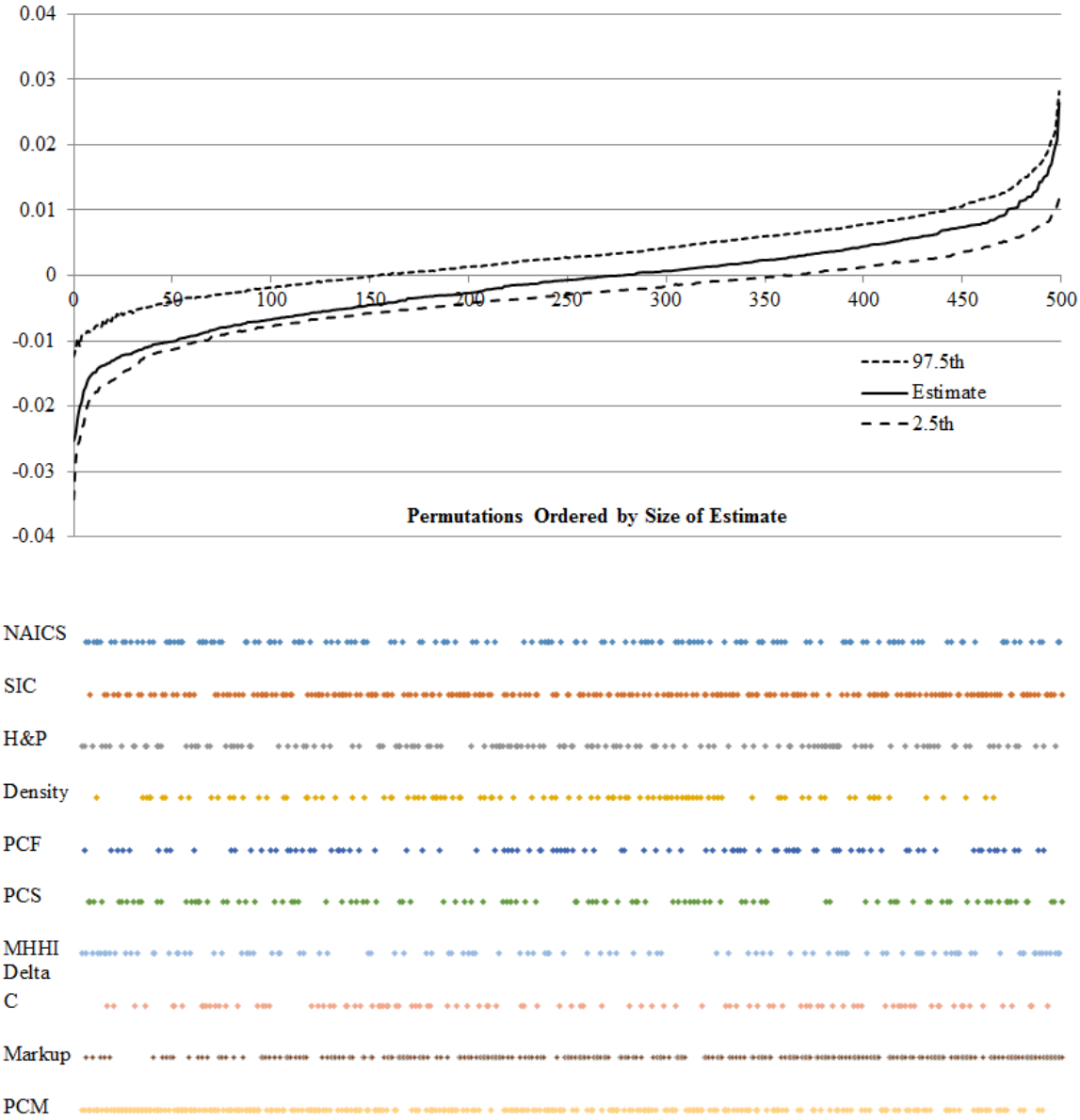
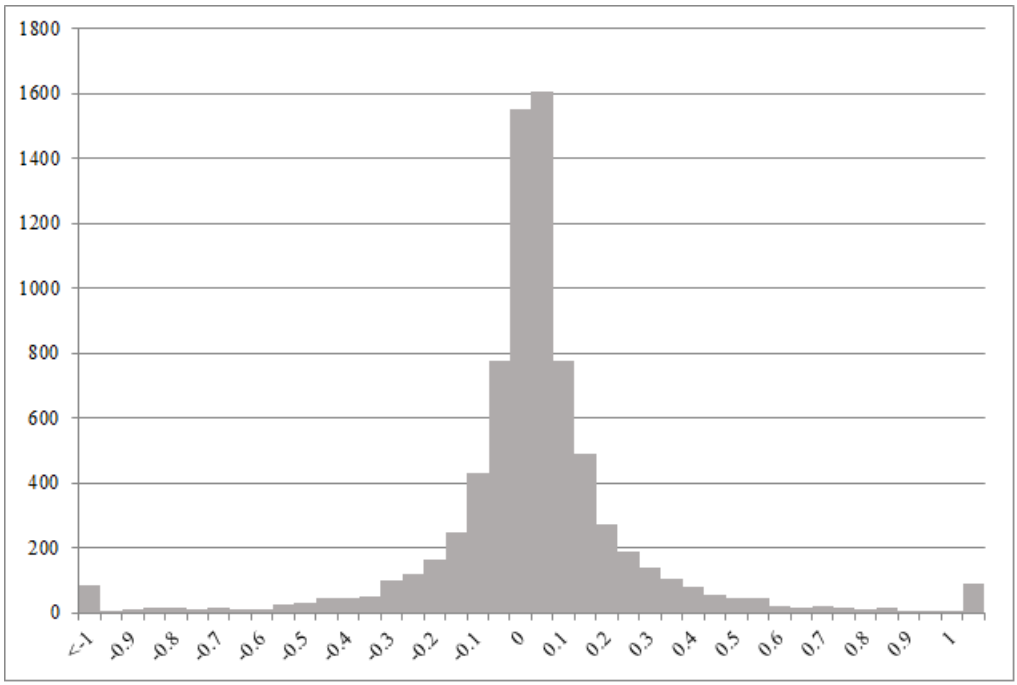


Figure 3: Distributions of Coefficients and t-statistics from Industry-by-Industry Regressions

The figures below summarize results from 7,738 regressions of profitability on common ownership. Specifically, we run the specification from Column 5 of Table 5, but, rather than pooled OLS, we run one time series regression for each industry using all of the different combinations of measures of industry, ownership, and profitability. Panel (A) below presents the resulting distribution of standardized coefficients representing the effect of common ownership on profitability. Panel (B) presents the distribution of corresponding t-statistics.

(A) Distribution of Coefficients



(B) Distribution of t-statistics

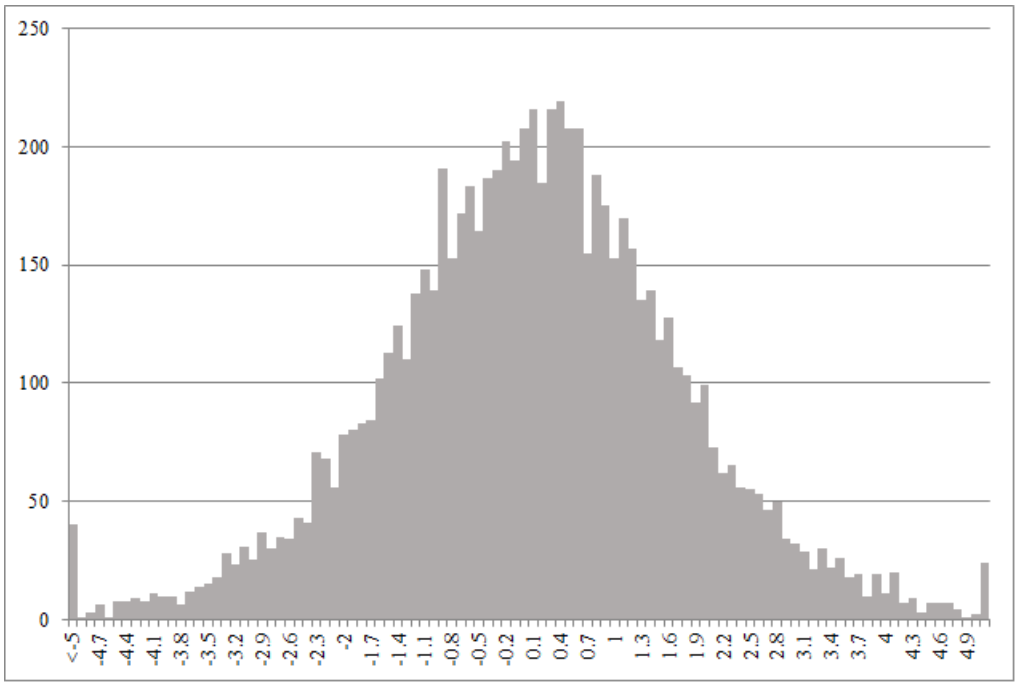


Table 1: Summary Statistics

This table presents summary statistics for quarterly industry-level common ownership, profitability, and other variables used in our analysis. Variables are defined in Appendix A. Data are from Thomson Reuters 13F, CRSP, and Compustat for the period starting with the first quarter of 1985 and ending with the fourth quarter of 2012. At the firm-level, we require firms to have total assets of at least $1 million, net sales of at least $250,000, and net sales greater than EBIT. Industries are defined using 4-digit NAICS codes. We require industries to have at least two firms in every industry-quarter for a minimum of 20 consecutive quarters to remain in the sample. There are 269 industries that meet the sample screen.

	Mean	Std. Dev.	P25	Median	P75	N
Common Ownership Measures						
Density	0.094	0.151	0.000	0.040	0.121	24,441
Δ Density	0.002	0.087	-0.003	0.000	0.006	24,065
PCF	0.157	0.136	0.000	0.154	0.250	24,441
Δ PCF	0.001	0.075	-0.018	0.000	0.022	24,065
PCS	0.279	0.173	0.154	0.250	0.353	24,441
Δ PCS	0.003	0.082	-0.011	0.000	0.015	24,065
MHHI Delta	1,359.247	993.018	592.683	1,188.514	1,968.982	24,441
Δ MHHI Delta	9.229	462.505	-133.913	4.464	161.842	24,065
C	0.155	0.100	0.096	0.142	0.196	24,441
Δ C	0.001	0.056	-0.013	0.000	0.016	24,065
Other Industry Variables						
Markup	1.110	0.229	1.026	1.067	1.123	24,441
PCM	0.292	0.172	0.206	0.295	0.387	24,400
Net CAPX	0.004	0.010	-0.002	0.002	0.008	24,373
Advertising	0.033	0.036	0.011	0.023	0.043	19,756
Off Degree (× 1,000)	0.003	0.003	0.000	0.003	0.006	24,441
Firms With Blocks	0.675	0.223	0.500	0.682	0.833	24,441
1 / No. Firms	0.143	0.136	0.042	0.091	0.200	24,441
HHI	3,269.033	2,159.312	1,650.625	2,726.358	4,450.853	24,441
ln(Assets)	9.146	2.096	7.780	9.060	10.457	24,441
Sales Growth	0.749	18.524	-0.056	0.026	0.117	24,391
Capital Intensity	5.732	8.034	2.689	3.735	5.630	24,441
R&D Intensity	0.002	0.006	0.000	0.000	0.001	24,441
R&D Missing	0.378	0.485	0.000	0.000	1.000	24,441
Leverage	0.297	0.196	0.147	0.261	0.413	24,438
Concentrated	0.283	0.450	0.000	0.000	1.000	24,441
Private, Family, or Dual	0.761	0.427	1.000	1.000	1.000	24,441
Cartel	0.217	0.412	0.000	0.000	0.000	24,441
Coverage	0.314	0.464	0.000	0.000	1.000	24,441
Balanced Panel	0.563	0.496	0.000	1.000	1.000	24,441

Table 2: Descriptive Statistics Regarding Large Increases in Common Ownership

The table reports the names and characteristics of 13F blockholder institutions that are related to significant quarterly increases in common ownership measured using Density. Our sample consists of 269 industries from 1985-2012. We focus on 651 industry-quarters where the increases in Density are more than two standard deviations beyond the mean quarterly change. Panel A reports the 13F blockholder institutions that caused the increase in common ownership for a random sample of 10 events. Panel B reports the frequency with which certain blockholders are identified across all 651 events and the institution type (bank trust, investment company, independent investment advisor) following Bushee (1998 and 2007). Panel C reports the frequency of events by each two-digit NAICS sector.

Panel A: Random Sample of 10 Large Increases in Density

NAICS	Description	Date	Δ Density	Institutions
2131	Support Activities for Mining	19932	0.1223	FIDELITY UNION TR CO
3321	Forging and Stamping	19934	0.1429	DIMENSIONAL FUND ADVS.
2349	Other Heavy Construction	19972	0.0542	FIDELITY UNION TR CO
				WELLINGTON/THORNDIKE
2131	Support Activities for Mining	20032	0.0980	FIDELITY UNION TR CO
3371	Household and Institutional Furniture and Kitchen Cabinet Manufacturing	20053	0.0882	AMVESCAP PLC LONDON
				BRANDES INVESTMENT MGMT
				DIMENSIONAL FUND ADVS.
				FIRST UNION NAT BK N C
				FRANKLIN RESOURCES
				HOTCHKIS & WILEY CAP MGMT, LLC
				MARINE BK SPRINGFIELD
				QUEST ADVISORY CORP.
				TWEEDY BROWNE INC
4541	Electronic Shopping and Mail-Order Houses	20054	0.0385	FIDELITY UNION TR CO
3279	Other Nonmetallic Mineral Product Mfg.	20104	0.1667	DIMENSIONAL FUND ADVS.
				HARVEY PARTNERS, LLC
4482	Shoe Stores	20113	0.2667	FIDELITY UNION TR CO
3255	Paint, Coating, and Adhesive Manufacturing	20114	0.1905	BLACKROCK, INC.
5616	Investigation and Security Services	20114	0.1667	HOUND PARTNERS, LLC

Panel B: Frequency by Institution of Large Increases in Density

Institution	Type	Frequency
FIDELITY UNION TR CO	INV	187
BARCLAYS BANK LIMITED	BNK	118
BLACKROCK, INC.	IIA	109
DIMENSIONAL FUND ADVS.	IIA	98
WELLINGTON/THORNDIKE	IIA	50
VANGUARD GROUP INC	INV	33
PRICE T ROWE ASSOCIATES	IIA	27
QUEST ADVISORY CORP.	IIA	24
NATIONSBANK CORPORATION	BNK	20
MORGAN STANLEY INC	IIA	18
MELLON NATIONAL CORP	BNK	17
PUTNAM MANAGEMENT	IIA	17
EQUITABLE LF ASSUR/U S	INS	16
FMR CORP	IIA	16
PIMCO ADVISORS L P	INV	16
FRANKLIN RESOURCES	INV	13
GOLDMAN SACHS & CO	IIA	12
CAPITAL RESEARCH + MGMT	INV	11

Table 2: Descriptive Statistics Regarding Large Increases in Common Ownership (Continued)

Panel C: Frequency by NAICS Sector of Large Increases in Density

NAICS Sector	Description	Frequency
11	Agriculture, Forestry, Fishing and Hunting	8
21	Mining, Quarrying, and Oil and Gas Extraction	16
22	Utilities	7
23	Construction	24
31	Manufacturing	48
32	Manufacturing	63
33	Manufacturing	140
42	Wholesale Trade	31
44	Retail Trade	42
45	Retail Trade	21
48	Transportation and Warehousing	35
49	Transportation and Warehousing	4
51	Information	30
52	Finance and Insurance	21
53	Real Estate and Rental and Leasing	24
54	Professional, Scientific, and Technical Services	22
56	Administrative and Support and Waste Management and Remediation Services	35
61	Educational Services	15
62	Health Care and Social Assistance	31
71	Arts, Entertainment, and Recreation	12
72	Accommodation and Food Services	4
81	Other Services (except Public Administration)	18

Table 3: Changes in Profitability around Large Changes in Common Ownership

This table reports changes in profitability around large quarterly changes in common institutional ownership. We identify large changes in two ways. First, quarterly changes in industry common ownership of more than two standard deviations beyond the mean industry quarterly change are defined as significant. Second, we identify structural breaks using a simple model in which common ownership is a function of a time varying level and an error term. Any industry level shift that is statistically significant at the 5% level is determined to be a significant change in common ownership. Changes in profitability are measured as the industry average over the four quarters subsequent to the change (quarter t=1 to t=4) minus to the industry average over the four quarters prior to the change (quarter t=-4 to t=-1). Variables are defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Inc./Dec.	2 S.D./S.B.	Profitability	C.O.	Pre	Post	Diff.	*t*-statistic	N
Increase	2SD	Markup	Density	1.111	1.109	-0.001	(-0.47)	651
Increase	2SD	Markup	PCF	1.097	1.096	-0.001	(-0.17)	586
Increase	2SD	Markup	PCS	1.116	1.115	-0.002	(-0.72)	722
Increase	2SD	Markup	MHHI Delta	1.110	1.115	0.005	(2.00)**	619
Increase	2SD	Markup	C	1.098	1.101	0.003	(0.81)	587
Increase	2SD	PCM	Density	0.311	0.309	-0.003	(-0.90)	651
Increase	2SD	PCM	PCF	0.283	0.288	0.005	(1.58)	586
Increase	2SD	PCM	PCS	0.306	0.309	0.003	(1.00)	722
Increase	2SD	PCM	MHHI Delta	0.287	0.292	0.005	(1.72)*	617
Increase	2SD	PCM	C	0.280	0.281	0.002	(0.42)	586
Increase	SB	Markup	Density	1.113	1.118	0.005	(0.58)	102
Increase	SB	Markup	PCF	1.116	1.128	0.012	(1.57)	98
Increase	SB	Markup	PCS	1.096	1.109	0.013	(2.20)**	118
Increase	SB	Markup	MHHI Delta	1.137	1.145	0.008	(0.77)	90
Increase	SB	Markup	C	1.087	1.095	0.008	(0.87)	77
Increase	SB	PCM	Density	0.317	0.317	0.000	(-0.04)	102
Increase	SB	PCM	PCF	0.310	0.322	0.012	(1.38)	98
Increase	SB	PCM	PCS	0.299	0.304	0.005	(0.68)	118
Increase	SB	PCM	MHHI Delta	0.303	0.315	0.012	(1.57)	90
Increase	SB	PCM	C	0.278	0.275	-0.003	(-0.39)	77
Decrease	2SD	Markup	Density	1.107	1.106	-0.001	(-0.33)	552
Decrease	2SD	Markup	PCF	1.104	1.105	0.001	(0.26)	624
Decrease	2SD	Markup	PCS	1.118	1.118	0.000	(-0.14)	611
Decrease	2SD	Markup	MHHI Delta	1.113	1.117	0.004	(1.37)	637
Decrease	2SD	Markup	C	1.103	1.105	0.003	(0.84)	579
Decrease	2SD	PCM	Density	0.307	0.305	-0.002	(-0.46)	552
Decrease	2SD	PCM	PCF	0.290	0.291	0.001	(0.35)	623
Decrease	2SD	PCM	PCS	0.304	0.306	0.002	(0.55)	611
Decrease	2SD	PCM	MHHI Delta	0.295	0.295	0.000	(-0.14)	637
Decrease	2SD	PCM	C	0.284	0.290	0.006	(1.44)	579
Decrease	SB	Markup	Density	1.105	1.119	0.014	(1.62)	79
Decrease	SB	Markup	PCF	1.131	1.139	0.008	(0.86)	77
Decrease	SB	Markup	PCS	1.126	1.140	0.014	(1.53)	83
Decrease	SB	Markup	MHHI Delta	1.113	1.120	0.008	(0.87)	80
Decrease	SB	Markup	C	1.107	1.102	-0.005	(-0.42)	69
Decrease	SB	PCM	Density	0.287	0.315	0.028	(2.56)**	79
Decrease	SB	PCM	PCF	0.297	0.295	-0.002	(-0.20)	77
Decrease	SB	PCM	PCS	0.279	0.289	0.010	(1.04)	83
Decrease	SB	PCM	MHHI Delta	0.286	0.280	-0.006	(-0.81)	80
Decrease	SB	PCM	C	0.294	0.294	0.000	(-0.02)	69

Table 4: Changes in Profitability around Large Changes in Common Ownership, Summary of Results

This table reports changes in profitability around large quarterly increases in common institutional ownership within various subsamples defined in the text. We identify positive structural breaks using a simple model in which common ownership is a function of a time varying level and an error term. Any industry level shift that is statistically significant at the 5% level is determined to be a significant change in common ownership. Changes in profitability are measured as the industry average over the four quarters subsequent to the change (quarter t=1 to t=4) minus to the industry average over the four quarters prior to the change (quarter t=-4 to t=-1). Variables are defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Subsample	Profitability	C.O.	Pre	Post	Diff.	*t*-statistic	N
Concentrated=1	Markup	Density	1.104	1.099	-0.005	(-0.30)	25
	Markup	PCF	1.077	1.093	0.016	(1.45)	30
	Markup	PCS	1.075	1.076	0.001	(0.08)	33
	Markup	MHHI Delta	1.097	1.086	-0.012	(-0.68)	20
	Markup	C	1.062	1.054	-0.008	(-0.78)	24
	PCM	Density	0.339	0.333	-0.006	(-0.34)	25
	PCM	PCF	0.299	0.325	0.026	(1.35)	30
	PCM	PCS	0.300	0.294	-0.005	(-0.30)	33
	PCM	MHHI Delta	0.285	0.286	0.001	(0.07)	20
	PCM	C	0.255	0.252	-0.003	(-0.22)	24
Private, Family, or Dual=0	Markup	Density	1.240	1.248	0.008	(0.36)	21
	Markup	PCF	1.161	1.171	0.01	(0.53)	20
	Markup	PCS	1.149	1.168	0.019	(1.28)	24
	Markup	MHHI Delta	1.209	1.204	-0.005	(-0.18)	23
	Markup	C	1.077	1.079	0.002	(0.12)	17
	PCM	Density	0.403	0.412	0.009	(0.55)	21
	PCM	PCF	0.331	0.334	0.003	(0.15)	20
	PCM	PCS	0.326	0.338	0.013	(0.48)	24
	PCM	MHHI Delta	0.337	0.340	0.003	(0.17)	23
	PCM	C	0.261	0.280	0.018	(1.13)	17
Cartel=1	Markup	Density	1.061	1.070	0.008	(0.54)	18
	Markup	PCF	1.084	1.096	0.012	(1.00)	22
	Markup	PCS	1.075	1.087	0.012	(0.92)	26
	Markup	MHHI Delta	1.108	1.115	0.007	(0.74)	19
	Markup	C	1.041	1.047	0.006	(0.65)	16
	PCM	Density	0.290	0.273	-0.017	(-1.05)	18
	PCM	PCF	0.328	0.344	0.016	(0.79)	22
	PCM	PCS	0.274	0.282	0.007	(0.37)	26
	PCM	MHHI Delta	0.298	0.308	0.01	(1.17)	19
	PCM	C	0.299	0.290	-0.009	(-0.76)	16
Coverage=1	Markup	Density	1.079	1.072	-0.006	(-0.76)	37
	Markup	PCF	1.071	1.090	0.019	(1.70)*	23
	Markup	PCS	1.074	1.075	0.002	(0.24)	41
	Markup	MHHI Delta	1.054	1.072	0.019	(2.30)**	23
	Markup	C	1.052	1.043	-0.009	(-0.62)	16
	PCM	Density	0.337	0.325	-0.012	(-1.22)	37
	PCM	PCF	0.322	0.360	0.038	(1.78)*	23
	PCM	PCS	0.308	0.302	-0.005	(-0.44)	41
	PCM	MHHI Delta	0.316	0.322	0.006	(0.54)	23
	PCM	C	0.285	0.266	-0.018	(-1.04)	16
Balanced Panel=1	Markup	Density	1.126	1.133	0.007	(0.67)	63
	Markup	PCF	1.152	1.156	0.004	(0.54)	58
	Markup	PCS	1.119	1.133	0.014	(2.60)**	71
	Markup	MHHI Delta	1.170	1.173	0.003	(0.32)	60
	Markup	C	1.116	1.120	0.004	(0.40)	47
	PCM	Density	0.312	0.313	0.001	(0.05)	63
	PCM	PCF	0.328	0.339	0.011	(1.02)	58
	PCM	PCS	0.308	0.315	0.007	(0.78)	71
	PCM	MHHI Delta	0.309	0.324	0.015	(1.92)*	60
	PCM	C	0.278	0.275	-0.003	(-0.25)	47

Table 5: Panel Regressions of Industries' Markups on Density

This table reports the results of multivariate OLS regressions explaining industry-level Markups with Density and controls for other aspects of institutional ownership and for differences in industry structure. All specifications include quarter fixed effects. Industry fixed effects are also included where indicated. Standard errors are robust to heteroscedasticity and clustered at the industry 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)	(2)	(3)	(4)	(5)
Density	-0.074**	0.003	-0.004	0.003	-0.004
	(-2.023)	(0.327)	(-0.391)	(0.299)	(-0.403)
Off Degree (x 1,000)			-1.741*		-1.691*
			(-1.911)		(-1.920)
ln(Assets)			0.013***		0.018**
			(2.733)		(2.268)
1 / No. Firms			0.188***		0.202***
			(3.639)		(2.844)
HHI			-0.000***		-0.000***
			(-3.279)		(-2.959)
Firms with Blocks			0.019*		0.018
			(1.747)		(1.474)
Capital Intensity				-0.001	-0.001
				(-0.322)	(-0.434)
Sales Growth				0.000**	0.000**
				(2.316)	(2.202)
R&D Intensity				-0.189	-0.200
				(-0.420)	(-0.446)
R&D Missing				0.011*	0.012**
				(1.819)	(2.092)
Leverage				-0.053**	-0.065***
				(-2.567)	(-3.334)
Quarter Effects	Y	Y	Y	Y	Y
Industry Effects	N	Y	Y	Y	Y
Observations	24,441	24,441	24,441	24,388	24,388
R^2	0.008	0.026	0.038	0.033	0.048
Industries		269	269	269	269

Table 6: Panel Regressions of Industry Profitability on Institutional Common Ownership, Summary of Results

This table reports the results of multivariate OLS regressions explaining industry-level profitability with common ownership and controls for other aspects of institutional ownership and for differences in industry structure. The specification is the same as column 5 from Table 5. All specifications include industry and quarter fixed effects. Standard errors are robust to heteroscedasticity and clustered at the industry level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

			Subsample				
Profitability	C.O.	Full	Concen-trated=1	Private, Family, Dual=0	Cartel=1	Cover-age=1	Balanced Panel=1
				Coefficient			
Markup	Density	-0.004	-0.012	0.013	-0.028	-0.007	-0.013
	PCF	-0.001	0.001	0.032	-0.027	-0.038	0.029
	PCS	0.023*	-0.010	0.027	-0.000	-0.003	0.011
	MHHI Delta	0.000	-0.000	-0.000	0.000	0.000	0.000
	C	-0.006	-0.038	-0.079*	0.057	0.003	0.012
PCM	Density	-0.003	0.018	0.014	-0.002	0.017	-0.004
	PCF	0.010	0.037	0.043	-0.043	0.022	0.003
	PCS	-0.001	0.008	0.013	0.012	0.016	0.003
	MHHI Delta	-0.000	-0.000	-0.000	-0.000	0.000	0.000
	C	-0.030	-0.043	-0.082	0.006	0.020	-0.033
				t-statistic			
Markup	Density	(-0.403)	(-0.914)	(0.686)	(-1.560)	(-0.551)	(-0.880)
	PCF	(-0.055)	(0.019)	(0.919)	(-1.045)	(-1.511)	(1.234)
	PCS	(1.839)	(-0.668)	(1.219)	(-0.016)	(-0.193)	(0.738)
	MHHI Delta	(1.121)	(-0.838)	(-0.707)	(1.178)	(0.933)	(0.674)
	C	(-0.291)	(-1.139)	(-1.886)	(1.408)	(0.108)	(0.325)
PCM	Density	(-0.184)	(0.958)	(0.630)	(-0.095)	(0.740)	(-0.258)
	PCF	(0.505)	(1.111)	(1.206)	(-0.865)	(0.649)	(0.131)
	PCS	(-0.067)	(0.259)	(0.461)	(0.510)	(0.566)	(0.142)
	MHHI Delta	(-0.438)	(-1.256)	(-1.322)	(-0.659)	(0.516)	(0.730)
	C	(-1.182)	(-0.953)	(-1.559)	(0.156)	(0.479)	(-1.072)
				N			
Markup	Density	24,388	6,886	5,831	5,305	7,887	13,755
	PCF	24,388	6,886	5,831	5,305	7,887	13,755
	PCS	24,388	6,886	5,831	5,305	7,887	13,755
	MHHI Delta	24,388	6,886	5,831	5,305	7,887	13,755
	C	24,388	6,886	5,831	5,305	7,887	13,755
PCM	Density	24,377	6,875	5,824	5,302	7,883	13,753
	PCF	24,377	6,875	5,824	5,302	7,883	13,753
	PCS	24,377	6,875	5,824	5,302	7,883	13,753
	MHHI Delta	24,377	6,875	5,824	5,302	7,883	13,753
	C	24,377	6,875	5,824	5,302	7,883	13,753

Table 7: Panel Regressions of Advertising and Net Capital Expenditures on Institutional Common Ownership, Summary of Results

This table reports the results of multivariate OLS regressions explaining industry-level Advertising and Net CAPX with common ownership and controls for other aspects of institutional ownership and for differences in industry structure. The specification is similar to column 5 from Table 5 but with different dependent variables. All specifications include industry and quarter fixed effects. Standard errors are robust to heteroscedasticity and clustered at the industry level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

			Subsample				
Expenditure	C.O.	Full	Concen-trated=1	Private, Family, Dual=0	Cartel=1	Cover-age=1	Balanced Panel=1
				Coefficient			
Net CAPX	Density	-0.002*	-0.000	0.002	-0.001	-0.003	-0.003
	PCF	-0.000	0.001	0.001	0.001	0.002	0.000
	PCS	-0.002	-0.002	0.001	0.001	-0.003	-0.002
	MHHI Delta	0.000	0.000	0.000	0.000	0.000*	-0.000
	C	-0.001	0.004	-0.002	-0.003	0.001	-0.005**
Advertising	Density	0.001	-0.005	-0.001	-0.012	-0.004	0.008
	PCF	-0.002	-0.017**	-0.002	-0.009	-0.001	0.000
	PCS	-0.002	-0.009	-0.003	-0.013	-0.001	0.002
	MHHI Delta	-0.000	-0.000	-0.000	-0.000	-0.000	0.000
	C	0.001	-0.006	0.025**	-0.006	-0.006	0.002
				t-statistic			
Net CAPX	Density	(-1.694)	(-0.258)	(1.309)	(-1.012)	(-1.596)	(-1.140)
	PCF	(-0.033)	(0.365)	(0.481)	(0.811)	(0.462)	(0.275)
	PCS	(-1.549)	(-0.793)	(0.297)	(0.620)	(-1.473)	(-1.109)
	MHHI Delta	(0.378)	(1.509)	(1.457)	(0.405)	(1.805)	(-0.863)
	C	(-0.479)	(1.035)	(-0.773)	(-0.985)	(0.188)	(-2.084)
Advertising	Density	(0.370)	(-0.895)	(-0.152)	(-1.323)	(-0.831)	(1.380)
	PCF	(-0.661)	(-2.415)	(-0.277)	(-1.052)	(-0.211)	(0.043)
	PCS	(-0.463)	(-1.249)	(-0.254)	(-1.316)	(-0.256)	(0.316)
	MHHI Delta	(-0.336)	(-0.317)	(-0.266)	(-1.370)	(-0.222)	(0.832)
	C	(0.262)	(-0.677)	(1.997)	(-0.592)	(-0.927)	(0.210)
				N			
Net CAPX	Density	24,321	6,862	5,817	5,295	7,878	13,709
	PCF	24,321	6,862	5,817	5,295	7,878	13,709
	PCS	24,321	6,862	5,817	5,295	7,878	13,709
	MHHI Delta	24,321	6,862	5,817	5,295	7,878	13,709
	C	24,321	6,862	5,817	5,295	7,878	13,709
Advertising	Density	19,732	4,595	3,881	4,712	6,297	11,733
	PCF	19,732	4,595	3,881	4,712	6,297	11,733
	PCS	19,732	4,595	3,881	4,712	6,297	11,733
	MHHI Delta	19,732	4,595	3,881	4,712	6,297	11,733
	C	19,732	4,595	3,881	4,712	6,297	11,733

Table 8: The Implied Effects of Mergers of Institutions on Common Ownership

This table summarizes the implied changes in five measures of common ownership resulting from 48 mergers of institutional investors. The implied change is the actual common ownership measure in the quarter prior to the merger announcement minus the counterfactual measure computed under the assumption that the merger has already taken place. Variables are defined in Appendix A.

Implied change in:	Min.	P1	P5	P10	P25	Median	P75	P90	P95	P99	Max.
Density	0	0	0	0	0	0	0	0	0	0.0083	1
PCF	-0.047	0	0	0	0	0	0	0	0	0.0138	0.333
PCS	0	0	0	0	0	0	0	0	0	0	0.5
MHHI Delta	-251.19	-5.469	-0.2859	0	0	0	0.0001	7.388	23.67	101.56	1,199.3
C	-0.0197	-0.00065	-0.00002	0	0	0	<0.00001	0.00062	0.00168	0.00725	0.1785

Table 9: Difference-in-Difference Regressions of Industries' Markups on Institutional Common Ownership

This table presents results of difference-in-difference regressions. The sample includes 12 quarters prior to each of the 48 institutional merger announcements and 12 quarters after each merger is completed. The periods between announcement and completion are not included. Treat is a dummy set to one if the implied change in common ownership (either MHHI Delta or C) is positive for that industry, zero otherwise. Post is a dummy set to one for the post-merger period. Variables are defined in Appendix A. Standard errors are clustered at the industry level. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\text{Treat}_{\text{MHHI Delta}}$*Post	0.002	-0.003	-0.003	-0.002	-0.003					
	(0.426)	(-1.192)	(-1.613)	(-0.938)	(-1.451)					
$\text{Treat}_{\text{MHHI Delta}}$	0.020									
	(1.328)									
Treat_{C}*Post						0.000	-0.003	-0.003*	-0.003	-0.003*
						(0.078)	(-1.393)	(-1.792)	(-1.178)	(-1.729)
Treat_{C}						0.018				
						(1.213)				
Off Degree (x 1,000)			-1.752**		-1.812**			-1.751**		-1.810**
			(-2.120)		(-2.277)			(-2.119)		(-2.275)
ln(Assets)			0.013***		0.020***			0.013***		0.020***
			(2.658)		(2.769)			(2.660)		(2.771)
1 / No. Firms			0.220***		0.248***			0.220***		0.248***
			(4.077)		(3.704)			(4.078)		(3.704)
HHI			-0.076***		-0.077***			-0.076***		-0.077***
			(-3.127)		(-2.927)			(-3.125)		(-2.924)
Firms with Blocks			0.020*		0.017			0.020*		0.017
			(1.801)		(1.403)			(1.798)		(1.400)
Capital Intensity				-0.002	-0.003				-0.002	-0.003
				(-0.938)	(-1.102)				(-0.938)	(-1.102)
Sales Growth				0.000**	0.000**				0.000**	0.000**
				(2.349)	(2.096)				(2.349)	(2.096)
R&D Intensity				0.013	0.001				0.014	0.001
				(0.033)	(0.003)				(0.033)	(0.003)
R&D Missing				0.012**	0.012**				0.012**	0.012**
				(2.138)	(2.169)				(2.137)	(2.169)
Leverage				-0.049**	-0.064***				-0.049**	-0.064***
				(-2.419)	(-3.337)				(-2.419)	(-3.339)
Quarter Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Effects	N	Y	Y	Y	Y		Y	Y	Y	Y
Observations	184,298	184,298	184,298	183,952	183,952	184,298	184,298	184,298	183,952	183,952
R^2	0.006	0.021	0.035	0.035	0.053	0.006	0.021	0.035	0.035	0.053
Industries	269	269	269	269	269	269	269	269	269	269

Table 10: Difference-in-Difference Regressions of Industry Profitability on Institutional Common Ownership, Summary of Results

This table summarizes the coefficient of interest from difference-in-difference regressions for the full sample and various subsamples. The specifications correspond to those in columns 5 and 10 from Table 9. The sample includes 12 quarters prior to each of the 48 merger announcements and 12 quarters after each merger is completed. The periods between announcement and completion are not included. Treat is a dummy set to one if the implied change in common ownership (either MHHI Delta or C) is positive for that industry, zero otherwise. Post is a dummy set to one for the post-merger period. Variables are defined in Appendix A. Standard errors are clustered at the industry level. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

			Subsample				
Profitability	C.O.	Full	Concen-trated=1	Private, Family, Dual=0	Cartel=1	Cover-age=1	Balanced Panel=1
				Coefficient			
Markup	MHHI Delta	-0.003	-0.006	-0.004	-0.003**	-0.003	-0.002
	C	-0.003*	-0.007	0.000	-0.004*	-0.003	-0.002
PCM	MHHI Delta	-0.003*	-0.014*	-0.005	-0.003*	-0.002	-0.002
	C	-0.004**	-0.014*	-0.002	-0.004***	-0.003	-0.002
				t-statistic			
Markup	MHHI Delta	(-1.451)	(-0.937)	(-0.522)	(-2.016)	(-1.111)	(-1.036)
	C	(-1.729)	(-1.120)	(0.023)	(-2.002)	(-0.939)	(-0.801)
PCM	MHHI Delta	(-1.754)	(-1.805)	(-0.690)	(-1.689)	(-0.618)	(-0.933)
	C	(-2.202)	(-1.802)	(-0.356)	(-2.702)	(-1.107)	(-1.068)
				N			
Markup	MHHI Delta	183,952	53,026	45,506	39,184	56,713	102,727
	C	183,952	53,026	45,506	39,184	56,713	102,727
PCM	MHHI Delta	183,846	52,920	45,440	39,159	56,672	102,717
	C	183,846	52,920	45,440	39,159	56,672	102,717

Table 11: Panel Regressions of Industry Output Prices on Institutional Common Ownership

This table reports the results of reduced-form regressions of changes in output prices on changes in common ownership, changes in the costs of materials and labor used in production, and changes in demand for industry output. The sample is all four-digit NAICS manufacturing industries that have sufficient data. Variables are defined in Appendix A. All specifications include industry and quarter fixed effects. Standard errors are robust to heteroscedasticity and clustered at the industry level. *t*-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
ΔDensity	-0.001				
	(-0.206)				
ΔPCF		-0.005			
		(-0.701)			
ΔPCS			0.000		
			(0.122)		
Δ MHHI Delta				0.000	
				(0.082)	
ΔC					0.001
					(0.058)
ΔHHI	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.649)	(-0.711)	(-0.667)	(-0.653)	(-0.646)
Δln(Materials)	0.042***	0.042***	0.042***	0.042***	0.042***
	(3.722)	(3.731)	(3.726)	(3.724)	(3.735)
Δln(Wages)	0.037*	0.037*	0.037*	0.037*	0.037*
	(1.908)	(1.912)	(1.908)	(1.910)	(1.897)
Δln(Quantity)	0.038	0.038	0.038	0.038	0.038
	(1.647)	(1.646)	(1.642)	(1.639)	(1.645)
Quarter Effects	Y	Y	Y	Y	Y
Industry Effects	Y	Y	Y	Y	Y
Observations	3,255	3,255	3,255	3,255	3,255
R^2	0.081	0.081	0.081	0.081	0.081
Industries	78	78	78	78	78

Table 12: IV Regressions of Industry Output Prices on Institutional Common Ownership

This table reports the second stage results of instrumental variable regressions of changes in output prices on changes in common ownership, changes in the costs of materials and labor used in production, and changes in demand for industry output. As an instrument for the actual changes in common ownership across the pre and post institutional merger periods, we use the difference between actual and counterfactual common ownership for each merger, i.e., the implied change. The implied change is the actual common ownership measure in the quarter prior to the merger announcement minus the counterfactual measure computed under the assumption that the merger has already taken place. Changes in prices, actual common ownership, and control variables are calculated as differences between their values at the quarter of the merger announcement and the indicated post period. The sample is all four-digit NAICS manufacturing industries that have sufficient data. Variables are defined in Appendix A. All specifications include institution merger fixed effects. Standard errors are robust to heteroscedasticity and clustered at the industry level. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Post Period							
	Qtr. 4	Qtr. 8	Qtr. 12	Avg. Qtrs. 4, 8, and 12	Qtr. 4	Qtr. 8	Qtr. 12	Avg. Qtrs. 4, 8, and 12
ΔMHHI Delta	-0.000	-0.000**	-0.000	-0.000				
	(-0.735)	(-1.984)	(-1.331)	(-1.554)				
Δ C					-0.766	1.010	2.260	-1.408
					(-0.948)	(0.095)	(0.415)	(-0.471)
ΔHHI	-0.231	-0.318**	-0.307	-0.317*	0.009	-0.035	-0.166	0.004
	(-0.819)	(-1.988)	(-1.461)	(-1.703)	(0.166)	(-0.207)	(-0.487)	(0.036)
Δln(Materials)	0.348***	0.334***	0.288***	0.318***	0.291***	0.349*	0.350**	0.282**
	(3.593)	(3.709)	(4.187)	(3.877)	(2.645)	(1.680)	(2.165)	(2.139)
Δln(Wages)	0.126	0.133	-0.029	0.060	0.225	0.060	-0.037	0.022
	(0.597)	(0.853)	(-0.261)	(0.407)	(1.071)	(0.097)	(-0.209)	(0.126)
Δln(Quantity)	-0.152**	-0.173**	-0.165***	-0.165**	-0.115	-0.173	-0.179	-0.120
	(-1.974)	(-2.409)	(-2.668)	(-2.462)	(-1.511)	(-1.222)	(-1.581)	(-1.092)
Merger Effects	Y	Y	Y	Y	Y	Y	Y	Y
Observations	652	651	647	654	652	651	647	654
F-stat (Weak Identification Test)	1.029	5.939	3.612	4.212	5.194	0.0646	0.270	0.611

Internet Appendix to Common Ownership and Competition in Product Markets

This Internet Appendix presents additional results examining industry coordination and common ownership. Initial tables report additional analyses using our main sample of industries defined by NAICS codes. Subsequent tables replicate important analyses from the paper but using industries defined by four-digit SIC codes or the 300 fixed-classification industries from Hoberg and Phillips (2016) (H&P), respectively.

IA.1 List of Exhibits

1. Table IA 1 reports changes in capital expenditures around large quarterly increases in common institutional ownership.

2. Table IA 2 reports changes in advertising around large quarterly increases in common institutional ownership.

3. Table IA 3 reports changes in costs of goods sold around large quarterly increases in common institutional ownership.

4. Table IA 4 reports results of difference-in-difference regressions of capital expenditures and advertising on common ownership.

5. Table IA 5 reports first-stage results of IV regressions of manufacturing industry output prices on common ownership.

6. Table IA 6 reports results of panel regressions of manufacturing industry PCM_{ASM} on common ownership.

7. Table IA 7 reports summary statistics for SIC-defined industries.

8. Table IA 8 reports results of the event study analyses when using SIC-defined industries.

9. Table IA 9 reports results of regressions of industries' markups on density when using SIC-defined industries.

10. Table IA 10 reports results of regressions of industry profitability on common ownership when using SIC-defined industries.

11. Table IA 11 reports results of difference-in-difference regressions of industries' markups on common ownership when using SIC-defined industries.

12. Table IA 12 reports a summary of results of difference-in-difference regressions of industry profitability on common ownership when using SIC-defined industries.

13. Table IA 13 reports summary statistics for H&P-defined industries.

14. Table IA 14 reports results of the event study analyses when using H&P-defined industries.

15. Table IA 15 reports results of regressions of industries' markups on density when using H&P-defined industries.

16. Table IA 16 reports results of regressions of industry profitability on common ownership when using H&P-defined industries.

17. Table IA 17 reports results of difference-in-difference regressions of industries' markups on common ownership when using H&P-defined industries.

18. Table IA 18 reports a summary of results of difference-in-difference regressions of industry profitability on common ownership when using H&P-defined industries.

19. Table IA 19 reports the individual industries for which the relation between common ownership and profitability is most frequently significant.

Table IA 1: Changes in Capital Expenditures around Large Changes in Common Ownership using NAICS-defined Industries

This table reports changes in industry Net CAPX around large quarterly changes in common institutional ownership. We identify large changes in two ways. First, quarterly changes in industry common ownership of more than two standard deviations beyond the mean industry quarterly change are defined as significant. Second, we identify structural breaks using a simple model in which common ownership is a function of a time varying level and an error term. Any industry level shift that is statistically significant at the 5% level is determined to be a significant change in common ownership. Changes in operations are measured as the industry average over the four quarters subsequent to the change (quarter t=1 to t=4) minus to the industry average over the four quarters prior to the change (quarter t=-4 to t=-1). Variables are defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Inc./Dec.	2SD/SB	Outcome Variable	C.O.	Pre	Post	Diff.	t-statistic	N
Increase	2SD	Net CAPX	Density	0.003	0.003	0.000	(0.16)	649
Increase	2SD	Net CAPX	PCF	0.005	0.005	0.000	(-0.03)	583
Increase	2SD	Net CAPX	PCS	0.003	0.003	0.000	(-0.2)	715
Increase	2SD	Net CAPX	MHHI Delta	0.004	0.004	0.000	(0.31)	619
Increase	2SD	Net CAPX	C	0.004	0.004	-0.001	(-1.69)*	586
Increase	SB	Net CAPX	Density	0.004	0.003	-0.001	(-1.01)	102
Increase	SB	Net CAPX	PCF	0.005	0.005	0.000	(0.63)	97
Increase	SB	Net CAPX	PCS	0.003	0.003	0.000	(-0.45)	119
Increase	SB	Net CAPX	MHHI Delta	0.004	0.004	0.001	(0.81)	89
Increase	SB	Net CAPX	C	0.006	0.004	-0.002	(-2.16)**	77
Decrease	2SD	Net CAPX	Density	0.003	0.003	0.000	(-0.06)	549
Decrease	2SD	Net CAPX	PCF	0.005	0.004	-0.001	(-2.25)**	621
Decrease	2SD	Net CAPX	PCS	0.004	0.003	0.000	(-0.64)	604
Decrease	2SD	Net CAPX	MHHI Delta	0.004	0.004	0.000	(-0.47)	636
Decrease	2SD	Net CAPX	C	0.004	0.004	0.000	(-0.35)	577
Decrease	SB	Net CAPX	Density	-0.001	0.001	0.002	(3.04)***	78
Decrease	SB	Net CAPX	PCF	0.004	0.003	-0.001	(-1.28)	76
Decrease	SB	Net CAPX	PCS	0.000	0.001	0.001	(1.36)	84
Decrease	SB	Net CAPX	MHHI Delta	0.003	0.003	-0.001	(-1.48)	81
Decrease	SB	Net CAPX	C	0.003	0.005	0.002	(2.82)***	69

Table IA 2: Changes in Advertising around Large Changes in Common Ownership using NAICS-defined Industries

This table reports changes in industry Advertising around large quarterly changes in common institutional ownership. We identify large changes in two ways. First, quarterly changes in industry common ownership of more than two standard deviations beyond the mean industry quarterly change are defined as significant. Second, we identify structural breaks using a simple model in which common ownership is a function of a time varying level and an error term. Any industry level shift that is statistically significant at the 5% level is determined to be a significant change in common ownership. Changes in operations are measured as the industry average over the four quarters subsequent to the change (quarter t=1 to t=4) minus to the industry average over the four quarters prior to the change (quarter t=-4 to t=-1). Variables are defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Inc/Dec	2SD/SB	Outcome Variable	C.O.	Pre	Post	Dif	t-statistic	N
Increase	2SD	Advertising	Density	0.029	0.028	-0.001	(-2.24)**	505
Increase	2SD	Advertising	PCF	0.037	0.035	-0.001	(-1.63)	426
Increase	2SD	Advertising	PCS	0.031	0.030	-0.001	(-1.65)	537
Increase	2SD	Advertising	MHHI delta	0.033	0.033	0.000	(0.66)	450
Increase	2SD	Advertising	C	0.034	0.033	-0.001	(-1.38)	417
Increase	SB	Advertising	Density	0.026	0.023	-0.003	(-1.31)	78
Increase	SB	Advertising	PCF	0.038	0.037	-0.001	(-0.56)	83
Increase	SB	Advertising	PCS	0.033	0.030	-0.003	(-1.53)	101
Increase	SB	Advertising	MHHI delta	0.036	0.037	0.001	(0.60)	67
Increase	SB	Advertising	C	0.034	0.032	-0.002	(-0.87)	58
Decrease	2SD	Advertising	Density	0.029	0.028	-0.001	(-1.51)	417
Decrease	2SD	Advertising	PCF	0.034	0.033	-0.001	(-0.82)	450
Decrease	2SD	Advertising	PCS	0.032	0.031	-0.001	(-1.14)	430
Decrease	2SD	Advertising	MHHI delta	0.031	0.031	0.000	(0.35)	466
Decrease	2SD	Advertising	C	0.033	0.032	-0.001	(-1.23)	406
Decrease	SB	Advertising	Density	0.025	0.021	-0.004	(-1.27)	54
Decrease	SB	Advertising	PCF	0.032	0.032	0.000	(0.00)	48
Decrease	SB	Advertising	PCS	0.026	0.027	0.001	(0.48)	53
Decrease	SB	Advertising	MHHI delta	0.027	0.027	0.000	(0.14)	59
Decrease	SB	Advertising	C	0.032	0.033	0.001	(0.39)	47

Table IA 3: Changes in Cost of Goods Sold around Large Changes in Common Ownership using NAICS-defined Industries

This table reports changes in industry total cost of goods sold over total industry sales around large quarterly changes in common institutional ownership. We identify large changes in two ways. First, quarterly changes in industry common ownership of more than two standard deviations beyond the mean industry quarterly change are defined as significant. Second, we identify structural breaks using a simple model in which common ownership is a function of a time varying level and an error term. Any industry level shift that is statistically significant at the 5% level is determined to be a significant change in common ownership. Changes in operations are measured as the industry average over the four quarters subsequent to the change (quarter t=1 to t=4) minus to the industry average over the four quarters prior to the change (quarter t=-4 to t=-1). Variables are defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Inc./Dec.	2SD/SB	Outcome Variable	C.O.	Pre	Post	Diff.	t-statistic	N
Increase	2SD	COGS	Density	0.692	0.694	0.002	(0.98)	651
Increase	2SD	COGS	PCF	0.718	0.718	0.000	(-0.16)	586
Increase	2SD	COGS	PCS	0.696	0.697	0.001	(0.27)	722
Increase	2SD	COGS	MHHI Delta	0.718	0.712	-0.006	(-2.06)**	619
Increase	2SD	COGS	C	0.721	0.720	-0.001	(-0.29)	587
Increase	SB	COGS	Density	0.686	0.688	0.002	(0.30)	102
Increase	SB	COGS	PCF	0.686	0.688	0.002	(0.26)	98
Increase	SB	COGS	PCS	0.709	0.705	-0.003	(-0.51)	118
Increase	SB	COGS	MHHI Delta	0.701	0.689	-0.012	(-2.14)**	90
Increase	SB	COGS	C	0.723	0.736	0.013	(1.73)*	77
Decrease	2SD	COGS	Density	0.696	0.696	-0.001	(-0.18)	552
Decrease	2SD	COGS	PCF	0.711	0.712	0.000	(0.08)	624
Decrease	2SD	COGS	PCS	0.699	0.698	-0.002	(-0.56)	611
Decrease	2SD	COGS	MHHI Delta	0.710	0.711	0.001	(0.24)	637
Decrease	2SD	COGS	C	0.717	0.717	0.001	(0.15)	579
Decrease	SB	COGS	Density	0.704	0.688	-0.016	(-2.17)**	79
Decrease	SB	COGS	PCF	0.703	0.708	0.004	(0.40)	77
Decrease	SB	COGS	PCS	0.723	0.719	-0.003	(-0.31)	83
Decrease	SB	COGS	MHHI Delta	0.715	0.722	0.006	(0.87)	80
Decrease	SB	COGS	C	0.706	0.715	0.009	(0.75)	69

Table IA 4: Difference-in-Difference Regressions of Industry Capital Expenditures and Advertising on Institutional Common Ownership, Summary of Results

This table summarizes the coefficient of interest from difference-in-difference regressions for the full sample and various subsamples. The specifications correspond to those in columns 5 and 10 from Table 9, however the dependent variable is either Net CAPX or Advertising. The sample includes 12 quarters prior to each of the 48 merger announcements and 12 quarters after each merger is completed. The periods between announcement and completion are not included. Treat is a dummy set to one if the implied change in common ownership (either MHHI Delta or C) is positive for that industry, zero otherwise. Post is a dummy set to one for the post-merger period. Variables are defined in Appendix A. Standard errors are clustered at the industry level. *t*-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

			Subsample				
Dependent Variable	C.O.	Full	Concentrated=1	Private, Family, Dual=0	Cartel=1	Coverage=1	Balanced Panel=1
				Coefficient			
Net CAPX	MHHI Delta	-0.000	-0.000	0.000	-0.000*	-0.000	-0.000
	C	-0.000**	-0.001**	-0.000	0.000	-0.000**	-0.000
Advertising	MHHI Delta	-0.001*	-0.002	-0.001	-0.001**	-0.000	0.000
	C	0.001**	0.002***	0.002**	0.000	0.000	-0.000
				t-statistic			
Net CAPX	MHHI Delta	(-0.011)	(-0.727)	(0.814)	(-1.908)	(-0.707)	(-0.473)
	C	(-2.348)	(-2.254)	(-0.341)	(1.052)	(-2.055)	(-1.309)
Advertising	MHHI Delta	(-1.672)	(-0.843)	(-0.529)	(-2.330)	(-0.024)	(0.716)
	C	(2.042)	(2.693)	(2.369)	(1.506)	(0.395)	(-0.448)
				N			
Net CAPX	MHHI Delta	183,360	52,894	45,410	39,129	56,648	102,273
	C	183,360	52,894	45,410	39,129	56,648	102,273
Advertising	MHHI Delta	144,847	33,493	28,390	34,380	44,107	86,382
	C	144,847	33,493	28,390	34,380	44,107	86,382

Table IA 5: First Stage IV Regressions of Industry Output Prices on Institutional Common Ownership

This table reports the first stage results of instrumental variable regressions of changes in output prices on changes in common ownership, changes in the costs of materials and labor used in production, and changes in demand for industry output. As an instrument for the actual changes in common ownership across the pre and post institutional merger periods, we use the difference between actual and counterfactual common ownership for each merger, i.e., the implied change. The implied change is the actual common ownership measure in the quarter prior to the merger announcement minus the counterfactual measure computed under the assumption that the merger has already taken place. Changes in prices, actual common ownership, and control variables are calculated as differences between their values at the quarter of the merger announcement and the indicated post period. The sample is all four-digit NAICS manufacturing industries that have sufficient data. Variables are defined in Appendix A. All specifications include institution merger fixed effects. Standard errors are robust to heteroscedasticity and clustered at the industry level. *t*-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Post Period				
	Qtr. 4	Qtr. 8	Qtr. 12	Avg. Qtrs. 4, 8, and 12	Qtr. 4	Qtr. 8	Qtr. 12	Avg. Qtrs. 4, 8, and 12
Implied Change in MHHI Delta	1.121	2.511**	1.774*	1.814**				
	(1.015)	(2.437)	(1.901)	(2.052)				
Implied Change in C					-0.739**	-0.077	0.188	-0.225
					(-2.279)	(-0.254)	(0.520)	(-0.782)
Δ HHI	-1,691.907***	-2,071.294***	-2,364.293***	-2,126.817***	0.054	0.015	0.053	0.035
	(-5.305)	(-6.467)	(-7.170)	(-6.185)	(1.140)	(0.472)	(1.020)	(0.859)
Δ ln(Materials)	209.468	8.468	-51.098	10.456	-0.040	-0.018	-0.025	-0.024
	(1.023)	(0.049)	(-0.330)	(0.063)	(-1.301)	(-0.806)	(-1.005)	(-0.979)
Δ ln(Wages)	-204.478	66.265	348.304	105.014	0.094	0.059	-0.014	-0.016
	(-0.178)	(0.074)	(0.393)	(0.109)	(0.767)	(0.829)	(-0.229)	(-0.210)
Δ ln(Quantity)	49.944	-102.060	-94.704	-82.700	0.058*	0.013	0.011	0.025
	(0.165)	(-0.561)	(-0.497)	(-0.474)	(1.680)	(0.347)	(0.299)	(0.711)
Merger Effects	Y	Y	Y	Y	Y	Y	Y	Y
Observations	652	651	647	654	652	651	647	654
R^2	0.116	0.131	0.162	0.142	0.129	0.094	0.135	0.112

Table IA 6: Panel Regressions of Manufacturing Industry PCMs on Institutional Common Ownership

This table reports the results of multivariate OLS regressions explaining manufacturing industry price-cost margins (PCM_{ASM}) with common ownership and controls for for differences in industry structure. The sample is all four-digit NAICS manufacturing industries that have sufficient data available from the US Census Bureau Annual Survey of Manufacturers to calculate PCM_{ASM} as defined in the text. Shipment Growth is the percentage change in the total value of shipments. Other variables are defined in Appendix A. All specifications include industry and quarter fixed effects. Standard errors are robust to heteroscedasticity and clustered at the industry level. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Density	0.005				
	(0.388)				
PCF		-0.013			
		(-0.804)			
PCS			0.012		
			(0.795)		
MHHI Delta				0.000	
				(0.836)	
C					-0.005
					(-0.243)
Capital Intensity	0.002	0.002	0.002	0.002	0.002
	(1.003)	(0.994)	(1.025)	(1.136)	(0.959)
Shipment Growth	0.001***	0.001***	0.001***	0.001***	0.001***
	(5.619)	(5.659)	(5.640)	(5.627)	(5.589)
R&D Intensity	0.256	0.329	0.261	0.271	0.275
	(0.211)	(0.273)	(0.217)	(0.224)	(0.228)
R&D Missing	0.005	0.005	0.005	0.005	0.006
	(0.715)	(0.673)	(0.638)	(0.685)	(0.730)
Leverage	-0.018	-0.018	-0.017	-0.018	-0.018
	(-1.108)	(-1.121)	(-1.054)	(-1.079)	(-1.107)
Quarter Effects	Y	Y	Y	Y	Y
Industry Effects	Y	Y	Y	Y	Y
Observations	1,179	1,179	1,179	1,179	1,179
R^2	0.215	0.215	0.215	0.216	0.215
Industries	83	83	83	83	83

Table IA 7: Summary Statistics of SIC-defined Industries

This table presents summary statistics for quarterly industry-level common ownership, profitability, and other variables used in our analysis. Variables are defined in Appendix A. Data are from Thomson Reuters 13F, CRSP, and Compustat for the period starting with the first quarter of 1987 and ending with the fourth quarter of 2012. At the firm-level, we require firms to have total assets of at least $1 million, net sales of at least $250,000, and net sales greater than EBIT. Industries are defined using 3-digit SIC codes. We require industries to have at least two firms in every industry-quarter for a minimum of 20 consecutive quarters to remain in the sample. There are 264 industries that meet the sample screen.

	Mean	Std. Dev.	P25	Median	P75	N
Density	0.095	0.150	0.000	0.044	0.127	25,568
PCF	0.152	0.136	0.000	0.143	0.250	25,568
PCS	0.284	0.171	0.167	0.250	0.357	25,568
MHHI delta	1,367.279	1,008.552	578.568	1,217.295	1,957.262	25,568
C	0.160	0.104	0.099	0.145	0.202	25,568
Markup	1.129	0.288	1.031	1.073	1.131	25,568
PCM	0.300	0.170	0.215	0.301	0.390	25,515
Off Degree (x 1,000)	8.264	8.143	0.000	7.460	14.799	25,160
Firms With Blocks	0.685	0.222	0.533	0.700	0.842	25,568
1/No. Firms	0.148	0.133	0.050	0.100	0.200	25,568
HHI	3,426.533	2,226.326	1,732.453	2,837.154	4,668.379	25,568
Log Assets	9.287	2.074	7.964	9.205	10.557	25,568
Sales Growth	0.625	16.407	-0.060	0.024	0.118	25,517
Capital Intensity	6.443	9.678	2.746	3.845	5.782	25,568
R&D Intensity	0.002	0.006	0.000	0.000	0.001	25,568
R&D missing	0.367	0.482	0.000	0.000	1.000	25,568
Leverage	0.312	0.207	0.153	0.267	0.435	25,552
Concentrated	0.297	0.457	0.000	0.000	1.000	25,568

Table IA 8: Changes in Profitability around Large Changes in Common Ownership using SIC-defined Industries

This table reports changes in profitability around large quarterly changes in common institutional ownership. We identify large changes in two ways. First, quarterly changes in industry common ownership of more than two standard deviations beyond the mean industry quarterly change are defined as significant. Second, we identify structural breaks using a simple model in which common ownership is a function of a time varying level and an error term. Any industry level shift that is statistically significant at the 5% level is determined to be a significant change in common ownership. Changes in operations are measured as the industry average over the four quarters subsequent to the change (quarter t=1 to t=4) minus to the industry average over the four quarters prior to the change (quarter t=-4 to t=-1). Variables are defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Inc./Dec.	2SD/SB	Profitability	C.O.	Pre	Post	Diff.	*t*-statistic	N
Increase	2SD	Markup	Density	1.121	1.123	0.002	(0.67)	719
Increase	2SD	Markup	PCF	1.124	1.125	0.001	(0.47)	673
Increase	2SD	Markup	PCS	1.120	1.120	0.000	(0.15)	777
Increase	2SD	Markup	MHHI Delta	1.140	1.142	0.001	(0.42)	698
Increase	2SD	Markup	C	1.130	1.130	0.000	(-0.06)	692
Increase	2SD	PCM	Density	0.303	0.309	0.006	(1.70)*	719
Increase	2SD	PCM	PCF	0.286	0.296	0.010	(2.68)***	672
Increase	2SD	PCM	PCS	0.303	0.306	0.003	(1.02)	776
Increase	2SD	PCM	MHHI Delta	0.295	0.300	0.006	(1.76)*	694
Increase	2SD	PCM	C	0.292	0.295	0.003	(1.10)	688
Increase	SB	Markup	Density	1.091	1.101	0.010	(1.00)	91
Increase	SB	Markup	PCF	1.137	1.135	-0.002	(-0.35)	92
Increase	SB	Markup	PCS	1.145	1.142	-0.003	(-0.38)	101
Increase	SB	Markup	MHHI Delta	1.164	1.158	-0.005	(-0.76)	106
Increase	SB	Markup	C	1.153	1.149	-0.004	(-0.53)	90
Increase	SB	PCM	Density	0.292	0.309	0.017	(1.67)*	90
Increase	SB	PCM	PCF	0.299	0.300	0.000	(0.02)	91
Increase	SB	PCM	PCS	0.294	0.312	0.017	(1.94)*	101
Increase	SB	PCM	MHHI Delta	0.311	0.321	0.010	(1.00)	106
Increase	SB	PCM	C	0.303	0.306	0.003	(0.31)	90
Decrease	2SD	Markup	Density	1.106	1.105	-0.001	(-0.35)	552
Decrease	2SD	Markup	PCF	1.104	1.104	0.001	(0.22)	624
Decrease	2SD	Markup	PCS	1.121	1.121	0.000	(-0.09)	612
Decrease	2SD	Markup	MHHI Delta	1.111	1.116	0.005	(1.46)	628
Decrease	2SD	Markup	C	1.101	1.103	0.003	(0.84)	577
Decrease	2SD	PCM	Density	0.306	0.305	-0.001	(-0.35)	552
Decrease	2SD	PCM	PCF	0.289	0.290	0.002	(0.48)	616
Decrease	2SD	PCM	PCS	0.305	0.307	0.003	(0.72)	609
Decrease	2SD	PCM	MHHI Delta	0.296	0.294	-0.001	(-0.38)	628
Decrease	2SD	PCM	C	0.281	0.287	0.006	(1.43)	575
Decrease	SB	Markup	Density	1.104	1.116	0.012	(1.44)	77
Decrease	SB	Markup	PCF	1.131	1.140	0.009	(0.99)	76
Decrease	SB	Markup	PCS	1.126	1.139	0.012	(1.32)	84
Decrease	SB	Markup	MHHI Delta	1.120	1.125	0.005	(0.53)	75
Decrease	SB	Markup	C	1.106	1.100	-0.005	(-0.45)	68
Decrease	SB	PCM	Density	0.280	0.305	0.025	(2.36)**	77
Decrease	SB	PCM	PCF	0.299	0.296	-0.003	(-0.24)	75
Decrease	SB	PCM	PCS	0.275	0.286	0.008	(0.85)	83
Decrease	SB	PCM	MHHI Delta	0.288	0.279	-0.008	(-0.99)	75
Decrease	SB	PCM	C	0.288	0.291	0.003	(0.22)	68

Table IA 9: Panel Regressions of Industries' Markups on Density using SIC-defined Industries

This table reports the results of multivariate OLS regressions explaining industry-level profitability with Density and controls for other aspects of institutional ownership and for differences in industry structure. All specifications include quarter fixed effects. Industry fixed effects are also included where indicated. Standard errors are robust to heteroscedasticity and clustered at the industry 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)	(2)	(3)	(4)	(5)
Density	0.022	0.027	0.005	0.023	0.001
	(0.271)	(1.276)	(0.288)	(1.290)	(0.052)
Off Degree (x 1,000)			0.001		0.001
			(1.079)		(1.254)
ln(Assets)			0.016***		0.025***
			(2.871)		(3.554)
1 / No. Firms			0.274***		0.298***
			(3.469)		(3.620)
HHI			-0.000***		-0.000***
			(-3.782)		(-3.626)
Firms with Blocks			0.010		0.008
			(0.589)		(0.515)
Capital Intensity				-0.001	-0.002
				(-0.666)	(-1.113)
Sales Growth				-0.000**	-0.000**
				(-2.399)	(-2.331)
R&D Intensity				-1.141***	-0.918***
				(-2.995)	(-2.821)
R&D Missing				0.012**	0.013**
				(2.233)	(2.035)
Leverage				-0.079***	-0.088***
				(-3.079)	(-4.003)
Quarter Effects	Y	Y	Y	Y	Y
Industry Effects	N	Y	Y	Y	Y
Observations	25,568	25,568	25,160	25,502	25,108
R^2	0.004	0.023	0.043	0.039	0.063
Industries		264	264	264	264

Table IA 10: Panel Regressions of Industry Profitability on Institutional Common Ownership using SIC-defined Industries, Summary of Results

This table reports the results of multivariate OLS regressions explaining industry-level Markups with common ownership and controls for other aspects of institutional ownership and for differences in industry structure. The specification is the same as column 5 from Table 5. All specifications include industry and quarter fixed effects. Standard errors are robust to heteroscedasticity and clustered at the industry level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

		Subsample	
Profitability	C.O.	Full	Concentrated=1
		Coefficient	
Markup	Density	0.001	0.012
	PCF	0.005	-0.003
	PCS	0.018	0.056
	MHHI Delta	0.000	0.000
	C	0.019	0.032
PCM	Density	-0.023	-0.011
	PCF	-0.010	0.002
	PCS	-0.022	-0.015
	MHHI Delta	-0.000	-0.000**
	C	-0.050**	-0.079**
		t-statistic	
Markup	Density	(0.052)	(0.579)
	PCF	(0.277)	(-0.089)
	PCS	(0.803)	(1.527)
	MHHI Delta	(0.461)	(0.941)
	C	(0.648)	(0.805)
PCM	Density	(-1.398)	(-0.790)
	PCF	(-0.460)	(0.042)
	PCS	(-1.117)	(-0.663)
	MHHI Delta	(-1.184)	(-2.205)
	C	(-2.101)	(-2.587)
		N	
Markup	Density	25,108	7,253
	PCF	25,108	7,253
	PCS	25,108	7,253
	MHHI Delta	25,108	7,253
	C	25,108	7,253
PCM	Density	25,101	7,247
	PCF	25,101	7,247
	PCS	25,101	7,247
	MHHI Delta	25,101	7,247
	C	25,101	7,247

Table IA 11: Difference-in-Difference Regressions of Industries' Markups on Institutional Common Ownership using SIC-defined Industries

This table presents results of difference-in-difference regressions. The sample includes 12 quarters prior to each merger announcement and 12 quarters after each merger is completed. The periods between announcement and completion are not included. Treat is a dummy set to one if the implied change in common ownership (either MHHI Delta or C) is positive for that industry, zero otherwise. Post is a dummy set to one for the post-merger period. Variables are defined in Appendix A. Standard errors are clustered at the industry level. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\text{Treat}_{MHHIDelta}$*Post	-0.003	-0.004	-0.005**	-0.003	-0.005**					
	(-1.246)	(-1.597)	(-2.153)	(-1.383)	(-2.078)					
$\text{Treat}_{MHHIDelta}$	0.012									
	(0.775)									
Treat_{C}*Post						-0.002	-0.001	-0.002	-0.000	-0.002
						(-0.939)	(-0.532)	(-1.277)	(-0.124)	(-1.003)
Treat_{C}						0.004				
						(0.290)				
Off Degree (x 1,000)			0.059		0.150			0.039		0.131
			(0.168)		(0.418)			(0.111)		(0.367)
ln(Assets)			0.017***		0.026***			0.017***		0.026***
			(3.265)		(4.160)			(3.260)		(4.159)
1 / No. Firms			0.230***		0.250***			0.230***		0.250***
			(3.477)		(3.670)			(3.474)		(3.669)
HHI			-0.114***		-0.102***			-0.113***		-0.102***
			(-3.925)		(-3.640)			(-3.922)		(-3.637)
Firms with Blocks			0.011		0.010			0.011		0.010
			(0.673)		(0.679)			(0.669)		(0.675)
Capital Intensity				-0.001	-0.002				-0.001	-0.002
				(-0.551)	(-1.200)				(-0.555)	(-1.203)
Sales Growth				-0.000*	-0.000*				-0.000*	-0.000*
				(-1.865)	(-1.755)				(-1.864)	(-1.754)
R&D Intensity				-1.046***	-0.847**				-1.045***	-0.847**
				(-2.677)	(-2.482)				(-2.676)	(-2.480)
R&D Missing				0.016***	0.016**				0.016***	0.016**
				(2.841)	(2.545)				(2.842)	(2.544)
Leverage				-0.089***	-0.096***				-0.089***	-0.096***
				(-3.261)	(-3.949)				(-3.262)	(-3.949)
Quarter Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Effects	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Observations	189,924	189,924	187,018	189,612	186,767	189,924	189,924	187,018	189,612	186,767
R^2	0.002	0.015	0.032	0.032	0.054	0.002	0.014	0.032	0.032	0.054
Industries		264	264	264	264		264	264	264	264

Table IA 12: Difference-in-Difference Regressions of Industry Profitability on Institutional Common Ownership, Summary of Results using SIC-defined Industries

This table summarizes the coefficient of interest from difference-in-difference regressions for the full sample and various subsamples. The specifications correspond to those in columns 5 and 10 from Table 9. The sample includes 12 quarters prior to each of the 48 merger announcements and 12 quarters after each merger is completed. The periods between announcement and completion are not included. Treat is a dummy set to one if the implied change in common ownership (either MHHI Delta or C) is positive for that industry, zero otherwise. Post is a dummy set to one for the post-merger period. Variables are defined in Appendix A. Standard errors are clustered at the industry level. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Profitability	C.O.	Full	Concentrated=1
		Coefficient	
Markup	MHHI Delta	-0.005**	-0.010
	C	-0.002	-0.006
PCM	MHHI Delta	-0.001	-0.001
	C	-0.000	-0.000
		t-statistic	
Markup	MHHI Delta	(-2.078)	(-1.216)
	C	(-1.003)	(-0.889)
PCM	MHHI Delta	(-0.812)	(-0.124)
	C	(-0.308)	(-0.050)
		N	
Markup	MHHI Delta	186,767	55,288
	C	186,767	55,288
PCM	MHHI Delta	186,772	55,244
	C	186,772	55,244

Table IA 13: Summary Statistics of H&P-defined Industries

This table presents summary statistics for quarterly industry-level common ownership, profitability, and other variables used in our analysis. Variables are defined in Appendix A. Data are from Thomson Reuters 13F, CRSP, and Compustat for the period starting with the first quarter of 1996 and ending with the fourth quarter of 2012. At the firm-level, we require firms to have total assets of at least $1 million, net sales of at least $250,000, and net sales greater than EBIT. Industries are defined using the 300 fixed-classification industries from Hoberg and Phillips (2016). MHHI Delta is winsorized at 10,000 (50 observations affected), and C is winsorized at 1.34 (59 observations affected). We require industries to have at least two firms in every industry-quarter for a minimum of 20 consecutive quarters to remain in the sample. There are 261 industries that meet the sample screen.

	Mean	Std. Dev.	P25	Median	P75	N
Density	0.121	0.173	0.000	0.067	0.167	15,977
PCF	0.163	0.142	0.000	0.158	0.267	15,977
PCS	0.325	0.178	0.200	0.294	0.429	15,977
MHHI Delta	1,635.476	1,334.711	631.705	1,391.187	2,363.960	15,977
C	0.185	0.145	0.109	0.164	0.232	15,977
Markup	1.108	0.269	1.022	1.075	1.135	15,977
PCM	0.329	0.200	0.246	0.336	0.437	15,932
Off Degree (x 1,000)	9.568	9.475	0.000	8.017	16.976	15,780
Firms With Blocks	0.732	0.213	0.600	0.750	0.889	15,977
1/NoFirms	0.166	0.146	0.053	0.125	0.250	15,977
HHI	3,944.648	2,496.298	1,977.188	3,495.545	5,364.849	15,977
Log Assets	8.976	2.274	7.396	8.831	10.613	15,977
Sales Growth	0.728	35.351	-0.047	0.026	0.106	15,946
Capital Intensity	5.891	7.294	2.905	3.958	5.826	15,977
R&D Intensity	0.005	0.009	0.000	0.001	0.007	15,977
R&D missing	0.175	0.380	0.000	0.000	0.000	15,977
Leverage	0.240	0.183	0.100	0.198	0.339	15,959
Concentrated	0.291	0.454	0.000	0.000	1.000	15,977

Table IA 14: Changes in Profitability around Large Changes in Common Ownership using H&P-defined Industries

This table reports changes in profitability around large quarterly changes in common institutional ownership. We identify large changes in two ways. First, quarterly changes in industry common ownership of more than two standard deviations beyond the mean industry quarterly change are defined as significant. Second, we identify structural breaks using a simple model in which common ownership is a function of a time varying level and an error term. Any industry level shift that is statistically significant at the 5% level is determined to be a significant change in common ownership. Changes in profitability are measured as the industry average over the four quarters subsequent to the change (quarter t=1 to t=4) minus to the industry average over the four quarters prior to the change (quarter t=-4 to t=-1). Variables are defined in Appendix A. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Inc./Dec.	2SD/SB	Profitability	C.O.	Pre	Post	Diff.	t-statistic	N
Increase	2SD	Markup	Density	1.102	1.105	0.003	(0.87)	420
Increase	2SD	Markup	PCF	1.100	1.108	0.008	(2.11)**	381
Increase	2SD	Markup	PCS	1.123	1.122	-0.001	(-0.15)	484
Increase	2SD	Markup	MHHI Delta	1.126	1.128	0.002	(0.43)	404
Increase	2SD	Markup	C	1.101	1.103	0.003	(0.67)	436
Increase	2SD	PCM	Density	0.333	0.334	0.000	(0.06)	417
Increase	2SD	PCM	PCF	0.330	0.335	0.006	(1.26)	377
Increase	2SD	PCM	PCS	0.343	0.340	-0.004	(-0.71)	480
Increase	2SD	PCM	MHHI Delta	0.338	0.338	0 .000	(0.06)	402
Increase	2SD	PCM	C	0.327	0.334	0.006	(1.48)	434
Increase	SB	Markup	Density	1.079	1.103	0.024	(2.29)**	53
Increase	SB	Markup	PCF	1.140	1.151	0.011	(1.03)	59
Increase	SB	Markup	PCS	1.046	1.058	0.011	(1.03)	40
Increase	SB	Markup	MHHI Delta	1.100	1.107	0.007	(0.67)	54
Increase	SB	Markup	C	1.048	1.038	-0.01	(-0.56)	33
Increase	SB	PCM	Density	0.320	0.352	0.031	(2.13)**	52
Increase	SB	PCM	PCF	0.321	0.339	0.018	(1.45)	59
Increase	SB	PCM	PCS	0.278	0.302	0.024	(1.34)	40
Increase	SB	PCM	MHHI Delta	0.334	0.361	0.027	(1.84)*	53
Increase	SB	PCM	C	0.343	0.322	-0.021	(-1.22)	33
Decrease	2SD	Markup	Density	1.106	1.105	-0.001	(-0.35)	552
Decrease	2SD	Markup	PCF	1.104	1.104	0.001	(0.22)	624
Decrease	2SD	Markup	PCS	1.121	1.121	-0.000	(-0.09)	612
Decrease	2SD	Markup	MHHI Delta	1.111	1.116	0.005	(1.46)	628
Decrease	2SD	Markup	C	1.101	1.103	0.003	(0.84)	577
Decrease	2SD	PCM	Density	0.306	0.305	-0.001	(-0.35)	552
Decrease	2SD	PCM	PCF	0.289	0.290	0.002	(0.48)	616
Decrease	2SD	PCM	PCS	0.305	0.307	0.003	(0.72)	609
Decrease	2SD	PCM	MHHI Delta	0.296	0.294	-0.001	(-0.38)	628
Decrease	2SD	PCM	C	0.281	0.287	0.006	(1.43)	575
Decrease	SB	Markup	Density	1.104	1.116	0.012	(1.44)	77
Decrease	SB	Markup	PCF	1.131	1.140	0.009	(0.99)	76
Decrease	SB	Markup	PCS	1.126	1.139	0.012	(1.32)	84
Decrease	SB	Markup	MHHI Delta	1.120	1.125	0.005	(0.53)	75
Decrease	SB	Markup	C	1.106	1.100	-0.005	(-0.45)	68
Decrease	SB	PCM	Density	0.280	0.305	0.025	(2.36)**	77
Decrease	SB	PCM	PCF	0.299	0.296	-0.003	(-0.24)	75
Decrease	SB	PCM	PCS	0.275	0.286	0.008	(0.85)	83
Decrease	SB	PCM	MHHI Delta	0.288	0.279	-0.008	(-0.99)	75
Decrease	SB	PCM	C	0.288	0.291	0.003	(0.22)	68

Table IA 15: Panel Regressions of Industries' Markups on Density using H&P-defined Industries

This table reports the results of multivariate OLS regressions explaining industry-level Markups with Density and controls for other aspects of institutional ownership and for differences in industry structure. All specifications include quarter fixed effects. Industry fixed effects are also included where indicated. Standard errors are robust to heteroscedasticity and clustered at the industry 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)	(2)	(3)	(4)	(5)
Density	-0.071	0.002	-0.006	0.000	-0.007
	(-1.097)	(0.154)	(-0.416)	(0.024)	(-0.466)
Off Degree (x 1,000)			-0.000		-0.000
			(-0.440)		(-0.539)
ln(Assets)			0.022***		0.027***
			(3.596)		(4.064)
1 / No. Firms			0.100*		0.104*
			(1.956)		(1.793)
HHI			-0.000***		-0.000***
			(-3.130)		(-3.612)
Firms with Blocks			0.025*		0.025
			(1.660)		(1.614)
Capital Intensity				-0.003*	-0.004***
				(-1.903)	(-2.752)
Sales Growth				-0.000***	-0.000***
				(-5.267)	(-5.413)
R&D Intensity				-1.018***	-0.768***
				(-4.128)	(-3.355)
R&D Missing				0.018	0.021*
				(1.522)	(1.682)
Leverage				0.002	-0.013
				(0.080)	(-0.599)
Quarter Effects	Y	Y	Y	Y	Y
Industry Effects	N	Y	Y	Y	Y
Observations	15,977	15,977	15,780	15,929	15,735
R^2	0.009	0.038	0.059	0.051	0.081
Industries		261	261	261	261

Table IA 16: Panel Regressions of Profitability on Institutional Common Ownership using H&P-defined Industries, Summary of Results

This table reports the results of multivariate OLS regressions explaining industry-level profitability with common ownership and controls for other aspects of institutional ownership and for differences in industry structure. The specification is the same as column 5 from Table 5. All specifications include industry and quarter fixed effects. Standard errors are robust to heteroscedasticity and clustered at the industry level. Variables are defined in Appendix A. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

		Subsample	
Profitability	C.O.	Full	Concen-trated=1
		Coefficient	
Markup	Density	-0.007	0.057***
	PCF	0.003	0.072**
	PCS	-0.010	0.080**
	MHHI Delta	0.000	0.000
	C	0.014	0.024
PCM	Density	-0.018	0.038*
	PCF	0.002	0.033
	PCS	-0.003	0.057*
	MHHI Delta	0.000	0.000
	C	0.015	0.073*
		t-statistic	
Markup	Density	(-0.466)	(2.973)
	PCF	(0.157)	(2.108)
	PCS	(-0.393)	(2.331)
	MHHI Delta	(1.020)	(1.069)
	C	(0.934)	(1.044)
PCM	Density	(-1.152)	(1.758)
	PCF	(0.115)	(1.094)
	PCS	(-0.144)	(1.715)
	MHHI Delta	(0.854)	(1.617)
	C	(0.803)	(1.665)
		N	
Markup	Density	15,735	4,494
	PCF	15,735	4,494
	PCS	15,735	4,494
	MHHI Delta	15,735	4,494
	C	15,735	4,494
PCM	Density	15,718	4,488
	PCF	15,718	4,488
	PCS	15,718	4,488
	MHHI Delta	15,718	4,488
	C	15,718	4,488

Table IA 17: Difference-in-Difference Regressions of Industries' Markups on Institutional Common Ownership using H&P-defined Industries

This table presents results of difference-in-difference regressions. The sample includes 12 quarters prior to each merger announcement and 12 quarters after each merger is completed. The periods between announcement and completion are not included. Treat is a dummy set to one if the implied change in common ownership (either MHHI Delta or C) is positive for that industry, zero otherwise. Post is a dummy set to one for the post-merger period. Variables are defined in Appendix A. Standard errors are clustered at the industry level. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\text{Treat}_{MHHIDelta}$*Post	0.004	0.006**	0.005**	0.007***	0.006***					
	(0.879)	(2.511)	(2.458)	(2.760)	(2.639)					
$\text{Treat}_{MHHIDelta}$	0.020									
	(1.483)									
Treat_{C}*Post						0.002	0.004	0.003	0.005*	0.003
						(0.534)	(1.551)	(1.329)	(1.780)	(1.485)
Treat_{C}						0.018				
						(1.421)				
Off Degree (x 1,000)			-0.391		-0.494			-0.384		-0.487
			(-0.784)		(-1.020)			(-0.770)		(-1.005)
ln(Assets)			0.019***		0.025***			0.019***		0.025***
			(3.034)		(3.657)			(3.038)		(3.661)
1 / No. Firms			0.095*		0.106*			0.095*		0.106*
			(1.824)		(1.879)			(1.821)		(1.874)
HHI			-0.042***		-0.050***			-0.042***		-0.050***
			(-3.022)		(-3.691)			(-3.020)		(-3.687)
Firms with Blocks			0.028**		0.028**			0.028**		0.028**
			(1.976)		(1.982)			(1.971)		(1.976)
Capital Intensity				-0.003**	-0.005***				-0.003**	-0.005***
				(-2.269)	(-3.188)				(-2.262)	(-3.182)
Sales Growth				-0.000***	-0.000***				-0.000***	-0.000***
				(-5.203)	(-5.249)				(-5.206)	(-5.262)
R&D Intensity				-0.802***	-0.603***				-0.802***	-0.603***
				(-3.835)	(-3.086)				(-3.832)	(-3.082)
R&D Missing				0.016	0.019*				0.016	0.019*
				(1.569)	(1.662)				(1.568)	(1.664)
Leverage				-0.004	-0.015				-0.004	-0.015
				(-0.172)	(-0.689)				(-0.175)	(-0.695)
Quarter Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Effects		Y	Y	Y	Y		Y	Y	Y	Y
Observations	93,475	93,475	92,213	93,217	91,975	93,475	93,475	92,213	93,217	91,975
R^2	0.008	0.038	0.055	0.052	0.078	0.008	0.038	0.054	0.051	0.077
Industries		261	261	261	261		261	261	261	261

Table IA 18: Difference-in-Difference Regressions of Industry Profitability on Institutional Common Ownership, Summary of Results using H&P-defined Industries

This table summarizes the coefficient of interest from difference-in-difference regressions for the full sample and various subsamples. The specifications correspond to those in columns 5 and 10 from Table 9. The sample includes 12 quarters prior to each of the 48 merger announcements and 12 quarters after each merger is completed. The periods between announcement and completion are not included. Treat is a dummy set to one if the implied change in common ownership (either MHHI Delta or C) is positive for that industry, zero otherwise. Post is a dummy set to one for the post-merger period. Variables are defined in Appendix A. Standard errors are clustered at the industry level. t-statistics are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Profitability	C.O.	Full	Concentrated=1
		Coefficient	
Markup	MHHI Delta	0.006***	0.003
	C	0.003	-0.003
PCM	MHHI Delta	0.006***	0.004
	C	0.004*	0.002
		t-statistic	
Markup	MHHI Delta	(2.639)	(0.670)
	C	(1.485)	(-0.674)
PCM	MHHI Delta	(2.626)	(0.550)
	C	(1.814)	(0.204)
		N	
Markup	MHHI Delta	91,975	27,160
	C	91,975	27,160
PCM	MHHI Delta	91,883	27,115
	C	91,883	27,115

Table IA 19: Industries with Significant Positive or Negative Relations

This table lists the industries for which we frequently estimate a negative (left column) or positive (right column) statistically significant relationship between common ownership and profitability. For each industry, we run a time series regressions of profitability on common ownership and controls. We do this for each unique combination of profitability measure and common ownership measure, resulting in 2×5=10 regressions for each industry. This is done separately for NAICS-, SIC-, and H&P-defined industries. H&P industry classifications do not have accompanying descriptions so we use the the NAICS industry description that corresponds to the most firms in the H&P industry. The *Count* variable below reflects the number of estimates for an industry that are significant at the 5% level.

Negative relation between common ownership and profitability			Positive relation between common ownership and profitability		
Industry	Description	Count	Industry	Description	Count
NAICS			NAICS		
4218	Machinery, equip. wholesalers	8	4812	Nonscheduled air transp.	9
3372	Office furniture manuf.	6	3341	Computer manufacturing	8
4861	Pipeline transp. of crude	6	5112	Software publishers	8
6244	Child day care Services	6	5223	Credit intermediation	7
8111	Automotive repair	6	5231	Securities and commodity contracts	7
8121	Personal care services	6	5614	Business support services	7
2372	Land subdivision	5	4862	Pipeline transp. of natural gas	6
3251	Basic chemical manuf.	5	5151	Radio and tv broadcasting	6
5311	Lessors of real estate	5	6222	Psychiatric hospitals	6
5415	Computer systems design	5	3119	Other food manuf.	5
5611	Office administrative services	5	3332	Industrial machinery manuf.	5
8129	Other personal services	5	3369	Other transp. equip.	5
			4811	Scheduled air transp.	5
			5133	Telecommunications	5
			5182	Data processing, hosting	5
			5621	Waste collection	5
			6114	Business schools, mgmt training	5
SIC			SIC		
508	Machinery, equip., and supplies	8	628	Exchange of securities	9
679	Miscellaneous investing	8	356	Industrial machinery	7
603	Savings institutions	7	360	Electronics	7
720	Personal services	7	800	Health services	7
874	Management and PR services	7	260	Paper and allied products	6
254	Office and store fixtures	6	351	Engines and turbines	6
153	Operative builders	5	357	Computer and office equip.	6
516	Chemicals and allied products	5	422	Warehousing, storage	6
207	Fats and Oils	4	732	Credit reporting agencies	6
243	Millwork, structural wood	4	104	Gold and silver ores	5
421	Trucking and courier services	4	381	Search, guidance, nav. systems	5
517	Petroleum and petroleum products	4	452	Nonscheduled air transp.	5
571	Home furniture	4	504	Commercial equipment	5
			621	Security brokers, dealers	5
			631	Life insurance	5
			734	Services to dwellings	5
			801	Doctors' offices	5
H&P			H&P		
20	Lessors of real estate	7	285	Restaurants and other eating places	6
46	Office furniture manuf.	7	28	Business support services	6
297	Support activities for mining	7	259	Household appliance manufacturing	5
39	Converted paper product manuf.	6	237	Advertising, public relations svcs.	5
294	Control instruments manuf.	6	198	Medical equip. manufacturing	5
8	Consumer goods rental	5	133	Computer systems design	5
56	Other food manuf.	5	84	Communications equip. manuf.	5
69	Screw, nut, and bolt manuf.	5			
248	Basic chemical manuf.	5			
258	Aerospace product manuf.	5			