

Online Appendices

“Common Ownership in America: 1980–2017”

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A Main Appendix

1 Common Ownership and Oligopoly Models

Relationship to Cournot

Much attention in the common ownership literature has been paid to the Modified Herfindahl–Hirschman Index (MHHI) concentration measure, which is derived from a Cournot oligopoly model of competition in O’Brien and Salop (2000).¹ MHHI extends the traditional concept of HHI to incorporate common ownership, and is defined from the following firm objective function:

$$\max_{q_f} \pi_f(q_f, q_{-f}) + \sum_g \kappa_{fg} \pi_g(q_f, q_{-f}).$$

After taking the FOC (where η represents the elasticity of demand) we get:

$$\frac{P_f - MC_f}{P_f} = \frac{1}{\eta} \sum_g \kappa_{fg} s_g.$$

Which gives the share weighted average markup of:

$$\begin{aligned} \sum_f s_f \frac{P_f - MC_f}{P_f} &= \frac{1}{\eta} \underbrace{\sum_f \sum_g \kappa_{fg} s_g s_f}_{MHHI} \\ \text{— where } MHHI &= \underbrace{\sum_f s_f^2}_{HHI} + \underbrace{\sum_f \sum_{g \neq f} \kappa_{fg} s_f s_g}_{\Delta MHHI}. \end{aligned}$$

Note that many of the papers that regress price on measures of ownership separately include HHI and $\Delta MHHI$ as independent variables. It is important to point out that both mea-

¹Originally the MHHI was derived by Bresnahan and Salop (1986) in the context of a joint-venture.

prices vary only at the *across markets* while the incentive terms κ_{fg} vary *across firms* within a market.

Relationship to Bertrand

The Price Pressure Index (PPI) is similarly defined for differentiated Bertrand competition. We consider the objective function for firm f when setting the price p_j holding fixed the prices of all other products p_{-j} . As firm f raises the price p_j some consumers substitute to other brands owned by f : $k \in \mathcal{J}_f$ on which it receives full revenue, and substitute brands owned by competing firms g : $k' \in \mathcal{J}_g$ for which it acts as if it receives a fraction of the variable profit κ_{fg} :

$$(p_j - mc_j)q_j(p_j, p_{-j}) + \sum_{k \in \mathcal{J}_f} (p_k - mc_k)q_k(p_j, p_{-j}) + \sum_g \kappa_{fg} \cdot \left(\sum_{k' \in \mathcal{J}_g} (p_{k'} - mc_{k'})q_{k'}(p_j, p_{-j}) \right).$$

When solving the FOC it is helpful to do two things: (1) divide through by $-\frac{\partial q_j}{\partial p_j}$; (2) define the diversion ratio $D_{jk} = -\frac{\frac{\partial q_k}{\partial p_j}}{\frac{\partial q_j}{\partial p_j}}$, this gives:

$$p_j - mc_j = -q_j / \frac{\partial q_j}{\partial p_j} + \sum_{k \in \mathcal{J}_f} (p_k - mc_k)D_{jk} + \sum_g \kappa_{fg} \cdot \left(\sum_{k' \in \mathcal{J}_g} (p_{k'} - mc_{k'})D_{jk'} \right). \quad (\text{A-1})$$

This clarifies what common ownership does under differentiated Bertrand competition. It raises the effective opportunity cost of selling product j . Now as p_j rises, some customers are *recaptured* by other products controlled by the same firm $k \in \mathcal{J}_f$ (this is the usual multiproduct oligopoly effect), also by products controlled by competing (but commonly owned firms) $k' \in \mathcal{J}_g$ with $\kappa_{fg} > 0$.

2 Alternative Similarity Measures

Our primary interest is how overlapping ownership relates to *profit weights* or *cooperation incentives* among firms in the product market. The measure in Rotemberg (1984) or O'Brien and Salop (2000) is shown in (1) to be an L_2 measure. We could construct alternative measures of investor overlap, such as an L_1 measure.

For example:

$$L_1(\beta_f, \beta_g) = \frac{1}{2} \left(\sum_s \beta_{fs} + \sum_s \beta_{gs} - \sum_s |\beta_{fs} - \beta_{gs}| \right).$$

It is important to point out that $\sum_s \beta_{fs} < 1$. This is because the set of investors $s \in S$

contains only large institutional investors who provide a 13(f) form to the SEC. We can think about $\sum_s \beta_{fs} = 1 - r_f$ where r_f represents the retail investor share in firm f . The L_1 measure varies from $[0, 1]$. It is highest if we don't have any retail investors, yet all investors hold the same portfolio so that $\beta_{fs} = \beta_{gs}$. Likewise the L_1 measure declines as portfolios become more dissimilar $|\beta_{fs} - \beta_{gs}|$ becomes large.

B Additional Data Concerns

1 Comparison to Thomson Reuters

We do two primary comparisons against the Thomson Reuters (2020) (TR) dataset, followed by a deep-dive on some particular holdings where the TR dataset seems deficient. First, we consider the number of 13(f) owners per S&P 500 firm. Second, we consider the number of S&P 500 single-class of share firm that has over 100 owners in the dataset. In both cases we indicate the TR data with solid lines and our scraped data (Backus, Conlon and Sinkinson, 2020) with dashed lines.

Appendix Figure A-1 plots the mean, median, 10th percentile, and minimum of the number of owners of S&P 500 firms over time. Solid lines are the TR data, dashed are the scraped data. As is clear, there appears to be an issue in the TR data where some firms show few owners, as evidenced by the “min” line. In addition, the “10th percentile” line shows that there is a series of quarters beginning in 2011 where over 10% of S&P 500 firms have very few reported owners. In contrast, the dashed lines show more consistent patterns in the scraped data.

Appendix Figure 2 presents these data in a different way: for each quarter, it plots the number of single-class of share firms held by 13(f) managers in the respective datasets, limited to issuances held by at least 100 investment managers. Note that this should be below 500 as we omit firms with multiple classes of shares. As is immediately clear, there is an issue with the TR dataset beginning in 2011. If a firm appears to have very few owners, this directly impacts κ through the $IHHI$, as shown in equation 1.

Finally, Appendix Figure A-2 does a “deep dive” for three S&P 500 securities around the 2011 window where the TR dataset appears to have deficiencies. The plot shows, in solid color lines, the percent of shares outstanding reported to be held by 13(f) managers for three major firms: Alcoa, Xerox, and Coach in the TR dataset. The solid lines show that prior 2011, 13(f) investment firms held between 60% and 90% of these firms. However, in 2011, that falls dramatically to under 10%, before reverting back in 2013 for one of the three firms. In dashed lines are the percent of shares outstanding found in our scraped and parsed dataset. The TR data seem unreliable while the scraped data present a reasonable time

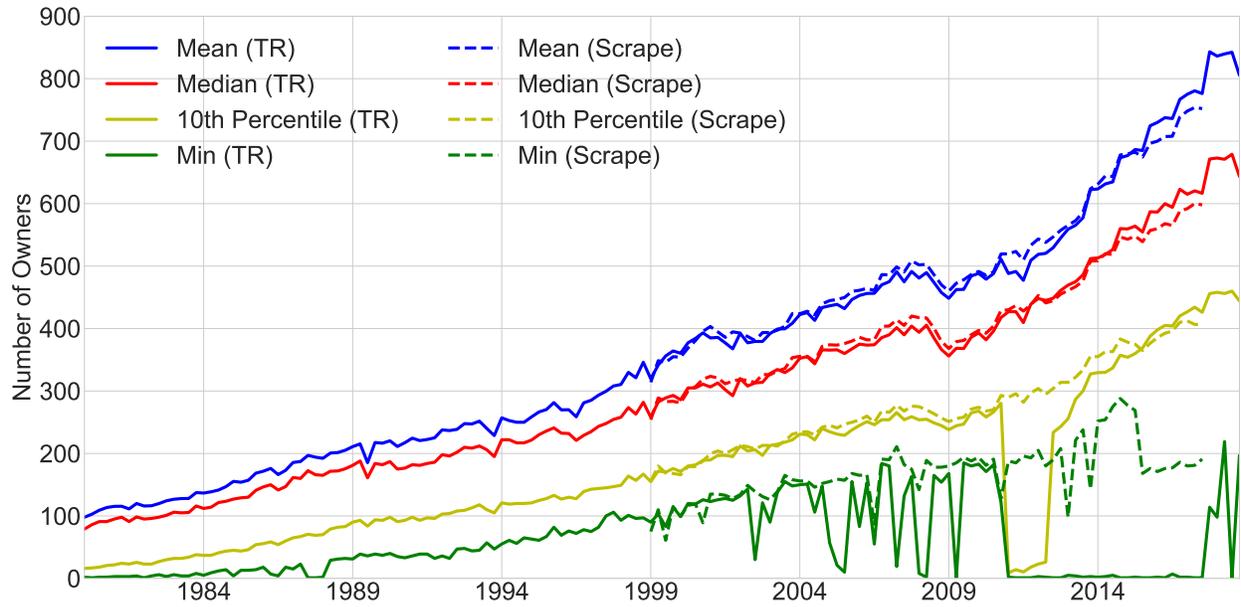


Figure A-1: Owners Per Firm

Notes: This figure depicts statistics of the number of investment managers per issue in the S&P 500 over time. The TR data uses “mgrno,” manager number, as a manager while the scraped data uses the SEC’s CIK number for a manager.

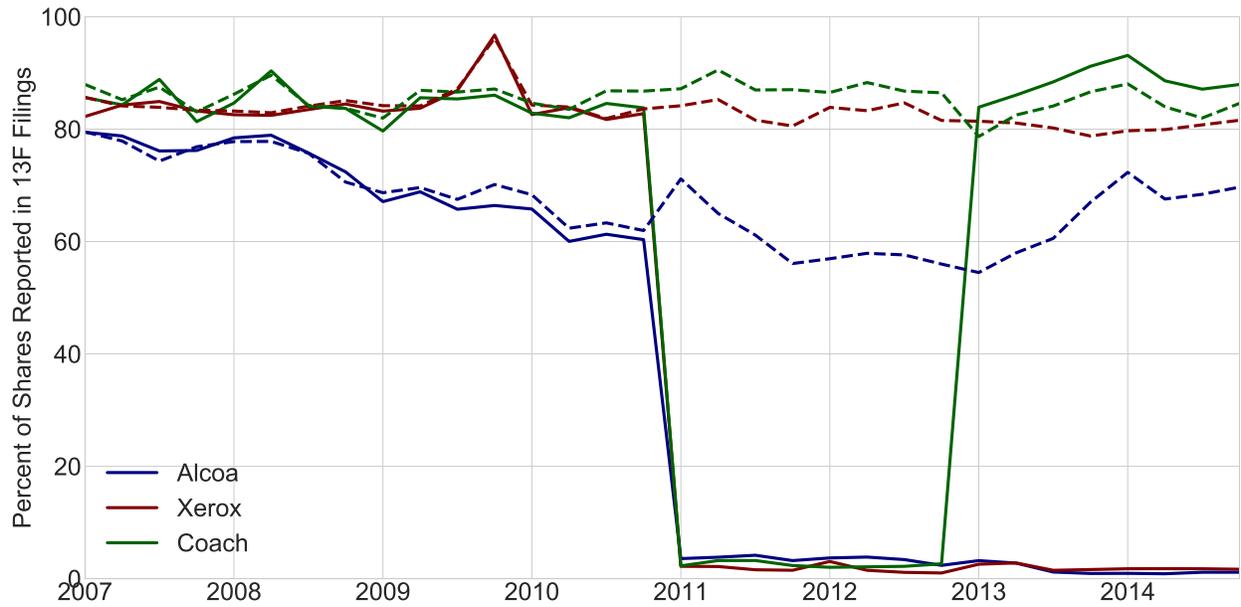
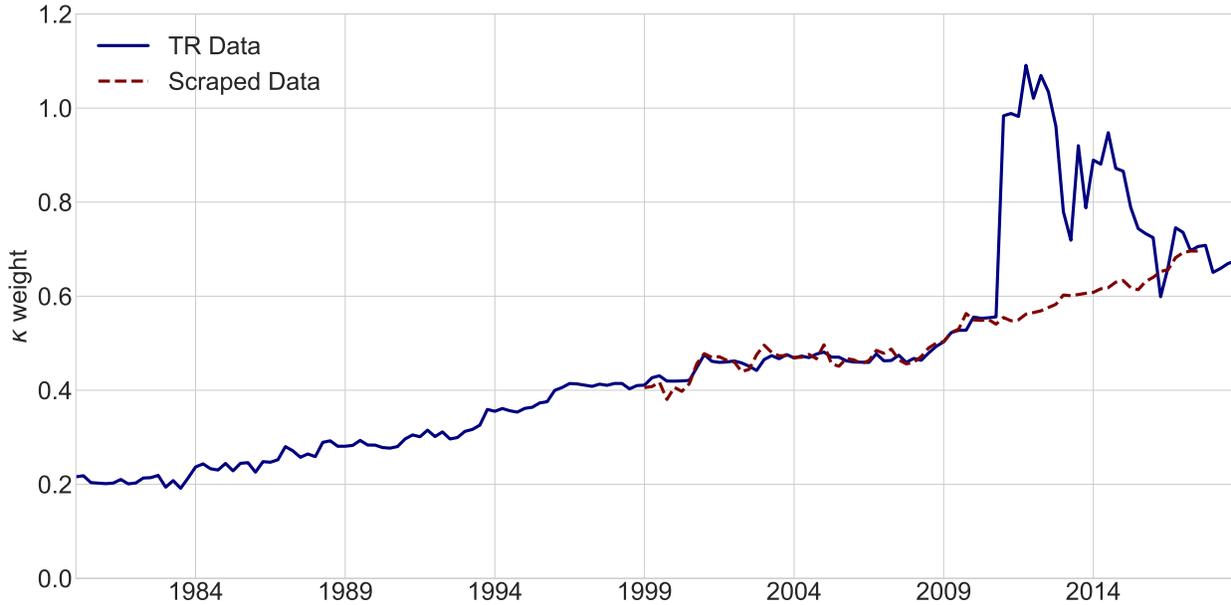


Figure A-2: Examples of TR Coverage Issues

Notes: This figure sums the holdings of all 13(f) managers for three firms: Alcoa (permno: 24643, CUSIP: 03965L10), Xerox (permno: 27983, CUSIP: 98412110), and Coach (permno: 88661, CUSIP: 87603010). TR data series are plotted solid lines, the authors’ scraped and parsed data in dashed lines.

series for institutional ownership.

Figure A-3: Profit Weight Comparison, TR vs Scraped Data



Notes: This figure presents average profit weights for both the TR and scraped datasets by control assumption. Solid lines denote Thomson-Reuters dataset and dashed line denotes scraped and parsed 13(f) dataset.

To summarize the issue with the Thomson Reuters dataset, Appendix Figure A-3 shows what the average computed profit weights (the κ values) would be using the raw Thomson Reuters data in solid lines, and our new dataset in dashed lines. As is clear, the Thomson Reuters dataset has coverage deficiencies in several years that result in large swings of the average κ , even reaching improbably high values starting in 2010.

2 Airline Sample

Most airlines are not S&P 500 constituents during this time period (one notable exception is Southwest Airlines). Therefore, we began by assembling a set of CUSIPs for airlines from The Center for Research in Securities Prices (2020) and arrived at a set that consisted of major airlines (excluding foreign and regional). We were careful to drop any reported holdings after any bankruptcy declaration: there are many cases of institutional investors continuing to report holdings of non-existent securities. We also gather CUSIPs for entities that emerge from bankruptcy, or from mergers. The final set of airlines consists of: AirTran, Alaska, American, Continental, Delta, Eastern, Hawaiian, JetBlue, Northwest, Pan Am, Southwest, Spirit, Trans World, United, US Airways, and Virgin America. Several of these have multiple CUSIPs over this time period. We do not adjust for insider holdings in this exercise, although in practice this may be a good thing to do if insider holdings are significant.

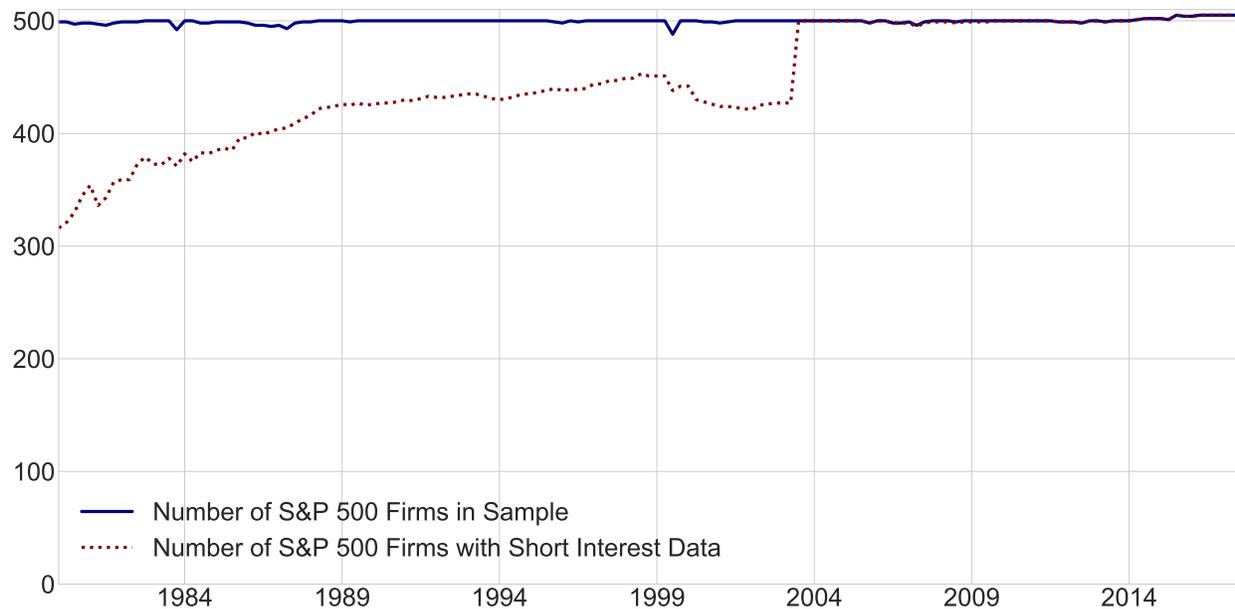


Figure A-4: Coverage of Short Interest Data

Notes: This figure compares the number of firms in the sample against the number of firms for which we observe the level of short interest in Compustat.

3 Short Interest

A known limitation of the 13(f) data for calculating institutional ownership is that short interest is double-counted. When an investor takes a short position they borrow shares from another investor and sell them, with a promise to repay the shares at a later date. These shares are then double-counted, reported on form 13(f) by both the initial investor as well as the investor to whom they are sold. It is for this reason that one can often observe “institutional ownership,” as reported in online sources, in excess of 100%.

Data on short interest are obtained from the Standard & Poor’s (2020) short interest supplemental dataset. These data are available at the firm level, not the investor level. Moreover, evidence suggests that even if we had data at the investor level, it is not clear how we should think about control rights. While it seems intuitive that only the actual holder of the stock should cast votes in corporate governance activities, in practice it seems that *both* the initial investor as well as the current holder may end up voting the same shares, see Kahan and Rock (2008).

Appendix Figure A-4 characterizes the coverage of the short interest data in our sample, which improves dramatically after 2004. Appendix Figure A-5 documents the degree of short interest. We see that while short interest in excess of 2% is quite common, short interest in excess of 20% is quite rare.

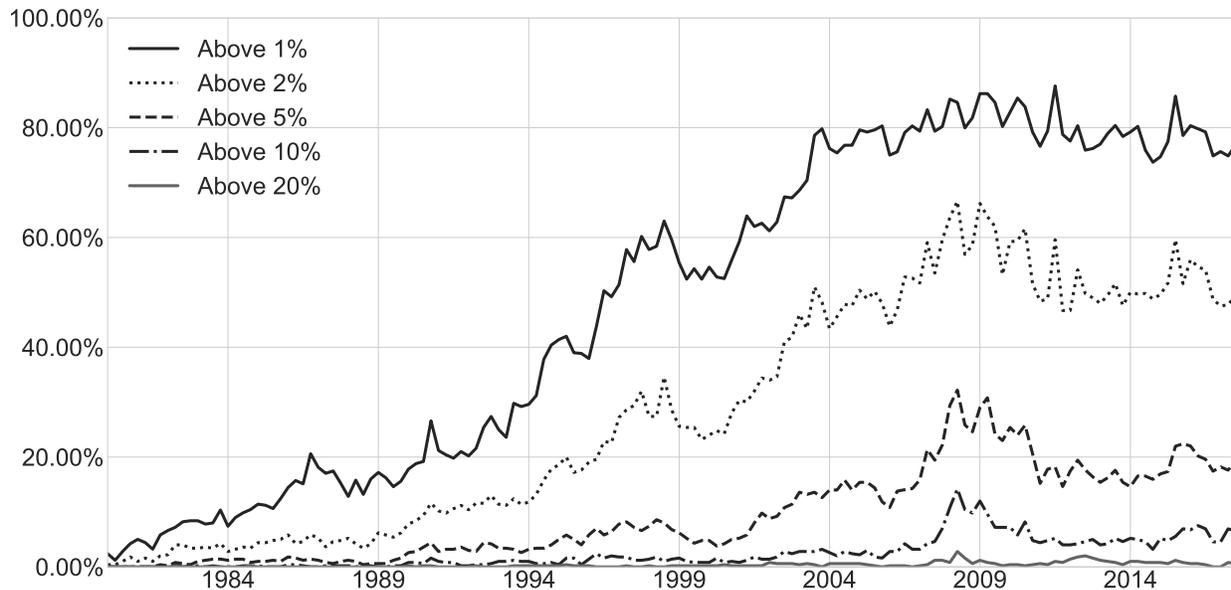


Figure A-5: Short Interest Levels

Notes: This figure shows the distribution of short interest levels over time reported for our sample firms in Compustat.

C Additional Tables and Figures

1 Distributions of κ

Figure A-6 shows the distribution of κ within quarter, over time, by plotting various percentiles of κ in the S&P 500 sample. All percentiles see broad increases in κ over time.

2 Tunneling and Specifications of Control

Here we re-create figure 9 under alternative specifications of γ . The results are depicted in Figure A-7. While the proportion of pairwise profit weights greater than one is insensitive to specification from 1980 to the late aughts, it becomes very sensitive in the period following. This coincides with the rise of the “Big Three” from Figure 5. If we place more weight on the holdings of these large firms in constructing control rights, we find substantially greater incentives for firms to engage in tunneling.

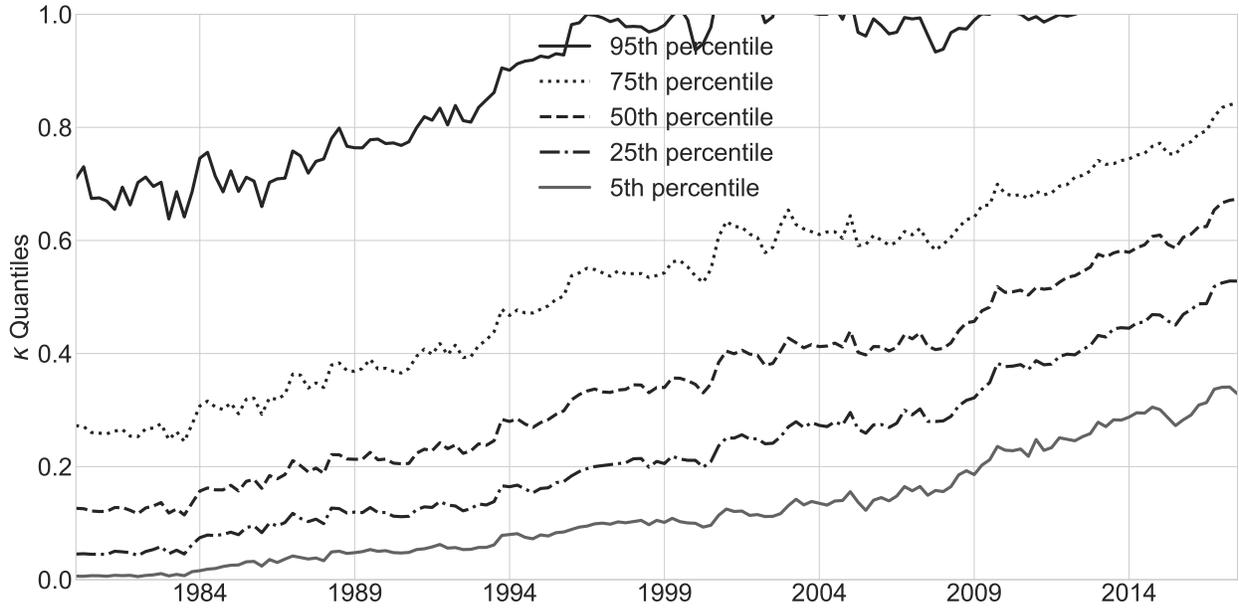


Figure A-6: Percentiles of Profit Weights Over Time

Notes: This figure depicts the various percentiles of the distribution of κ within a quarter over time, assuming equal weights. See Section 2 for an explicit formula for common ownership weights and derivation.

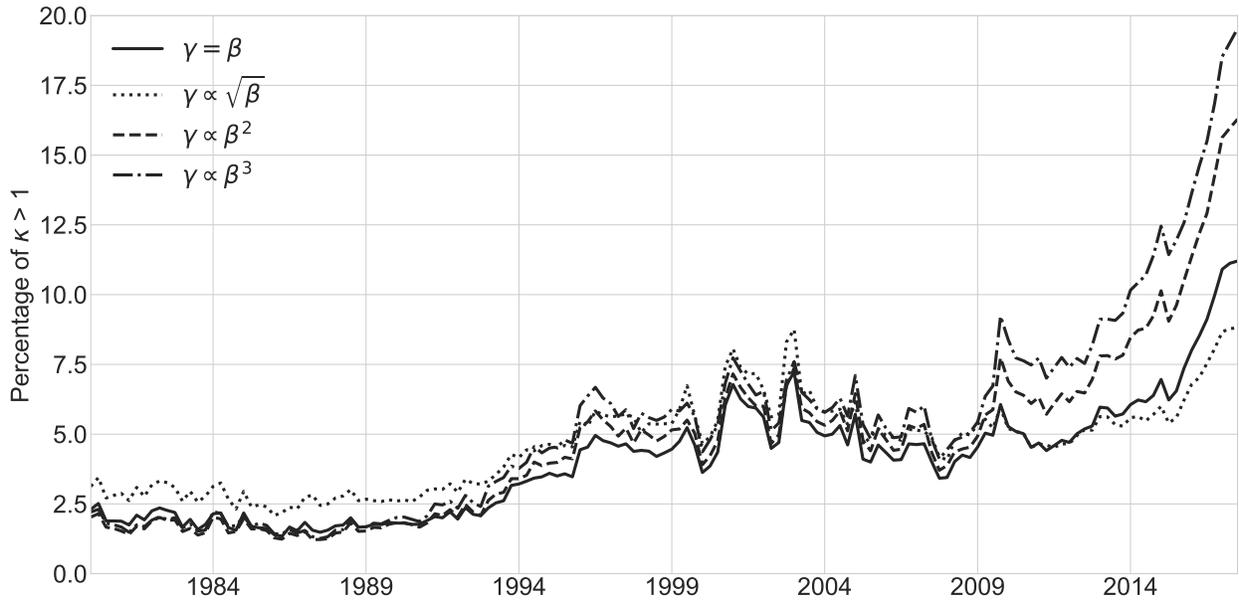


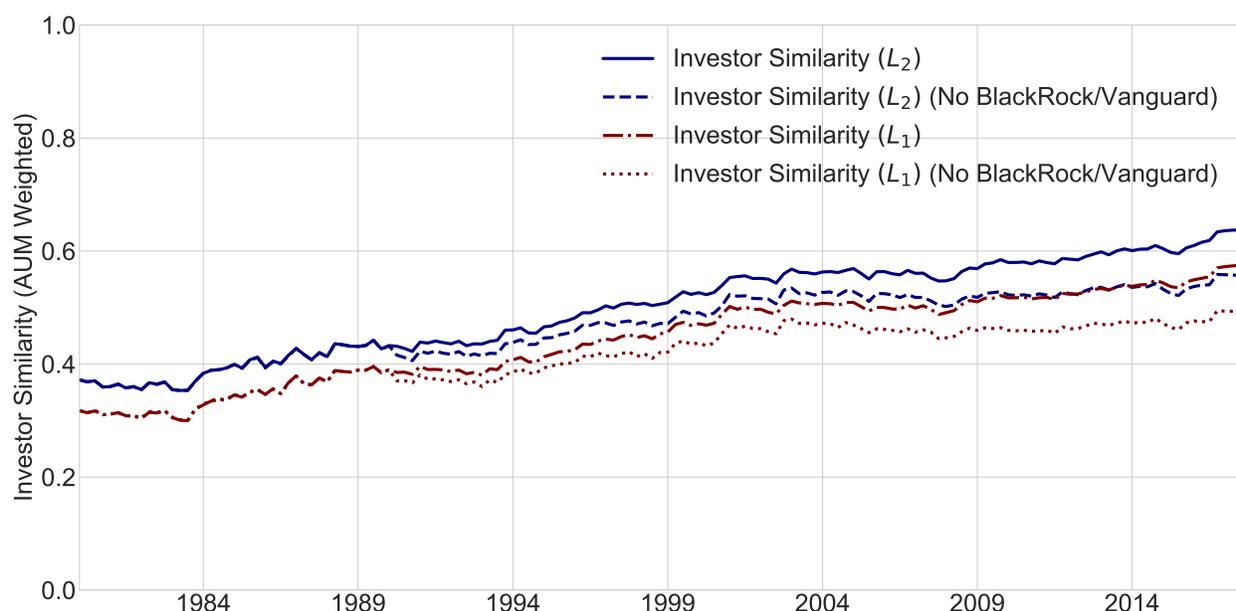
Figure A-7: Potential Tunneling Incentives $\kappa > 1$, Alternative Control Specifications

Note: This figure reports the fraction of pairwise profit weights $\kappa_{f,g} > 1$ in each period under different control assumptions.

3 Rise of Indexing

To understand the role that large institutional investment firms BlackRock and Vanguard have had on the rise of indexing, we now revisit Figure 8, which plotted the similarity of

Figure A-8: Similarity Between Investor Portfolios and S&P 500 Index



Notes: This figure depicts L1 and L2 similarity measures comparing investor portfolios weighted by investor AUM within our sample of S&P 500 assets. Dashed lines show the result if we exclude BlackRock and Vanguard.

investor portfolios to the “market” portfolio of the S&P 500. The figure computes the average in each time period weighted by assets under management. We now re-compute these figures removing BlackRock and Vanguard entirely. This allows us to see the contribution to the rise in indexing attributable to those firms. Appendix Figure A-8 shows the results. From this, we see that while those particular firms are indeed large, they are large and particularly indexed, and as a result they have had a sizable effect on the increase in indexing.

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