Institutional Ownership, Peer Pressure and Voluntary Disclosures

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ABSTRACT: We document peer effect as an important factor in determining corporate voluntary disclosure policies. Our identification strategy relies on a discontinuity in the distribution of institutional ownership caused by the annual Russell 1000/2000 index reconstitution. Around the threshold of the Russell 1000/2000 index, the top Russell 2000 index firms experience a significant jump in institutional ownership compared with their closely-neighbored bottom Russell 1000 index firms due to index funds' benchmarking strategies. The increase in institutional ownership and resultant improvement in the information environment of the top Russell 2000 index firms create pressures on their industry peers to increase voluntary disclosures. Consistent with this prediction, we find that the discontinuously higher institutional ownership of the top Russell 2000 index firms significantly increases industry peers' likelihood and frequency of issuing management forecasts. Further analyses show that such an effect could be driven by firms' incentive to compete for capital.

Keywords: Institutional ownership; peer effect; voluntary disclosures; Russell index

JEL Classifications: G23, G34, M41, D80.

Data Availability: Data are available from the public sources cited in the text.

I. INTRODUCTION

Peer effects have long been central research considerations in sociology, social psychology, and economics (Asch 1952; Merton 1957; Bikhchandani, Hirshleifer, and Welch 1992; Leary and Roberts 2014). Theoretically, the action chosen by one firm can affect the constraints, expectations, and/or preferences of its economically related peers and, in turn, its peers' actions (Manski 2000). Empirically, there is some evidence from extant studies showing that industry peers have interdependent corporate policies, including capital structure (Leary and Roberts 2014), investment (Beatty, Liao, and Yu 2013), and compensation (Bizjak, Lemmon, and Naveen 2008). A common empirical challenge in this stream of research, as highlighted by Leary and Roberts (2014), is to credibly establish the causal effect of one firm's behavior or characteristics on the interdependent behavior of its peers, since such an association can be driven by the similar individual characteristics of peers within the same group or by their similar institutional environments (Manski 1993).

In this study, we overcome the aforementioned empirical challenge and document a peer effect on corporate disclosures, utilizing a quasi-randomized experiment instituted by the indexing behavior of the Russell Investment Company (RIC). Every year, on May 31, the RIC ranks all eligible stocks according to their market capitalization. The first 1000 largest firms are included in the Russell 1000 index and the next 2000 largest firms constitute the Russell 2000 index. In this regard, the market capitalizations of these 3000 firms evolve smoothly with respect to the rankings. Near the Russell 1000/2000 threshold, the differences in size between the top Russell 2000 index firms (i.e. the largest Russell 2000 index firms) and the bottom Russell 1000 index firms (i.e. the smallest Russell 1000 index firms) should be small. However, since both the Russell 1000 and 2000 indexes are value weighted, firms in the top of the Russell 2000 index receive significantly

higher weights compared to firms in the bottom of the Russell 1000 index within their respective indexes. When index funds benchmark against the Russell indexes to form their portfolios, they mechanically hold more shares in the top Russell 2000 index firms and significantly fewer shares in the bottom Russell 1000 index firms, resulting in a significant jump in quasi-indexer ownership at the cutoff point between the two indexes (Boone and White 2015; Appel, Gormley, and Keim 2016; Crane, Michenaud, and Weston 2016). Since this discontinuous increase in quasi-indexer ownership near the Russell 1000/2000 threshold is considered a plausibly exogenous shock to individual firms, it allows us to establish causal evidence on peer influence by examining the reactions of the Russell firms' peers following annual Russell 1000 and 2000 index reconstitution.

Prior studies provide ample evidence that institutional ownership benefits firms by improving their information environments and, in turn, their access to capital (e.g., Healy, Hutton, and Palepu 1999; Bushee and Noe 2000; Jiambalvo, Rajgopal, and Venkatachalam 2002; Bushman, Piotroski, and Smith 2004; Ajinkya, Bhojraj, and Sengupta 2005). In particular, Boone and White (2015) show that the higher quasi-index ownership of the top Russell 2000 index firms leads to an increase in management disclosures, analyst following, and liquidity. The authors argue that quasi-indexers have a strong incentive to demand greater public disclosures because it is costly for them to gather private information on their portfolio firms due to their large and diverse holdings. In addition, greater corporate transparency can reduce quasi-indexers' monitoring costs. Both managers and analysts would cater to quasi-indexers' demands by supplying more public information, resulting in a more transparent information environment and better stock liquidity. [1]

We rely on the annual reconstitution of the Russell indexes to identify peer influence on corporate voluntary disclosures. Specifically, we investigate management forecasts of the *industry*

[1] Recent studies show that quasi-indexers are active voters and exert strong influence over corporate policies (Appel et al. 2016; Bird and Karolyi 2016; Chen, Li, and Shevlin 2016; Crane et al. 2016; Khan, Srinivasan, and Tan 2016).

peers of the top Russell 2000 index firms versus *those* of the bottom Russell 1000 index firms following annual Russell 1000/2000 index reconstitution. We argue that the increase in institutional ownership and/or resultant improvement in the information environment of the top Russell 2000 index firms create pressure on other firms in the same industry to take action to improve their own information environment. Such pressure can stem from managers' incentive to compete for capital, mimic peers, or satisfy the demand of common institutional investors (Merton 1957; Bryant 1983; Diamond 1985; Jung 2013). We are interested in examining management forecasts as a form of voluntary disclosures because they are shown by prior studies to be an effective strategic mechanism used by managers to improve the information environment.[2] According to Beyer et al. (2010), management forecasts, on average, account for approximately 55 percent of the quarterly stock return variance attributed to accounting-based information, including earnings announcements and other forms of voluntary disclosure.

Using a regression discontinuity design (RDD), we find that the discontinuity of institutional ownership around the Russell 1000/2000 threshold causes a significant variation in the likelihood and frequency of management forecast issuance by industry peers of the Russell index firms. Compared with the industry peers of firms in the bottom of the Russell 1000 index with lower institutional ownership, industry peers of the top Russell 2000 index firms, with greater institutional ownership, are more likely to issue management forecasts and communicate with their investors more frequently. Given that exposure to high institutional ownership can be viewed as nearly random when the samples of Russell index firms are restricted to a narrow band, our inference is unlikely driven by omitted common variables. Our results are robust to the different

[2] The role of management forecasts in improving the information environment is well documented (e.g., Ruland, Tung, and George 1990; Marquardt and Wiedman 1998; Lang and Lundholm 2000; Francis, Khurana, and Pereira 2005; Graham, Harvey, and Rajgopal 2005; Balakrishnan, Billings, Kelly, and Ljungqvist 2014). See also the reviews by Hirst, Koonce, and Venkataraman (2008) and Beyer, Cohen, Lys, and Walther (2010).

bandwidth choices around the threshold, polynomial orders of the functional forms, the propensity score matching (PSM) procedure, changes analyses, and the instrumental variable (IV) approach as an alternative identification strategy.

A large body of literature shows that a better corporate information environment attracts cheaper capital and lowers firms' cost of financing.[3] Boone and White (2015) provide supportive evidence by showing an increase in stock liquidity for firms in the top of the Russell 2000 index due to the increase of their institutional ownership. We thus conjecture that the top Russell 2000 index firms gain competitive advantages on the product market due to their access to cheaper capital. In oligopoly theory, competitors react to each other's strategic moves. In addition, the marginal returns to increasing one's strategy rise with increases in the competitors' strategy (e.g., Bryant 1983; Diamond 1985; Milgrom and Roberts 1990). In this respect, when one firm's information environment is improved, and in turn its cost of capital is lowered, it increases the marginal benefit of its industry competitors' actions to improve their own information environments. Therefore, via the network of industry competition, the competitive advantage of the top Russell 2000 index firms motivates industry peers to take actions to improve their own information environments and lower their cost of capital. Therefore, we predict that the industry peers strategically issue more management forecasts to keep up with the competition for capital.

We first show that the effect of higher institutional ownership on increasing peer firms' management forecasts as documented in the main test is weakened after controlling for Russell firms' stock liquidity during the period following the annual index reconstitution. This result suggests that the increase in stock liquidity that comes with high institutional ownership drives

[3] See, among others, Myers and Majluf (1984), Diamond and Verrecchia (1991), Chung and Jo (1996), Lang and Lundholm (1996), Sengupta (1998), Healy et al. (1999), Easley and O'Hara (2004), Francis et al. (2005), Leone, Rock, and Willenborg (2007), Kothari, Li, and Short (2009), and Beyer et al. (2010).

peer firms to respond by increasing their voluntary disclosures, supporting peers' competition for capital as one important channel through which peer pressure is exerted. Next, we use Rajan and Zingales' (1998) measure of the dependence of external financing, namely, the RZ ratio, and the market-to-book ratio to proxy for firms' need to attract external capital. Our cross-sectional analyses reveal that peer firms with greater needs for external financing represented by a higher RZ ratio and market-to-book ratio are more responsive to the high institutional ownership of the top Russell 2000 index firms in the industry. These results suggest that peer firms in need of capital have stronger incentives to improve their information environment to compete for it.

Our study first contributes to the growing literature on the impact of peer influence on corporate policies, disclosures, and other firm-specific characteristics.[4] Beatty et al. (2013) show that peers react to fraudulent reports by increasing investments during the period of fraud. Ozoguz and Rebello (2013) show that firms' investments respond to innovations in the stock prices of peer firms, which suggests that managers use information in peer firms' stock prices in making investment decisions. Jung (2013) shows that common institutional ownership can drive intra-industry information demand and diffusion of disclosure practices. There are also studies that provide evidence of peer firms' influence on capital structure and financing choice, disclosures, and compensation (e.g., Arya and Mittendorf 2007; Bizjak et al. 2008; Laschever 2013; Leary and Roberts 2014).[5] We add additional evidence to this literature by documenting peer influence as a significant factor that drives managers' decisions to make voluntary disclosures beyond those firm-specific characteristics documented in earlier studies (Healy and Palepu 2001; Hirst et al. 2008;

[4] A few studies document intra-industry information transfer associated with earnings announcements, management forecasts and accounting restatements (e.g., Foster 1981; Baginski 1987; Han, Wild, and Ramesh 1989; Gleason, Jenkins, and Johnson 2008).

[5] Leary and Roberts (2014) show that firms' capital structures and debt and equity issuance decisions are significantly related to peer firm equity shocks. Arya and Mittendorf (2007) show that competing firms can coordinate mutually beneficial disclosures to attract analyst coverage. Bizjak et al. (2008) and Laschever (2013) show that peer comparisons play a role in the determination of executive compensation.

Beyer et al. 2010). In addition, this study uses a nearly randomized experiment to overcome the identification problems faced by empirical studies that examine peer effects. The identification of peer effects is empirically challenging because the observed interdependent behaviors among peers can be driven by the similar individual characteristics of peers within the same group or by their similar institutional environments (Manski 1993). Relying on the exogenous variation in institutional ownership of those Russell firms near the index threshold, we are able to causally attribute the variation in their corresponding industry peers' management forecast behavior as evidence of a peer effect.

Second, extant studies mostly focus on the beneficial effects of institutional ownership on a firm's own information environment, such as disclosure practices, analyst following, and stock liquidity (e.g., Healy et al. 1999; Bushee and Noe 2000; Ajinkya et al. 2005; Boone and White 2015). However, little is known about the effects of institutional investors on firms beyond those in which they have invested. Piotroski and Roulstone (2004) find that institutional investors facilitate the incorporation of firm- and industry-specific information into stock prices. In other words, the presence of significant institutional ownership facilitates intra-industry information transfer. Our study contributes to the literature by documenting that the beneficial effect of institutional ownership can spill over to peer firms in the same industry, causing industry-wide information transparency.

The remainder of this paper is structured as follows. Section II introduces our identification strategy. Section III describes our data and sample selection procedure and discusses the main and control variables. Section IV presents our empirical results, including the main results, and those of robustness tests and additional analyses. The final section concludes the paper.

II. IDENTIFICATION STRATEGY

The Empirical Challenge of Identifying a Peer Effect

If we observe a characteristic X of firm i in a group Ω at time t and we try to infer whether a peer firm j from the same group Ω would take a responsive action Y (peer effect) at time t, the following model could be used to investigate the economic significance of the potential peer effect:

$$\begin{aligned} Peer\ Y_{j,t} = {} & \beta_0 + \beta_1 X_{i,t} + Observed\ Characteristics\ of\ peer\ firm\ j + Observed \\ & Characteristics\ of\ firm\ i + Observed\ Characteristics\ of\ group\ \Omega + Unobserved \\ & Characteristics\ of\ peer\ firm\ j + Unobserved\ Characteristics\ of\ firm\ i + \\ & Unobserved\ Characteristics\ of\ group\ \Omega + \varepsilon_{j,t}. \end{aligned} \quad (1)$$

The challenge in estimating the above model is the omitted variable problem that results from unobserved characteristics stemming from firm i, the corresponding peer firm j, and the common group Ω. Controlling firm or group fixed effects is unlikely to resolve this problem, because the characteristics X of firm i at time t and the response Y of firm j at time t can be simultaneously driven by unmodeled factors in time t rather than any time-invariant factor captured by fixed effects. The concern about omitted variables is greater when studying peer effects because both firm i and the corresponding peer firm j are from the same group Ω, which potentially results in more omitted common causal variables (Manski 1993; Leary and Roberts 2014). In this regard, the assumption of a zero conditional mean can be hardly satisfied, since the residual ε captures all omitted variables that could be related to X (i.e., $E(X|\varepsilon) \neq 0$).

In the context of this study, an industry firm i's institutional ownership is unlikely to be exogenous. For example, the change in institutional ownership could be driven by an industry-wide shock that simultaneously affects the disclosure behavior of firm i and its corresponding peer firm j. To address this problem and establish causality between firm i's action X and firm j's response Y, we need to look for a random event that affects only the institutional ownership of firm

i but not that of the corresponding peer firm *j*. With such randomized assignments of treatment (i.e., higher institutional ownership), we can have the condition $E(X|\varepsilon) = 0$.

Russell Index Reconstitution

We utilize a quasi-randomized experiment instituted by the indexing behavior of the Russell Investment Company (RIC) to establish the peer effect on firms' voluntary disclosure behavior. Every year, on the last trading date in May, the RIC ranks eligible stocks based on their market capitalization. The largest 1000 stocks are included in the Russell 1000 index and the next 2000 largest stocks are used to construct the Russell 2000 index. Subsequently, the RIC constructs the indexes on the last date of June using the predetermined weights of member stocks. The index weights are determined by dividing each firm's float-adjusted market capitalization by the cumulative floated-adjusted market capitalization of all firms assigned to that particular index. The RIC computes each firm's float-adjusted market capitalization using its actual number of shares available to trade publicly. Near the Russell 1000/2000 threshold, firms' market capitalizations evolve smoothly in the sense that the top Russell 2000 index firms and the bottom Russell 1000 index firms have very similar market capitalizations. However, due to the value-weighted construction of each index, the top Russell 2000 index firms receive significantly higher index weights than the bottom Russell 1000 index firms within their respective indexes, resulting in a sharp jump in weights around the threshold.[6]

Due to their transparency and convenience, the Russell indexes are popular among institutional investors. Many index and quasi-index funds rebalance their portfolios based on the movements of the Russell indexes. Then the discontinuity of the index weights described above plus the fact that Russell 2000 index is even more popular than Russell 1000 index, mechanically results in

[6] In the Internet Appendix Figure IA1, we graphically illustrate the smooth evolvement of market capitalization and a discontinuity in index weights around the threshold of Russell 1000/2000 index.

higher ownership by quasi-indexers for firms at the top of the Russell 2000 index compared to firms at the bottom of the Russell 1000 index near the threshold of the indexes (Lu 2013; Chang, Hong, and Liskovich 2015). Lee and Lemieux (2010) contend that if the assignment variable (i.e., market capitalization in our context) evolves smoothly with respect to the distance to threshold, the assignment and the outcome of the assignment can be viewed as exogenous for the firms lying on the two sides nearest to the threshold. In other words, when we restrict firm *i* to those near the threshold, firm *i*'s characteristic *X* is exogenous and not related to any unobserved characteristics stemming from firm *i*, the corresponding peer firm *j*, or the common group Ω. If we define those firms nearest to the threshold as Φ, then we can use the following model to examine the peer effect:

$$Peer\ Y_{j,t}|(X\in\Phi) = \beta_0 + \beta_1 X_{i,t}|(X\in\Phi) + \varepsilon_{j,t}|(X\in\Phi). \quad (2)$$

Lee and Lemieux (2010) suggest that choosing a sufficiently narrow band Φ can satisfy the assumption of a linear functional form. Within the narrow band, firms cannot precisely manipulate inclusion into one index versus another and are therefore like-randomized above and below the threshold. Then, due to the exogeneity of *X* (i.e., $E(X|\varepsilon, X\in\Phi) = 0$) and the linear functional form, the local linear estimator of Eq. (2) is unbiased. This approach is also known as an RDD.

Following prior studies (Lu 2013; Boone and White 2015), we use a bandwidth of [-100, +100] wherein the threshold is defined by the position of the stock ranked 1000th within the Russell 1000 index by the RIC based on its float-adjusted market capitalization at the end of June each year. Each year, we then take the 100 firms nearest to the threshold on both sides, i.e., the 100 smallest firms from the Russell 1000 index and the 100 largest firms from the Russell 2000 index. Boone and White (2015) document a significant discontinuity in institutional ownership around the Russell 1000/2000 threshold arising from portfolio weighting. We verify this discontinuity by plotting the institutional ownership of the Russell 1000 and 2000 index firms within the bandwidth

[-100, +100] on each side of the threshold. We measure institutional ownership by the proportion of shares held by institutional investors over the total number of shares outstanding.[7] Following Bushee (1998, 2001) and Bushee and Noe (2000), we classify institutional investors into quasi-indexers, transient institutional investors, and dedicated institutional investors based on their past investment patterns in terms of portfolio turnover and diversification.[8]

In Figures 1(a) to 1(d), we plot total institutional ownership, quasi-indexer ownership, transient institutional investor ownership, and dedicated institutional investor ownership, respectively. Figure 1(a) shows that, near the threshold, the top Russell 2000 index firms lying on the right side experience a significant jump in total institutional ownership compared to the bottom Russell 1000 index firms lying on the left side, due to their significantly larger index weights. Consistent with prior studies (e.g., Boone and White 2015), this discontinuity in total institutional ownership around the threshold is primarily contributed by quasi-indexers. The comparison of Figures 1(b) and 1(c) shows that quasi-indexer ownership experiences a much larger increase than transient institutional investor ownership when firms shift from the Russell 1000 index to the Russell 2000 index across the threshold. Figure 1(d) shows a slight decrease in dedicated institutional investor ownership when firms move across the threshold from the left to the right.

Boone and White (2015) show that the significant increase in the quasi-indexer ownership of the top Russell 2000 index firms leads to an increase in public information supplied by both managers and analysts, resulting in an improved information environment. To verify their findings with our sample, we plot the likelihood and frequency of managerial forecasts and analyst

[7] The institutional holding data are obtained from Thomson's CDA/Spectrum Database.

[8] We are grateful to Professor Brian Bushee for providing data of the three types of institutional ownership. According to Bushee (2001), quasi-indexers use indexing or buy-and-hold strategies that are characterized by large and diversified holdings and low portfolio turnover. Transient institutional investors tend to hold highly diversified portfolios as well, but they trade frequently to realize short-term trading profits, resulting in high portfolio turnover. Dedicated institutional investors provide long-term and stable ownership to a small number of portfolio firms and they have less diversified portfolio holdings and lower portfolio turnover.

following of the Russell 1000/2000 index firms lying within the narrow band [-100, +100]. The figures included in the Internet Appendix (Figure IA2) show a significant increase in management forecasts and analyst following around the threshold, moving from the Russell 1000 index firms on the left to the Russell 2000 index firms on the right, consistent with the results of Boone and White (2015).

III. DATA, SAMPLE SELECTION, AND VARIABLE DEFINITIONS

Data and Sample Selection

Information about the Russell index firms comes from the RIC. We supplement these data with accounting information from Compustat and stock price information from the Center for Research in Security Prices (CRSP). We also obtain analyst forecast data from I/B/E/S, managerial forecast data from the First Call Company Issued Guidance database and institutional holding data from Thomson's CDA/Spectrum Database. We follow Boone and White (2015) to set a sample period of 1998 to 2006. The reason is that, from 2007, the RIC implemented a new policy that permits a firm to stay in the previous index if its market value is within ±2.5 percent of the new 1000th firm's market capitalization. Therefore, the index assignment after 2006 is not entirely determined by market capitalizations. Nevertheless, our results are robust when we include the period after 2006.

Our sample screening process consists of three steps as shown in Table 1. In the first step, as described earlier, we choose a narrow bandwidth [-100, +100], as suggested by prior studies (Boone and White 2015; Appel et al. 2016; Crane et al. 2016), to identify the treatment Russell index firms and the control Russell index firms. Specifically, each year, we select 100 largest firms from the Russell 2000 index (treatment Russell index firms) and 100 smallest firms from the Russell 1000 index (control Russell index firms), providing a total of 1800 Russell index firms for

the period 1998 to 2006. Then, we remove a Russell index firm if (1) its Standard Industry Identification Code (SIC) is missing from Compustat, (2) there are both control and treatment Russell index firms in the same industry defined by the same four-digit SIC code, and (3) no industry peer firms are identified based on the four-digit SIC code. This yields a sample of 519 Russell 2000 index firms (treatment Russell index firms), and 567 Russell 1000 Index firms (control Russell index firms). In the second step, following Leary and Roberts (2014), we use the four-digit SIC code to identify peers for each Russell index firm obtained from the first step (see Appendix A).[9] In this step, we require that the industry peers should not be one of the treatment or control Russell index firms in a particular year. We further delete industry peers that have missing data in calculating the control variables in our regression model. Eventually, we identify 12,740 treatment peer firms and 7,208 control peer firms. In the final step, we remove those Russell index firms with no peers identified in the second step due to missing data and obtain 450 Russell 2000 index firms and 384 Russell 1000 index firms.

Since the assignment of Russell 1000 index firms and Russell 2000 index firms is viewed as nearly random when the band (Φ) is sufficiently narrow, the industry distribution of these treatment and control Russell index firms and that of their industry peers should be highly dispersed. This is confirmed by the results of our industry analysis presented in the Internet Appendix Table IA2.

Main Variables

We investigate whether the industry peers of the top Russell 2000 index firms are associated with more managerial voluntary disclosures in the form of management forecasts in response to

[9] Our four-digit SIC peer identification does not introduce additional uncertainty into the assignment of treatment and control firms. Thus, our strategy is considered as a sharp RDD (Hahn, Todd, and van der Klaauw 2001; Lee and Lemieux 2010).

the improved information environment of those top Russell 2000 index firms. We develop two proxies for peer firms' managerial forecasting behavior. First, the indicator variable *Guidance* is equal to one if a firm provides any management forecast after the annual reconstitution of Russell indexes during the period from July 1 this year to May 31 next year and zero otherwise. Second, the measure of forecast frequency (*Frequency*) is defined as the number of annual or quarterly forecasts during the period from July 1 this year to May 31 next year.

As discussed in the previous section, the corresponding industry peers of Russell 2000 index firms lying within the narrow band (0, +100] are defined as treatment peer firms. We set an indicator variable *Treatment* to be one in the year when the peer firms are classified as the treatment peer firms. Accordingly, the corresponding industry peers of the Russell 1000 index firms lying within the narrow band [-100, 0) are defined as control peer firms. In this case, the indicator variable *Treatment* equals zero in that particular year.

Pre-Assignment Firm Characteristics

The assumption for a valid RDD is that the evolution of the assignment variable, that is, the Russell firms' market capitalization in our context, is smooth with respect to the distance to threshold, which is consistent with local continuity and the inability of firms to precisely manipulate the assignments. This is the case with the annual Russell 1000/2000 index reconstitution (e.g., Boone and White 2015; Chen et al. 2016). Nevertheless, to further mitigate concerns of index assignment manipulation, we examine the descriptive statistics and the local continuity of a set of firm-level determinants documented by prior studies that affect corporate voluntary disclosures for both Russell index firms and their peers (Ball, Jayaraman, and Shivakumar 2012). These determinants include firm size, earnings volatility, return volatility, analyst following, R&D activities, and the equity or debt issuance of both Russell index firms and

their industry peers. These firm-year level determinants are constructed based on accounting and stock information prior to the index reconstitution at the end of June each year.[10]

Panels A and B of Table 2 present the summary statistics of the aforementioned determinants for the Russell index firms lying within the bandwidth [-100, +100] and their industry peers, respectively. Panel A shows that the treatment and control Russell index firms differ significantly in size, return volatility, industry size, R&D expenditures, and debt and equity issuance. In Panel B, it shows that the corresponding treatment and control peer firms differ significantly in earnings volatility, analyst following, R&D expenditures, and equity and debt issuance. [11] However, as pointed out by Lee and Lemieux (2010), the validity of an RDD is violated only by the discontinuity of the pre-assignment determinants, around the threshold. In the Internet Appendix Figure IA3, we plot the determinants that are shown in Table 2 to be significantly different between the treatment and control groups, to check their local continuity around the threshold and find that they do not exhibit significant discontinuities around the Russell 1000/2000 index threshold. This result suggests that the observed discontinuous increase (decrease) in the managerial forecasts of corresponding peer firms around the threshold, if any, is unlikely to be driven by the difference in pre-assignment firm characteristics between the treatment and control Russell firms and their peers.

IV. EMPIRICAL RESULTS

Main Results

Figure 2 presents the RDD plots for the likelihood and frequency of management forecasts issued by industry peers during the period from July through May following the June index reconstitution within our chosen narrow band [-100, +100] around the Russell 1000/2000 threshold.

[10] See Appendix B for details of the variable definitions.
[11] The descriptive statistics in Panel B are reported for unique (non-duplicate) peer firm years.

Specifically, the x-axis represents the distance to threshold of the Russell index firms, whereas the y-axis represents the likelihood (frequency) of issuing managerial forecasts by the *corresponding peer firms*. In Figure 2(a), we observe a sharp jump in the likelihood of managerial forecast issuance when shifting from the control peer firms (peer firms of the bottom Russell 1000 index firms) on the left side of the threshold to the treatment peer firms (peer firms of the top Russell 2000 index firms) on the right side. There is no overlap in the 90 percent confidence intervals of the treatment and control samples around the threshold. We find a similar pattern when using the frequency of management forecasts as the *y* variable (Figure 2(b)). Given the nearly random assignment of the firms into the two indexes around the threshold of Russell 1000/2000, the local discontinuities in Figure 2 establish the *causal effect* of the discontinuously higher institutional ownership of the top Russell 2000 index firms on increasing the probability and frequency of management forecasts by their industry peers (i.e., the spillover effect of institutional ownership on peer firms' management forecast behavior).

We further estimate the treatment effect of index assignment using parametric estimation and present the results in Table 3. Lee and Lemieux (2010) argue that including baseline covariates can help establish the validity of the RDD and reduce sampling variability. Therefore, in addition to baseline regressions, we also include in Eq. (2) the aforementioned pre-assignment characteristics of the Russell index firms and peer firms to help further establish the validity of our RDD. Note that we only control for firm characteristics in the pre-assignment period. Therefore, we can avoid the problem of including causal channels through which the treatment effect materializes.[12] The empirical model is as follows:

[12] We control for the pre-assignment characteristics to better identify the causal effect (Pearl 2009; Gow, Larcker, and Reiss 2016). The pre-assignment characteristics could be potential confounders, in the sense that they could be related to the possibility of a peer firm being treated or, in other words, being in the same industry with the top Russell 2000 index firms.

$$\begin{aligned}\textit{Management forecast}_{j\,t} = {} & \alpha + \beta_0 \textbf{\textit{Treatment}}_{j\,t} + \beta_1 \textit{Absrank}_{i\,t} + \beta_2 \textit{Lsize\_peer}_{j\,t-1} \\ & + \beta_4 \textit{Ret\_vol\_peer}_{j\,t-1} + \beta_5 \textit{N\_analyst\_peer}_{j\,t-1} \\ & + \beta_6 \textit{Rnd\_peer}_{j\,t-1} + \beta_7 \textit{Issuance\_peer}_{j\,t-1} + \beta_8 \textit{Lsize\_ru}_{i\,t-1} + \beta_9 \textit{Earn\_vol\_ru}_{i\,t-1} \\ & + \beta_{10} \textit{Ret\_vol\_ru}_{i\,t-1} + \beta_{11} \textit{N\_analyst\_ru}_{i\,t-1} + \beta_{12} \textit{Rnd\_ru}_{i\,t-1} \\ & + \beta_{13} \textit{Issuance\_ru}_{i\,t-1} + \beta_{14} \textit{Indsize}_{i\,t-1} + \textit{Year} + \textit{Industry} + \varepsilon_{j\,t}, \end{aligned} \quad (3)$$

where *Management forecast*$_j$ represents peer firm *j*'s forecast behavior, proxied by the likelihood and frequency of issuing management forecasts. We include the variable *Absrank*, the absolute distance to the Russell 1000 exclusion/inclusion threshold, to capture the effect of the distance to threshold. We also include industry and year fixed effects.

In columns (1) to (3) of Table 3, we use logit regressions in which the dependent variables are the indicator variable *Guidance*. In column (1), we do not control for any pre-assignment determinant. The coefficient on *Treatment* is significantly positive (0.326, *z* = 5.33), suggesting that the industry peers of the top Russell 2000 firms are more likely to issue management forecasts than those of the bottom Russell 1000 firms.[13] We further control for the pre-assignment characteristics of the peer firms in column (2) and still find a significantly positive coefficient on *Treatment* (0.347, *z* = 5.12). In column (3), we add the Russell firms' pre-assignment characteristics as additional controls and still find the coefficient on *Treatment* to be positive and significant (0.304, *z* = 4.45). More importantly, we find that the coefficients on *Treatment* do not change significantly between columns (1), (2) and (3), which supports our RDD validity and suggests that the pre-assignment firm characteristics are not likely to confound the treatment effect. For economic significance, the result in column (3) suggests that firms are 5.62 percent more likely to make management forecasts if they are industry peers of the top Russell 2000 firms.

In columns (4) to (6) of Table 3, we use a discrete variable *Frequency* as the dependent variable and use Poisson regressions. The results are qualitatively similar (0.127, *z* = 2.48 in column (4);

[13] The estimation of a logit model drops observations due to the controlling of industry fixed effect.

0.126, z = 3.05 in column (5); 0.111, z = 2.62 in column (6)), revealing that the industry peers of the top Russell 2000 firms issue management forecasts more frequently. We again find that the differences in the coefficients on *Treatment* are not statistically significant between columns (4), (5) and (6). In terms of economic significance, the results in column (6) suggest that the industry peers of the top Russell 2000 firms have a 7.44 percent higher management forecast frequency than those of the bottom Russell 1000 firms.[14]

Boone and White (2015) find that the increase in the management forecasts of firms in the top of the Russell 2000 index is mainly driven by an increase in the demand for public disclosures from quasi-indexers. Quasi-indexers have limited ability to trade on private information and rely on public disclosures to reduce their monitoring costs. Other studies also show that quasi-indexers are not passive owners and, instead, exert a strong influence on corporate policies in governance, tax planning, and dividend payout (Appel et al. 2016; Bird and Karolyi 2016; Chen et al. 2016; Crane et al. 2016; Khan et al. 2016). A recent article in The Wall Street Journal reports that index fund managers such as Vanguard, BlackRock, and State Street often cast deciding shareholder votes on issues such as mergers and leadership changes (Krouse, Benoit, and McGinty 2016).

Along the same line, we further separate total institutional ownership into quasi-indexer ownership, transient institutional investor ownership, and dedicated institutional investor ownership and replace the variable *Treatment* in Eq. (3) by the three types of institutional ownership. The estimated results reported in Table 4 show that the quasi-indexer ownership can significantly explain peer firms' management forecast behavior in terms of both forecast likelihood and frequency, while transient institutional investor ownership can only explain management

[14] In additional analyses, we also examine the precision, horizons, and accuracy of the management forecasts of the industry peers of the top Russell 2000 index firms. We only find some evidence that the high institutional ownership of Russell 2000 index firms significantly affects peer firms' forecast accuracy. The discussions and results of the analyses are included in the Internet Appendix, Section IA4.

forecast likelihood. For dedicated institutional investors, their ownership is not significant in explaining either peer firms' management forecast likelihood or frequency. This result can be partially due to the small variation in dedicated institutional investor ownership across the threshold between the Russell 2000 and 1000 indexes, as indicated in Figure 1(d), or dedicated institutional investors' lower demand for public disclosures.[15]

Together with the non-parametric results in Figure 2, the results reported in Tables 3 and 4 suggest that the higher institutional ownership, particularly quasi-indexer ownership of the top Russell 2000 index firms, and the resultant improvement of their information environment drive their industry peers to make more voluntary disclosures in the form of management forecasts. We causally attribute such findings to peer effects, because the discontinuity of institutional ownership around the Russell 1000/2000 threshold is plausibly exogenous and does not affect industry peers.

An Instrumental Variable Approach

We supplement the RDD analyses using an instrumental variable (IV) approach to address the concern that firms may self-select into treatment or that unobservable firm factors lead to the outcomes of index assignment (Hahn et al. 2001). Further, the float adjustment employed by the RIC results in some firms receiving a different portfolio weighting than predicted based on their market capitalization, which could violate the local continuity assumption around the Russell 1000/2000 threshold. Following Boone and White (2015), Appel et al. (2016) and Crane et al. (2016), we employ Russell 2000 membership as an instrument of quasi-indexer ownership. As discussed in Section II, the index assignment mechanically affects quasi-indexer ownership but is unlikely to have a direct effect on the management disclosure of peer firms. In this respect, it meets the relevance and exclusion requirements of a valid IV. In the first step, we regress quasi-indexer

[15] Boone and White (2015) argue that dedicated institutional investors can profit based on private information and may therefore prefer more opaque information environments that enable them to retain their informational advantages.

institutional ownership on the indicator of the top Russell 2000 index firms within the bandwidth [-100, +100] around the threshold, based on the following specification:

$$Io\_quasi = \alpha_0 + \alpha_1 Treatment + \alpha_2 Ln(Float) + \Sigma\, \alpha_\gamma controls + Year + Industry + \varepsilon, \quad (4)$$

where *Io_quasi* is the corresponding Russell index firm's percentage of shares held by quasi-indexers at the end of the quarter following the index reconstitution, for each peer firm in the same industry. *Ln(Float)* is the natural logarithm of the float-adjusted market capitalization at the end of June (provided by RIC), which is used to control for the RIC's float adjustment. The other control variables are the same as in Eq. (3). The estimated results of Eq. (4) reported in column (1) of Table 5 show that the coefficient on the IV (*Treatment*) is positive and significant. Consistent with Figure 1(b), such result suggests that the inclusion in Russell 2000 index near the threshold (*Treatment*) causally increases quasi-indexer ownership.

In the second step, we regress peer firms' management forecast behaviors on the instrumented quasi-indexer ownership of the corresponding Russell index firms ($\widehat{Io\_quasi}$), as follows:

$$Management\ forecast = \alpha_0 + \alpha_1 \widehat{Io\_quasi} + \alpha_2 Ln(Float) + \Sigma\, \alpha_\gamma controls + Year + Industry + \varepsilon, \quad (5)$$

where $\widehat{Io\_quasi}$ is the fitted value of *Io_quasi* from estimating Eq. (4) in the first step. We include *Ln(Float)* and the other control variables as in Eq. (4). The results reported in columns (2) and (3) of Table 5 show that both the likelihood and frequency of peer firms' management forecasts increase with the instrumented quasi-indexer ownership (0.483, t = 2.26 in column (2); 0.700, t = 2.02 in column (3)). We repeat the analyses in Table 5 using total institutional ownership. The untabulated results are qualitatively similar. Overall, the results of the IV approach confirm those of the RDD analyses, that the industry peers of firms in the top of the Russell 2000 index are more likely to issue management forecasts and issue management forecasts more frequently.

Other Robustness Tests

We conduct multiple sensitivity analyses to further ensure the robustness of our inferences. First, we include higher-order polynomials (i.e., first- to third-order polynomials) of the distance to threshold to allow for nonlinearity in our functional form and the results reported in Panel A of Table 6 show that the coefficients on *Treatment* are still positive and significant for both the forecast likelihood and frequency. Second, we follow the literature on RDD and repeat our main tests using alternative bandwidths of [-50, +50] and [-150, +150] (Lee and Lemieux 2010; Boone and White 2015). We find that the coefficients on *Treatment* are still positive and significant for both forecast likelihood and frequency (Panel B, Table 6). Third, in our main tests, we allow a peer firm to be counted multiple times if it is associated with more than one Russell index firm lying within the selected narrow band. For example, if firm A is the industry peer of a treatment Russell index firm C and another treatment Russell index firm D, then we will count firm A twice in our regression model because we view each Russell index firm–peer firm pair as a unique relationship. Since one peer firm can be counted multiple times, we use within-firm clustering to address the underestimation in standard errors (i.e., overestimation in *z*) in our main tests. To check the robustness of our results, we count each peer firm only once and estimate Eq. (3) using this non-duplicate sample. The results in Panel C of Table 6 are consistent with our main results reported in Table 3. Fourth, we employ a propensity score matching (PSM) procedure to create a matched sample to eliminate the differences between the treatment and control peer firms' characteristics. Specifically, we use the peer firms' pre-assignment characteristics controlled in Eq. (3) to predict the probability of being the top Russell 2000 firms' industry peers (*Treatment* = 1). We then match each treatment peer firm with the control peer firm with the closest propensity score. Our results still hold for the matched sample (Panel D, Table 6). Fifth, we conduct falsification tests by setting two pseudo thresholds at the 500th or the 1,500th largest firm, respectively, based on the firm's

float-adjusted market capitalization (i.e., index weights) at the end of June. As shown in Panel E of Table 6, all coefficients on *Treatment* are insignificant for the treatment and control samples constructed based on these two pseudo thresholds.

Lastly, we include additional controls to ensure the robustness of our main results. First, we control for firm fixed effects and the results still hold. Second, we control for the average institutional ownership of the peer firms' industry and the peer firms' own institutional ownership and find similar results. The results confirm that the increase in quasi-indexer ownership caused by index assignment is exogenous to common industry characteristics and peer firms' own characteristics, providing further support for using this setting to examine peer effects. However, we conjecture that when institutional ownership in the peer firms' industry is already quite high, further increases in institutional ownership within the industry might not drive the peer firms to further increase their management forecasts. To test this conjecture, we partition our sample based on the average institutional ownership of peer firms in the same industry. We find a significant treatment effect only for the group of peer firms in the industries with an average level of institutional ownership below the median. We also partition the sample based on the peer firms' own institutional ownership and find similar results. We do not tabulate these results for brevity.

Changes Regressions

In this section, we first conduct changes analyses to examine the association between changes in the treatment variable and changes of peer firms' management forecast behavior. The estimated results of the changes regressions reported in columns (1) and (2) of Table 7 show positive and significant coefficients on Δ*Treatment* for both management forecast likelihood and frequency.

Next, we separately examine the effect of an increase versus a decrease in the treatment variable on peer firms' management forecast behavior. Prior studies show that the issuance of

management forecast is a sticky disclosure behavior, especially when it comes to the cessation of management forecasts (Houston, Lev, and Tucker 2010; Chen, Matsumoto, and Rajgopal 2011). The cessation of management forecasts is usually associated with a decrease in analyst coverage, increases in analyst forecast errors and dispersions, and deteriorating stock return performance, and thus is costly. In contrast, managers initiate or increase management forecasts to alleviate information asymmetry (Balakrishnan et al. 2014) and cater to institutional investors' demand for transparency (Boone and White 2015). Therefore, we expect that it is more likely to observe peer firms to increase their management forecasts when they switch from the peers of the Russell 1000 control firms to the peers of the Russell 2000 treatment firms (the treatment indicator changes from zero to one). However, we are less likely to observe peer firms to decrease their management forecasts when they switch from the peers of Russell 2000 treatment firms to the peers of Russell 1000 control firms (the treatment indicator changes from one to zero). To test this conjecture, we define two indicators: *Switch to Ru2000* and *Switch to Ru1000*, where *Switch to Ru2000* takes a value of one if Δ*Treatment* is positive and zero otherwise and *Switch to Ru1000* takes a value of one if Δ*Treatment* is negative and zero otherwise. We replace Δ*Treatment* with these two indicators in the changes regressions and report the estimated results in columns (3) and (4) of Table 7. The results show that the coefficients on *Switch to Ru2000* are positive and significant in both columns (3) and (4), suggesting that for peer firms with the treatment indicator changing from zero to one, both the likelihood and frequency of their management forecasts are significantly increased. Although their sign is negative, the coefficients on *Switch to Ru1000* are not significant at any conventional level, suggesting that when the peer firms are no longer treated within the next year, their management forecast behavior is not significantly changed. This finding suggests that management forecast behavior is stickier in the downward direction.

Given the stickiness of the managers' forecasting behavior, we expect that within a short period, if a firm's industry peers are treated for multiple times, the first-time/initial treatment results in a lasting change in forecasting behavior and the subsequent treatments may impose only a limited effect. We follow Roberts and Sufi (2009) to compare the effect of first-time treatments and subsequent treatments within a four year window.[16] In particular, we define two separate treatment indicators: *New Treatment* and *Subsequent Treatment*. The variable *New Treatment* equals one if a firm is the industry peer of a Russell 2000 index treatment firm in the current year, but not in any of the past three years, and zero otherwise. *Subsequent Treatment* equals one if a firm has been the industry peer of a Russell 2000 index treatment firm in any of the past three years and the current year, and zero otherwise. We then estimate the changes regressions by replacing Δ*Treatment* with *New Treatment* and *Subsequent Treatment*. By so doing, we separate the effect of initial versus subsequent treatments on the change in management forecast behavior. The estimated results reported in columns (5) and (6) of Table 7 show that the coefficient on *New Treatment* is positive and significant, but that on *Subsequent Treatment* is insignificant. This finding supports the notion that the initial treatment can result in a lasting change in forecasting behavior given the stickiness of the managers' forecasting behavior. In contrast, the subsequent treatment does not impose a significant effect on firms' forecasting behaviors, suggesting a decreasing marginal treatment effect. [17]

Possible Channels

Competing for Capital

[16] Roberts and Sufi (2009) examine the effect of debt covenant violation on firms' net debt issuance and show that only new/initial covenant violations have a significant effect on reducing net debt issuance.

[17] The difference between the coefficients on initial and subsequent treatment appears to be large economically, but it is statistically insignificant. Thus, we caution against a strong interpretation of these results.

In this section, we examine whether the peer pressure of improving a firm's information environment is driven by the firm's incentive to compete for capital. Boone and White (2015) show that stock liquidity increases for firms in the top of the Russell 2000 index due to the increase in their institutional ownership and public disclosures. Since improvement in stock liquidity can lead to lower costs of capital, this creates pressure on rivals to improve their own information environment to compete for cheaper capital. This conjecture is supported by the oligopoly theory that the marginal returns to increasing one's strategy rise with increases in the competitors' strategy (e.g., Bryant 1983; Diamond 1985; Milgrom and Roberts 1990).

To test whether the increase in the Russell 2000 firms' stock liquidity causes their competitors (peers) to respond, we examine the change in treatment effect after controlling for Russell firms' stock liquidity in Eq. (3). Following prior literature, we use two illiquidity measures and one liquidity measure: the bid–ask spread (*Spread_ru*) calculated as the closing ask price less the closing bid price divided by the midpoint of the closing ask and bid prices, Amihud's (2002) measure of the price impact calculated as the logarithm of the average ratio of the absolute return to the dollar volume of trading (*Amihud_ru*), and dollar trading volumes measured as the logarithm of the average daily trading volume multiplied by the closing price (*Dollarvol_ru*) (Balakrishnan et al. 2014). All three measures are calculated based on trading information during the period following annual index reconstitution. Consistent with our conjecture, the estimated results reported in Table 8 show that Russell firms' stock liquidity is significantly associated with peer firms' management forecasts. More importantly, Russell firms' stock liquidity significantly absorbs the treatment effect on the frequency of management forecasts (*Frequency*). The coefficients on *Treatment* are no longer significant in columns (6) to (8) after controlling for Russell firms' liquidity. In column (8), the inclusion of Russell firms' liquidity reduces the

magnitude of the coefficient on *Treatment* by almost half, from 0.111 to 0.058. The corresponding economic impact of *Treatment* on *Frequency* decreases from 7.44 percent to 3.94 percent, representing a 47 percent reduction. As for the probability of management forecast issuance (*Guidance*), the marginal effect of *Treatment* on *Guidance* decreases from 5.62 percent to 4.34 percent (i.e., the coefficient changes from 0.304 to 0.234) based on column (4), representing a 23 percent reduction. Overall, the results reported in Table 8 suggest that competing for capital can be an important channel through which peer influence is exerted.

To provide further support for the capital competition channel, we next explore cross-sectional variations in peer firms' management forecasting behaviors conditional on their financing needs. We first use the dependence of external financing (*RZ ratio*) articulated by Rajan and Zingales (1998) to proxy for the incentives for peer firms to compete for capital. The variable *RZ ratio* is the industry median of firms' intrinsic demand for external financing for capital investment, measured as the ratio of total capital expenditures plus research and development expense in excess of cash flows over the sum of total capital expenditures and research and development expense. We separate the full sample into two subsamples based on *RZ ratio* of peer firms and re-estimate Eq. (3) using each subsample, respectively. In Panel A, Table 9, we observe a stronger peer effect of increasing both the likelihood and frequency of management forecast issuance when the treatment peer firms have a higher degree of external financing dependency as measured by the *RZ ratio* (0.183, $z = 2.29$ vs. 0.891, $z = 4.83$ in columns (1) and (2); 0.003, $z = 0.06$ vs. 0.427, $z = 3.63$ in columns (3) and (4)). Seemingly unrelated estimation (SUE) tests show that the differences between the coefficients for the two subsamples are statistically significant.

Given that higher growth opportunities would further increase demand for capital, one expects that treatment peer firms with high growth opportunities have stronger incentives to provide

management forecasts to compete for capital. Therefore, we also stratify the full sample into two subsamples based on the market-to-book ratio of industry peers, which we use as a proxy for growth opportunities. Then, we re-estimate Eq. (3) using each subsample and report the estimated results in Panel B, Table 9. Consistent with our prediction, the high institutional ownership of the Russell 2000 index firms has a more significant spillover effect in driving their corresponding peer firms with higher growth opportunities (i.e., higher market-to-book ratios) to issue management forecasts (0.196, z = 2.45 vs. 0.503, z = 3.44 in columns (1) and (2); 0.057, z = 1.12 vs. 0.227, z = 2.72 in columns (3) and (4)). The differences in the coefficients are also statistically significant.

Alternative Channels: Herding Effect and Common Institutional Ownership

We argue that peer firms respond to the improved information environment of the top Russell 2000 index firms in the same industry due to their incentive to compete for capital. Peer pressure could also be exerted through other channels. One possible channel could be the herding effect. The sociology, psychology and economic literature has long observed that people tend to converge toward similar behaviors or mimic each other's behaviors (Asch 1952; Merton 1957; Granovetter 1978; Diamond and Dybvig 1983; Scharfstein and Stein 1990; Banerjee 1992; Rajan 1994; Trueman 1994; Hong, Kubik, and Solomon 2000; Hirshleifer and Teoh 2003; Sias 2004). When the top Russell 2000 index firms increase voluntary disclosures to accommodate the demands of institutional investors for information transparency, managers of peer firms may have to mimic or converge to this behavior. The herding effect and incentives to compete for capital need not be mutually exclusive. Mimicking peers' forecasting behaviors can also lead to enhanced access to capital, due to improved information transparency. Our test here merely seeks to show whether the herding effect can explain away the treatment effect on peer firms' management forecasts.

To this end, we control for the frequency of the Russell index firms' management forecasts (*Frequency_ru*) in Eq. (3) following annual index reconstitution and report the estimated results in columns (2) and (5) of Table 10. It shows that the management forecasting behaviors of Russell index firms affect the forecasting behaviors of their industry peers. This is consistent with the notion that herding effect is one possible channel (e.g., Seo 2017). However, including the management forecasting behaviors of Russell index firms does not significantly change the magnitude of the treatment effect. For example, the marginal effect of *Treatment* on the probability of providing management forecasts decreases only from 5.62 percent to 5.18 percent (i.e., the coefficient changes from 0.304 to 0.279) based on column (2). This result suggests that herding is unlikely to be the primary reason why the treatment peer firms (peer firms of the top Russell 2000 index firms) increase their management forecasts.

The peer effect can also be disseminated through common institutional ownership. Cross-holding investors can serve as conduits between peer firms to spread corporate disclosure policies (Massa and Zaldokas 2017). Jung (2013) finds that a firm's decision to follow a first mover in providing more quantitative disclosures is positively associated with an increase in cross-holdings. In this respect, we expect peer pressure to be reinforced by common institutional ownership. Since the increase in institutional ownership of the top Russell 2000 index firms could result in an increase in cross-holding behavior, it could also lead to an increase in the corresponding peer firms' management disclosures. We follow Jung (2013) to construct a common ownership variable (*Common holding*) based on quasi-indexer holdings. The results reported in columns (3) and (6) of Table 10 show that common ownership is positively associated with the management forecasts of peer firms, which is consistent with Jung (2013). However, we find that the economic magnitude

of the treatment effect is not reduced by common ownership. In this regard, common ownership is unlikely to be the first-order factor that drives the peer effect.

One caveat is that the potential mechanisms could be multiple, given the complex nature of peer effects (Manski 1993). In this regard, we do not claim to have fully explored or provided convincing evidence to support or rule out these mechanisms. Nevertheless, our empirical results appear to suggest that competing for capital can be an important force leading to the increase in the management forecasts of peer firms.

Other Disclosures

We mainly focus on management forecasts as a strategic action taken by managers to improve firms' information environment. However, whether overall information environment improves with increase in management forecasts depends on whether different types of accounting information are complements or substitutes. If the increase in management forecasts substitutes for other accounting information, the net effect on the overall information environment will be uncertain. Prior studies mostly support a complementary relationship between different types of accounting information (Beyer et al. 2010). For example, Ball et al. (2012) show that audited financial reports and voluntary disclosure are complements.[18] Specifically, the authors show that the quality of mandatory reporting lends credibility to voluntary disclosure and, as a result, increases investors' demand for voluntary disclosures. Boone and White (2015) show an increase in both management forecasts and voluntary 8-K filings for firms in the top of the Russell 2000 index following annual index reconstitution. To shed more light on the peer firms' efforts to improve their information environment, in this section, we examine the peer firms' earnings quality and other voluntary news from management. The results reported in Table 11 show that

[18] Many other studies argue for and show a complementary relation between voluntary and mandatory disclosures (e.g., McNichols and Trueman 1994; Gigler and Hemmer 1998; Stocken 2000).

both earnings quality measured by performance-matched discretionary accruals (Kothari, Leone, and Wasley 2005) and the amount of other voluntary management disclosures increase for peers firms in the same industry with the top Russell 2000 firms.[19] The increase in earnings quality can lend credibility to the management forecasts issued by peer firms, enhancing the effectiveness of management forecasts as a strategy to improve the information environment.

We must admit that outsiders demand accounting information for different reasons. Information demanded for valuation purposes is likely to differ from that demanded for evaluating managerial stewardship. The former requires information about firm value, which is a combined effect of management effort and luck, while the latter requires information that allows investors to evaluate managers' efforts only (e.g., Gjesdal 1981; Beyer et al. 2010). Therefore, managers may act strategically in making their disclosure choices and do not always intend to make more disclosures. Even if we restrict our attention to information related to raising capital, information intended by equity investors may not be useful to creditors (Sharpe 1990; Boot 2000). Furthermore, disclosure can reduce welfare if it destroys risk-sharing opportunities (Beyer et al. 2010). However, generally, prior studies have provided ample evidence that corporate disclosures reduce information asymmetries and, in turn, increase a firm's stock liquidity (e.g., Diamond and Verrecchia 1991; Kim and Verrecchia 1994; Easley and O'Hara 2004). We thus argue that the industry peers of the top Russell 2000 index firms increase their management forecasts or other disclosure to improve their information environment and stock liquidity as a response to the improved information environment of those top Russell 2000 index firms. [20]

[19] We follow Edmans, Goncalves-Pinto, Wang, and Xu (2014) to measure the amount of other voluntary news using data from the Capital IQ Key Developments database.

[20] It is worth mentioning that disclosure also has proprietary cost. Disclosure can harm a disclosing firm if its competitors on the product market make strategic use of the information to their advantage (Darrough 1993). When firms increase their disclosures as a response to peer pressure, it may not necessarily improve overall welfare on the product market. Darrough (1993) shows that whether firms benefit by hiding or sharing information depends on the nature of competition and private information. Thus, we only focus on the implication of peer induced disclosure on

V. CONCLUSION

In this study, we use the discontinuity in the institutional ownership of firms around the Russell 1000/2000 threshold as a quasi-random experiment to identify peer influence on firms' voluntary disclosures. We argue that, since the discontinuously higher institutional ownership results in a better information environment for those top Russell 2000 index firms, it creates pressure on peer firms in the same industry to take actions to improve their own information environment. We focus on voluntary management disclosures in the form of management forecasts as an effective strategic move that peer firms can make to improve their information environment. We find robust results, where the discontinuously higher institutional ownership of the top Russell 2000 index firms near the threshold leads to a significant increase in the likelihood and frequency of management forecast issuance by their peer firms in the same industry. Further analyses show that the incentive for peer firms to compete for capital can at least partially explain the increase in their management forecasts.

Our findings have important implications for the presence of externalities in corporate practices and policies. Through peer influence, the effect of beneficial or harmful practices can be augmented in the economy. Therefore, when regulators and policy makers consider the potential benefits and costs of new regulations, they should not ignore interactions among firms and how common corporate practices spread through the economy.

a firm's information and trading environments. The product market implication of such peer induced disclosure is beyond the scope of this study and may be explored by future studies.

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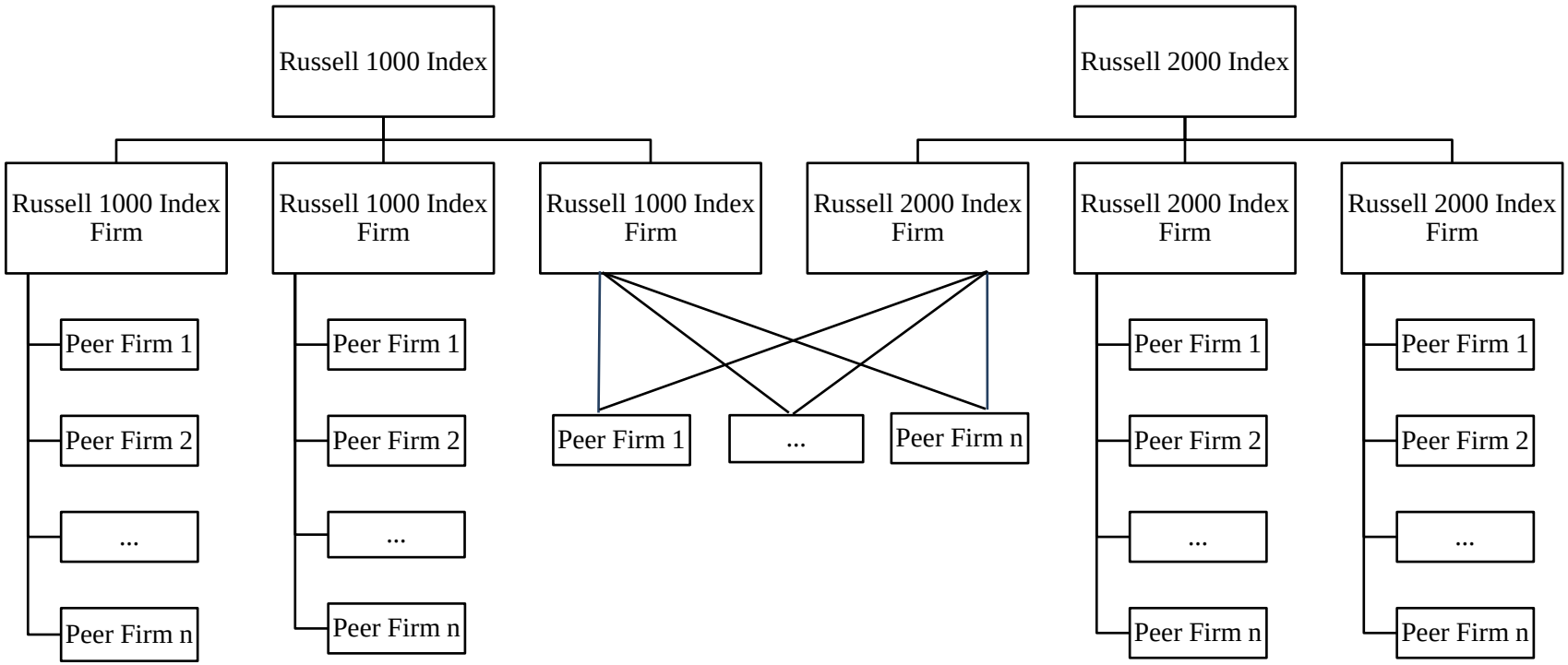
Appendix A. Sample Construction Procedure



Appendix B. Variable Definitions

Management forecast variables	
Guidance	An indicator variable equal to one if the firm provides annual or quarterly forecasts from July through May subsequent to the index reconstitution, and zero otherwise.
Frequency	The number of annual or quarterly forecasts from July through May subsequent to the index reconstitution.
Test variable	
Treatment	An indicator variable that equals one for corresponding industry peers of the Russell 2000 index treatment firms and zero for the corresponding industry peers of the Russell 1000 index control firms in a particular year.
Control Variables	
Peer Firms' Characteristics	
Lsize_peer	The natural logarithm of market capitalization of peer firms, which is measured by the market value of equity prior to index reconstitution.
Earn_vol_peer	Earnings volatility of peer firms, calculated as the standard deviation of ROA over the past five years prior to index reconstitution.
Ret_vol_peer	Return volatility of peer firms, calculated as the standard deviation of monthly returns over the past five years prior to index reconstitution.
N_analyst_peer	Analyst following of peer firms, calculated as the natural logarithm of one plus the number of analysts following the peer firm in the year prior to index reconstitution.
Rnd_peer	R&D expenditures of peer firms scaled by the lagged total asset at the fiscal year-end prior to index reconstitution.
Issuance_peer	Equity or debt issuance of peer firms, which is an indicator variable that takes the value of one if a firm has any seasoned equity offering or long-term debt issuance in the year prior to the index reconstitution.
Indsize	The industry size of peer firms, calculated as the natural logarithm of the total market capitalization of the industry, which is measured by the total market value of equity of the whole industry prior to index reconstitution.
Russell index Firm's Characteristics	
Absrank	The absolute value of the distance to Russell 1000 exclusion/inclusion threshold.
Lsize_ru	The natural logarithm of market capitalization of the Russell index firms.
Earn_vol_ru	Earnings volatility of Russell index firms.
Ret_vol_ru	Return volatility of Russell index firms.
N_analyst_ru	Analyst following of Russell index firms.
Rnd_ru	Research and development activities of Russell index firms.
Issuance_ru	Equity or debt issuance of Russell index firms.

Table 1. Sample Selection

The table presents the sample selection procedure.

		Total	Treatment	Control
Russell index firms		**1,800**	**900 (100×9)**	**900(100×9)**
less	Missing SIC code in Compustat	(71)	(36)	(35)
	Treatment and control Russell index firms in the same industry	(640)	(343)	(297)
	No peer firms identified based on SIC code	(3)	(2)	(1)
Number of Russell index firms		***1,086***	***519***	***567***
Corresponding peer firms		**59,368**	**33,317**	**26,051**
less	Missing data in calculating control variables	(39,420)	(20,577)	(18,843)
Number of peer firms		***19,948***	***12,740***	***7,208***
Russell index firms		***1,086***	***519***	***567***
less	No peer firms identified due to missing data	(252)	(69)	(183)
Number of Russell index firms		***834***	***450***	***384***

Table 2. Summary Statistics

The table presents the means and medians of selected financial data. The sample period is from 1998 to 2006. Panel A reports means and medians for Russell index firms around the Russell 1000/2000 threshold. Panel B reports means and medians for their peer firms. In Panel B, the duplicated peer firm years are eliminated. We conduct *t*-tests to test for differences between the means. The difference-in-means *t*-tests assume unequal variance across groups when a test of equal variance is rejected at the 10 percent level. We use the Wilcoxon Rank Sum Test to test for differences between the medians. See Appendix B for all variable definitions. Variables are winsorized at the 1 percent level in both tails. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel A: Russell Index Firms

	Control (Russell 1000) firms			Treatment (Russell 2000) firms		
	N	Mean	Median	N	Mean	Median
LSize_ru	384	7.415	7.441	450	7.245***	7.244***
Earn_vol_ru	384	0.077	0.040	450	0.073	0.047
Ret_vol_ru	384	0.122	0.112	450	0.131**	0.121*
N_analyst_ru	384	1.832	2.197	450	1.861	2.079
Rnd_ru	384	0.009	0.000	450	0.033***	0.000***
Issuance_ru	384	0.911	1.000	450	0.942*	1.000*
Indsize	384	10.056	9.99	450	10.294**	10.211**

Panel B: Peer Firms

	Control (Russell 1000) peer firms			Treatment (Russell 2000) peer firms		
	N	Mean	Median	N	Mean	Median
LSize_peer	5,095	5.445	5.332	7,153	5.493	5.406
Earn_vol_peer	5,095	0.150	0.061	7,153	0.163**	0.060
Ret_vol_peer	5,095	0.166	0.138	7,153	0.168	0.143
N_analyst_peer	5,095	1.180	1.099	7,153	1.242***	1.099***
Rnd_peer	5,095	0.025	0.000	7,153	0.072***	0.000***
Issuance_peer	5,095	0.862	1.000	7,153	0.822***	1.000***

Table 3. Main Regressions

The sample period is from 1998 to 2006. Management forecast is proxied by *Guidance* or *Frequency*. *Guidance* is an indicator variable equal to one if the peer firm provides annual or quarterly forecasts from July through May following the index reconstitution, and zero otherwise. *Frequency* is the number of annual or quarterly forecasts issued from July through May following the index reconstitution. The test results are from estimating Eq. (3). See Appendix B for all variable definitions. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Guidance			Frequency		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	**0.326*** **	**0.347*** **	**0.304*** **	**0.127** **	**0.126*** **	**0.111*** **
	(5.33)	**(5.12)**	**(4.45)**	**(2.48)**	**(3.05)**	**(2.62)**
Indsize		-0.045	-0.061*		-0.081***	-0.084***
		(-1.30)	(-1.72)		(-3.50)	(-3.55)
LSize_peer		0.048*	0.048*		0.048**	0.048**
		(1.68)	(1.68)		(2.52)	(2.49)
Earn_vol_peer		-0.254**	-0.240**		-0.175**	-0.177**
		(-2.16)	(-2.04)		(-2.03)	(-2.07)
Ret_vol_peer		-0.761	-0.744		-1.046**	-1.020**
		(-1.51)	(-1.46)		(-2.56)	(-2.49)
N_analyst_peer		1.223***	1.223***		0.785***	0.785***
		(25.32)	(25.32)		(22.47)	(22.44)
Rnd_peer		-1.791***	-1.906***		-1.131***	-1.116***
		(-4.52)	(-4.76)		(-3.52)	(-3.47)
Issuance_peer		0.366***	0.404***		0.333***	0.358***
		(2.92)	(3.12)		(3.83)	(4.00)
Absrank			-0.000			-0.000
			(-0.14)			(-0.04)
LSize_ru			-0.133			-0.088
			(-1.58)			(-1.24)
Earn_vol_ru			-0.062			0.113
			(-0.29)			(0.87)
Ret_vol_ru			0.067			-0.178
			(0.11)			(-0.44)
N_analyst_ru			-0.002			0.005
			(-0.10)			(0.35)
Rnd_ru			0.834**			-0.048
			(2.29)			(-0.20)
Issuance_ru			-0.264***			-0.125**
			(-2.90)			(-2.43)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,941	19,941	19,941	19,948	19,948	19,948
Pseudo R^2	0.085	0.306	0.307	0.148	0.354	0.354

Difference in the coefficients on *Treatment*				
	(1) vs. (2)	(1) vs. (3)	(4) vs. (5)	(4) vs. (6)
	chi^2 =0.23	*chi^2 = 0.25*	*chi^2= 0.00*	*chi^2= 0.2*
	P = 0.63	*P = 0.62*	*P = 0.97*	*P = 0.65*

Table 4. Different Institutional Investor Types

The table presents regressions of peer firm management forecast on Russell index firms' institutional ownership. *Io_ded_ru* is the ownership of dedicated institutional investors. *Io_quasi_ru* is the ownership of quasi-indexers. *Io_tra_ru* is the ownership of transient institutional investors. Institutional ownership is measured as total shares owned by the institutional investors over total number of shares outstanding at the end of September following the June reconstitution of Russell index. The sample period is from 1998 to 2006. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Guidance	Frequency
	(1)	(2)
Io_ded_ru	**-0.014**	**-0.104**
	(-0.10)	**(-0.89)**
Io_quasi_ru	**0.517*** **	**0.208** **
	(3.45)	**(2.47)**
Io_tra_ru	**0.532*** **	**0.132**
	(2.65)	**(1.18)**
Other Controls	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	19,941	19,948
Pseudo R^2	0.306	0.354

Table 5. IV Analysis

This panel presents the two-stage least squares (2SLS) regression using the indicator of the top of Russell 2000 index firm as an instrument for the quasi-indexer institutional ownership. The first stage estimates *Io_quasi* as a function of the indicator of the top of Russell 2000 index firm as in Eq. (4). *Io_quasi* is the quasi-indexer ownership of Russell index firms. *Float control* is the natural logarithm of the float-adjusted market capitalization at the end of June (provided by RIC). The second stage presents estimations of Eq. (5) using instrumented quasi-indexer ownership as test variables. The sample period is from 1998 to 2006. The control variables in Eqs. (4) and (5) are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. In columns (1), (2) and (3), we use OLS regressions. The t-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	First Stage	Second Stage	
	Io_quasi	Guidance	Frequency
	(1)	(2)	(3)
Treatment (IV)	**0.053*** **		
	(14.52)		
Instrumented io_quasi		**0.483****	**0.700*** **
		(2.26)	**(2.02)**
Float control	Yes	Yes	Yes
Other controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	19,948	19,948	19,948
Adjusted R^2	0.735	0.330	0.358

Table 6. Other Robustness Tests

Panel A: Include higher order distance

This panel presents estimations of Eq. (3), including higher order polynomials of the distance-to-threshold as control variables. The sample period is from 1998 to 2006. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Guidance	Frequency
	(1)	(2)
Treatment	**0.302*** **	**0.110*** **
	(4.44)	**(2.62)**
Higher Order Polynomials of Absrank	Yes	Yes
Other Controls	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	19,941	19,948
Pseudo R^2	0.307	0.354

Panel B: Alternative bandwidth

This panel presents estimations of Eq. (3) using two alternative bandwidths. The sample period is from 1998 to 2006. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	[-50,+50]		[-150,+150]	
	Guidance	Frequency	Guidance	Frequency
	(1)	(2)	(3)	(4)
Treatment	**0.496*** **	**0.290*** **	**0.204*** **	**0.117*** **
	(5.18)	**(3.91)**	**(2.98)**	**(2.71)**
Other Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	15,684	15,689	17,783	17,786
Pseudo R^2	0.298	0.342	0.319	0.382

Panel C: Non-duplicate sample

This panel presents estimations of Eq. (3) using a non-duplicate peer firm sample. The sample period is from 1998 to 2006. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Guidance	Frequency
	(1)	(2)
Treatment	**0.264*** **	**0.087** **
	(4.17)	**(2.25)**
Other Controls	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	12,241	12,248
Pseudo R^2	0.302	0.357

Panel D: PSM procedure

This panel presents the descriptive statistics of selected variables of peer firms between the treatment and matched control groups and results of the second-stage regression of Eq. (3) using the PSM matched sample. The sample period is from 1998 to 2006. We conduct *t*-tests to test for differences between the means. The difference-in-means *t*-tests assume unequal variance across groups when a test of equal variance is rejected at the 10 percent level. We use the Wilcoxon Rank Sum Test to test for differences between the medians. See Appendix B for all variable definitions. Variables are winsorized at the 1 percent level in both tails. The t-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Balance check:

	Control (Russell 1000) peer firms			Treatment (Russell 2000) peer firms		
	N	Mean	Median	N	Mean	Median
Indsize	1,167	10.574	10.325	1,167	10.571	10.479
LSize_peer	1,167	5.532	5.536	1,167	5.453	5.420
Earn_vol_peer	1,167	0.150	0.069	1,167	0.150	0.068
Ret_vol_peer	1,167	0.179	0.154	1,167	0.176	0.157
N_analyst_peer	1,167	1.262	1.386	1,167	1.240	1.386
Rnd_peer	1,167	0.050	0.000	1,167	0.051	0.000
Issuance_peer	1,167	0.894	1.000	1,167	0.893	1.000

Second stage regressions:

	Guidance	Frequency
	(1)	(2)
Treatment	**0.041***	**0.069****
	(1.84)	**(2.03)**
Other Controls	Yes	Yes
Industry FE	Yes	Yes
Group FE	Yes	Yes
Observations	2,334	2,334
Adjusted R^2	0.275	0.310

Panel E: Falsification tests using pseudo cutoff points

This panel presents estimations of Eq. (3) using firms ranked by 500th and 1500th as the cutoff point, respectively. The sample period is from 1998 to 2006. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	500^{th} rank as the cutoff point		1500^{th} rank as the cutoff point	
	Guidance	Frequency	Guidance	Frequency
	(1)	(2)	(3)	(4)
Treatment	**0.061**	**0.080**	**-0.004**	**-0.021**
	(0.67)	**(1.38)**	**(-0.04)**	**(-0.35)**
Other Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	15402	15402	13897	13897
Pseudo R^2	0.280	0.337	0.312	0.377

Table 7. Changes Regressions

The table presents the estimated results of the changes regressions. Δ*Treatment*, Δ*Guidance* and Δ*Frequency* are measured by their respective changes in the year following index reconstitution compared to the year prior to index reconstitution, which we define as July through May in each period. *Switch to Ru2000* equals one if Δ*Treatment* is positive and zero otherwise. *Switch to Ru1000* equals one if Δ*Treatment* is negative and zero otherwise. *New Treatment* equals one if a firm is the industry peer of a Russell 2000 index treatment firm in the current year, but not in any of the past three years and zero otherwise. *Subsequent Treatment* equals one if a firm has been the industry peer of a Russell 2000 index treatment firm in any of the past three years and the current year, and zero otherwise. The sample period is from 1998 to 2006. The changes in control variables are abbreviated for brevity. Variables are winsorized at the 1 percent level in both tails. We use OLS regressions. The t-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Δ*Guidance*	Δ*Frequency*	Δ*Guidance*	Δ*Frequency*	Δ*Guidance*	Δ*Frequency*
	(1)	(2)	(3)	(4)	(5)	(6)
Δ*Treatment*	**0.027***	**0.074***				
	(1.69)	**(1.78)**				
Switch to Ru2000			**0.037***	**0.129****		
			(2.03)	**(2.21)**		
Switch to Ru1000			**0.001**	**-0.026**		
			(0.07)	**(-0.43)**		
New Treatment					**0.069***	**0.223***
					(1.71)	**(2.19)**
Subsequent Treatment					**0.005**	**0.058**
					(0.27)	**(0.76)**
Changes of other controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,804	3,804	3,804	3,804	1,260	1,260
Adjusted R^2	0.017	0.025	0.018	0.025	0.010	0.013

Table 8. Channel Tests: Control for Liquidity

This table presents the estimated results of Eq. (3) after controlling for Russell firms' stock liquidity. *Spread_ru* is the closing ask price less the closing bid price divided by the midpoint of the closing ask and bid prices of Russell index firms from July through May following index reconstitution. *Amihud_ru* is the logarithm of the average ratio of the absolute return to the dollar volume of trading of Russell index firms from July through May following index reconstitution. *Dollarvol_ru* is the logarithm of the average daily trading volume multiplied by the closing price of Russell index firms from July through May following index reconstitution. The sample period is from 1998 to 2006. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Guidance				Frequency			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	**0.304*** **	**0.262*** **	**0.252*** **	**0.234*** **	**0.111*** **	**0.065**	**0.064**	**0.058**
	(4.45)	**(3.64)**	**(3.57)**	**(3.31)**	**(2.62)**	**(1.43)**	**(1.43)**	**(1.30)**
Spread_ru		**-12.197*** **				**-7.380** **		
		(-2.89)				**(-2.58)**		
Amihud_ru			**-0.139*** **				**-0.053***	
			(-2.88)				**(-1.73)**	
Dollarvol_ru				**0.185*** **				**0.063** **
				(4.69)				**(2.43)**
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19941	19581	19745	19740	19948	19588	19752	19747
Pseudo R^2	0.307	0.308	0.308	0.308	0.354	0.361	0.361	0.361

Table 9. Subsample Analyses

This table presents the subsample analyses. Panel A presents the estimated results of Eq. (3) for the subsamples partitioned based on peer firms' RZ ratio and Panel B for the subsamples partitioned based on peer firms' market-to-book ratio. The *RZ ratio* is the industry median of firms' intrinsic demand for external financing for capital investment, measured as the ratio of total capital expenditures plus research and development expense in excess of cash flows over total capital expenditures plus research and development expense. The market-to-book ratio equals the market value of equity divided by the book value of equity. The sample period is from 1998 to 2006. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel A: RZ ratio

	Guidance		Frequency	
	(1)	(2)	(3)	(4)
	Low RZ	High RZ	Low RZ	High RZ
Treatment	**0.183****	**0.891*****	**0.003**	**0.427*****
	(2.29)	**(4.83)**	**(0.06)**	**(3.63)**
Other Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	15,862	3,058	15,869	3,088
Pseudo R^2	0.309	0.302	0.358	0.355
Subsample Differences:				
	chi^2 = 13.12		*chi^2 = 13.88*	
	P = 0.0003		*P = 0.0002*	

Panel B: Market to book ratio

	Guidance		Frequency	
	(1)	(2)	(3)	(4)
	Low MTB	High MTB	Low MTB	High MTB
Treatment	**0.196****	**0.503*****	**0.057**	**0.227*****
	(2.45)	**(3.44)**	**(1.12)**	**(2.72)**
Other Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	15,915	3,950	15,920	3,976
Pseudo R^2	0.308	0.324	0.365	0.340
Subsample Differences:				
	chi^2 = 6.61		*chi^2 = 7.01*	
	P = 0.0102		*P = 0.0081*	

Table 10. Channel Tests: Herding Effect and Common Ownership

This table presents the estimated results of Eq. (3) after controlling for Russell firms' management forecasts and common ownership. *Frequency_ru* is the number of annual or quarterly forecasts of Russell index firms from July through May following the index reconstitution. *Common holding* is the number of common holding quasi-indexer institutional investors scaled by the total number of institutional investors. The sample period is from 1998 to 2006. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use logit regression for *Guidance* and Poisson regression for *Frequency*. The z-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Guidance			Frequency		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	**0.304*** **	**0.279*** **	**0.287*** **	**0.111*** **	**0.093** **	**0.095** **
	(4.45)	**(4.09)**	**(4.21)**	**(2.62)**	**(2.19)**	**(2.25)**
Frequency_ru		**0.034*** **			**0.015*** **	
		(4.80)			**(4.11)**	
Common holding			**0.554*** **			**0.592*** **
			(3.07)			**(4.12)**
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,941	19,941	19,941	19,948	19,948	19,948
Pseudo R^2	0.307	0.308	0.308	0.354	0.355	0.356

Table 11. Other Disclosures

The table presents regressions of estimating peer firms' accrual quality and other voluntary disclosures on Russell index firms' institutional ownership. The sample period is from 1998 to 2006. *Earnings quality* is measured as the absolute value of performance-matched discretionary accruals (Kothari et al. 2005). *Other News* is the natural logarithm of one plus the number of news issued from July through May following the index reconstitution excluding mandatory reporting and management forecasts. The control variables are the same as those in column (3) of Table 3 and thus are abbreviated. Variables are winsorized at the 1 percent level in both tails. We use OLS regressions. The t-statistics reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Earnings Quality	*Other News*
	(1)	(1)
Treatment	**-0.009*** **	**0.049*** **
	(-3.12)	**(2.79)**
Other Controls	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	13,840	19,948
Adjusted R^2	0.204	0.756

Figure 1. Institutional Ownership of Russell Index Firms Lying within the Narrow Band of [-100, 100]

This graph displays the distribution and fitted curves of institutional ownership of Russell index firms lying within the narrow band of [-100, 100]. The sample period is from 1998 to 2006. The x-axis represents the distance-to-threshold of the Russell index firms, whereas the y-axis represents the total institutional ownership (percentage), the ownership of quasi-indexers (percentage), the ownership of transient institutional investors (percentage) and the ownership of dedicated institutional investors (percentage) of the Russell index firms in Figures 1(a), 1(b), 1(c) and 1(d), respectively. Distance represents the relative position of a firm from the threshold zero, which represents the firm ranked 1000th based on its float-adjusted market capitalization within the Russell 1000 index at the end of June each year. The larger Russell 1000 firms are associated with negative values in distance-to-threshold, and the smaller Russell 2000 firms are associated with positive values. The fitted curves are based on quadratic polynomial regressions. The gray lines represent the 90 percent confidence intervals of the corresponding fitted curves.

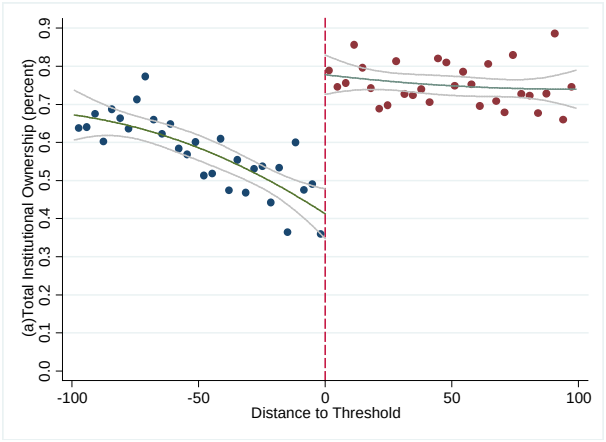


Figure 1(a)

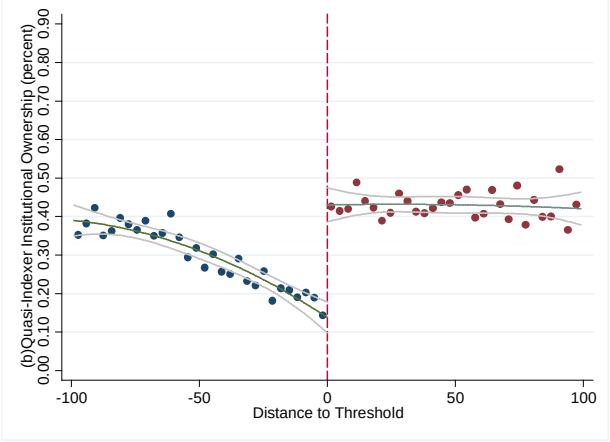


Figure 1(b)

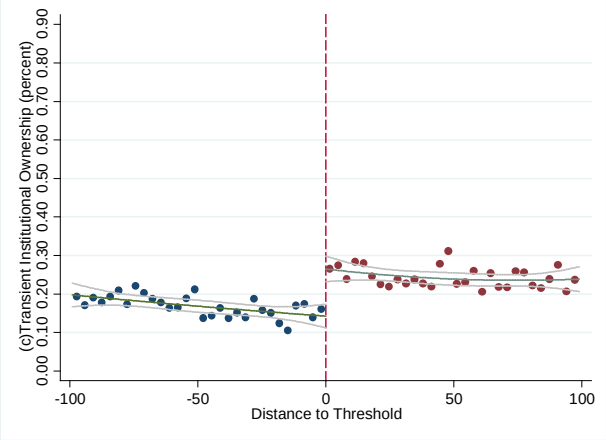


Figure 1(c)

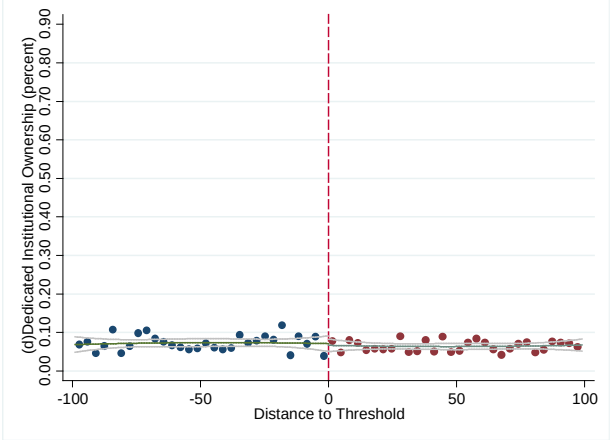


Figure 1(d)

Figure 2. Guidance and Frequency of Corresponding Peer Firms' Management Forecasts

This graph displays the distribution and fitted curves of *Guidance* and *Frequency* for the corresponding 19,948 industry peers of the Russell index firms lying within the narrow band of [-100, 100]. *Guidance* is an indicator variable equal to one if the peer firm provides annual or quarterly forecasts from July through May following the index reconstitution, and zero otherwise. *Frequency* is the number of annual or quarterly forecasts from July through May following the index reconstitution. The sample period is from 1998 to 2006. The x-axis represents the distance-to-threshold of the Russell index firms, whereas the y-axis represents the *Guidance* and *Frequency* of corresponding peers in Figures 2(a) and 2(b), respectively. Distance represents the relative position of a firm from the threshold zero, which represents the firm ranked 1000th based on its float-adjusted market capitalization within the Russell 1000 index at the end of June each year. The larger Russell 1000 firms are associated with negative values in distance-to-threshold, and the smaller Russell 2000 firms are associated with positive values. The fitted curves are based on quadratic polynomial regressions. The gray lines represent the 90 percent confidence intervals of the corresponding fitted curves.

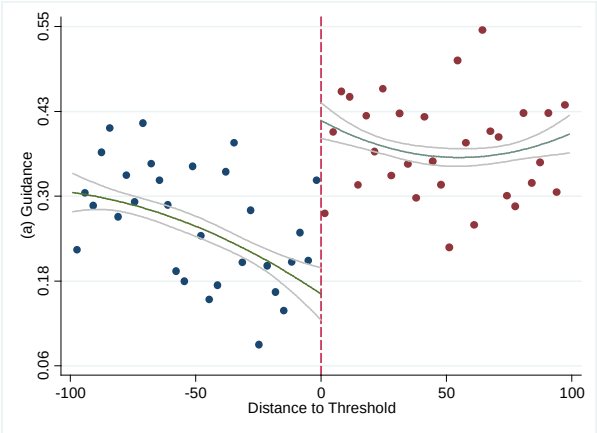


Figure 2(a)

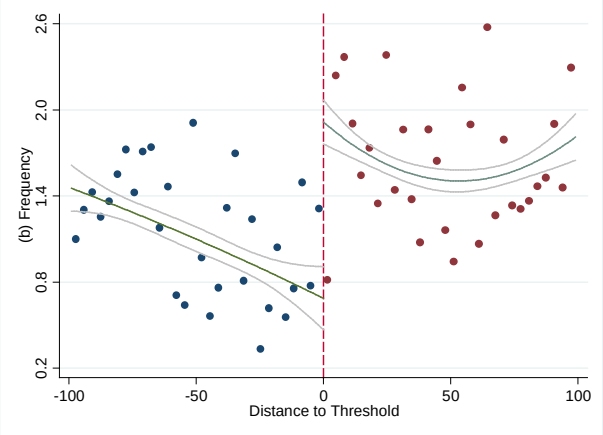


Figure 2(b)

Internet Appendix

"Institutional Ownership, Peer Pressure, and Voluntary Disclosures"

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This internet appendix provides supplementary figures and tables with discussions to the manuscript titled "Institutional Ownership, Peer Pressure, and Voluntary Disclosures." In particular, Section IA1 discusses Figure IA1 that plots the evolvement of the Russell index firms' market capitalization and index weights around the threshold of the Russell 1000/2000 index. Section IA2 graphically replicates the results of Boone and White (2015) using our sample. Section IA3 discusses Figure IA2 that plots the pre-assignment characteristics for the Russell index firms and their industry peers. Section IA4 discusses additional analyses on the management forecast quality of the industry peers of the Russell index firms. The results of the analyses are reported in Table IA1. Finally, Table IA2 presents the industry distribution of the Russell index firms and their peer firms.

IA1. Market Capitalization and Index Weights of the Russell Index Firms

We plot the market capitalization and index weights of the Russell index firms in Figure IA1. We define the threshold as the position of the stock ranked 1000th based on its float-adjusted market capitalization at the end of June each year (the stock with the lowest weight in the Russell 1000 index). The distance to threshold is defined as the relative position of a Russell index firm from that threshold according to its rank of float-adjusted market capitalization within its respective index. With respect to the distance to threshold, Russell 1000 index firms are associated with negative values (on the left of the threshold) and Russell 2000 index firms are associated with positive values (on the right of the threshold). We observe several important patterns. First, firms' market capitalizations evolve smoothly along the distance to the threshold (Figure IA1 (a)). Second, there is a discontinuity in the level of index weights around the threshold (Figure IA1 (b)). For example, the weight of the Russell 2000 index firm ranked 1st within the Russell 2000 index is significantly larger than that of the Russell 1000 index firm ranked 1000th within the Russell 1000 index, demonstrating a sharp jump in weights around the threshold.

IA2. Replication of Boone and White (2015)

In this section, we replicate the results of Boone and White (2015) regarding management forecasts and analyst following using our sample. We plot in Figure IA2, the likelihood and frequency of managerial forecasts and analyst following of the Russell 1000/2000 index firms lying within the narrow band [-100, +100]. Figures IA2 (a) and (b) show a significant increase in both management forecast likelihood and frequency around the threshold, moving from the Russell 1000 index firms on the left to the Russell 2000 index firms on the right. Figure IA2 (c)

shows a similar pattern for analyst following. The results are consistent with those of Boone and White (2015) that the significant increase in the quasi-indexer ownership of the top Russell 2000 index firms leads to an increase in public information supplied by both managers and analysts.

IA3. Pre-assignment Characteristics

As illustrated in Figure IA1 (a), Russell firms' market capitalizations evolve continuously across the Russell 1000/2000 index threshold. In Figure IA3, we plot the rest of the determinants that are shown in Table 2 (in the manuscript) to be significantly different between the treatment and control groups, to check their local continuity around the threshold. Figure IA3 shows that these determinants *do not* exhibit significant discontinuities around the Russell 1000/2000 index threshold even though they are significantly different between the treatment and control groups based on the mean values. [1]

IA4. Quality of Management Forecasts

Following the literature, we test the precision, horizons, and accuracy of the management forecasts (Feng et al. 2009; Boone and White 2015). To fully utilize the information in managerial forecasts, our estimations are based on individual forecasts made by the management. We define *Precision* as equal to zero if the forecast is a qualitative forecast, one if the forecast is an open-ended forecast, two if the forecast is a range forecast, and three if the forecast is a point forecast. The forecast horizon (*Horizon*) is measured as the number of calendar days between the quarterly (annual) management earnings forecast and the fiscal period-end divided by 90 (365). Following Zhang (2012), we measure forecast accuracy (*Accuracy*) as -1 times the absolute

[1] The RDD plots of the other determinants do not show any discontinuity around the threshold either. We do not include their figures for brevity.

value of the management forecast error, which is computed as the absolute value of the difference between actual earnings and the management forecast (point or mid-point of the range forecast) scaled by the average stock price one week before the management forecast announcement date.

The results of non-parametric estimations are shown in Figure IA4, wherein the x-axis represents the distance to threshold of the Russell index firms and the y-axis represents the precision, horizons, or accuracy of the managerial forecasts by *corresponding peer firms*. The overlaps in the 90 percent confidence intervals of the treatment and control samples around the threshold in Figures IA4 (a), IA4 (b) and IA4 (c) for precision, horizons, and accuracy, respectively, seem to suggest that treatment peer firms are not associated with greater precision, longer horizons, or more accurate management forecasts compared with control peer firms.

We further conduct parametric estimation of Eq. (3) (in the manuscript) using *Precision*, *Horizon* or *Accuracy* as the dependent variable and report the results in Table IA1. In these tests, we include an additional control variable (*Period*) to indicate whether the management forecast is for annual or quarterly earnings, because forecasts on annual or quarterly earnings can exhibit significantly different characteristics. We find that the high institutional ownership of Russell 2000 index firms significantly affects peer firms' forecast accuracy (0.004, t = 2.73). In contrast, we find no evidence that the high institutional ownership of Russell 2000 index firms increases peer firms' forecast precision or horizons (0.031, z = 0.34 in column (1); -0.033, t = -1.59 in column (2)). Together with the evidence from non-parametric estimation, we conclude that the overall effect of high institutional ownership on peer firms' managerial forecast quality is much weaker.

Figure IA1. Market Capitalization and Index Weights of Russell Index Firms

This graph displays the distributions of market capitalization, and index weights of Russell 1000/2000 firms. The sample period is from 1998 to 2006. The x-axis represents the distance-to-threshold of the Russell index firms, whereas the y-axis represents the market capitalization and index weight of the Russell index firms in Figures IA1 (a) and IA1 (b), respectively. Distance represents the relative position of a firm from the threshold zero, which represents the firm ranked 1000th based on its float-adjusted market capitalization within the Russell 1000 index at the end of June each year. The rankings are based on the float-adjusted market capitalization within each respective index at the end of June each year. The Russell 1000 firms are associated with negative values in distance-to-threshold, and the Russell 2000 firms are associated with positive values.

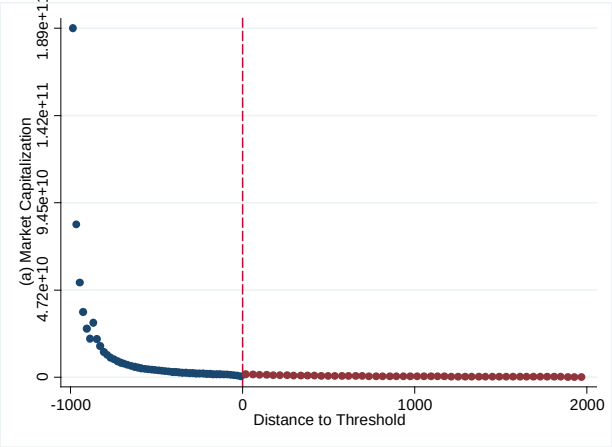

Figure IA1 (a)

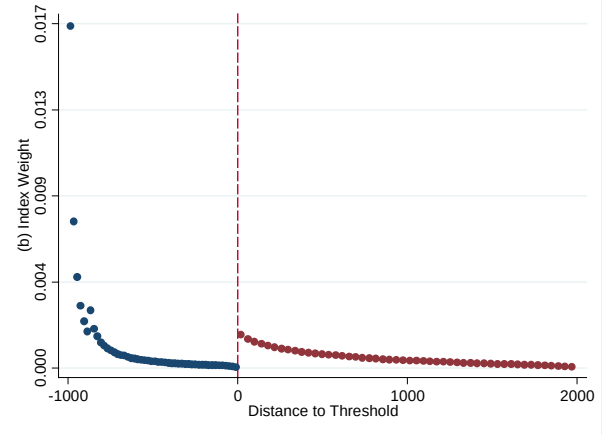

Figure IA1 (b)

Figure IA2. Guidance, Frequency and Analyst Following of Russell Index Firms Lying within the Narrow Band of [-100, 100]

This graph displays the distribution and fitted curves of *Guidance*, *Frequency* and *Analyst following* for the Russell index firms lying within the narrow band of [-100, 100]. *Guidance* is an indicator variable equal to one if the Russell index firm provides annual or quarterly forecasts from July through May following the index reconstitution, and zero otherwise. *Frequency* is the number of annual or quarterly forecasts from July through May following the index reconstitution. *Analyst following* is the natural logarithm of one plus the number of analysts following the Russell index firm in the year after the index reconstitution. The sample period is from 1998 to 2006. The x-axis represents the distance-to-threshold of the Russell index firms, whereas the y-axis represents the *Guidance*, *Frequency* and *analyst following* of the Russell index firms in Figures IA2 (a), IA2 (b) and IA2 (c), respectively. Distance represents the relative position of a firm from the threshold zero, which represents the firm ranked 1000th based on its float-adjusted market capitalization within the Russell 1000 index at the end of June each year. The larger Russell 1000 firms are associated with negative values in distance-to-threshold, and the smaller Russell 2000 firms are associated with positive values. The fitted curves are based on quadratic polynomial regressions. The gray lines represent the 90 percent confidence intervals of the corresponding fitted curves.

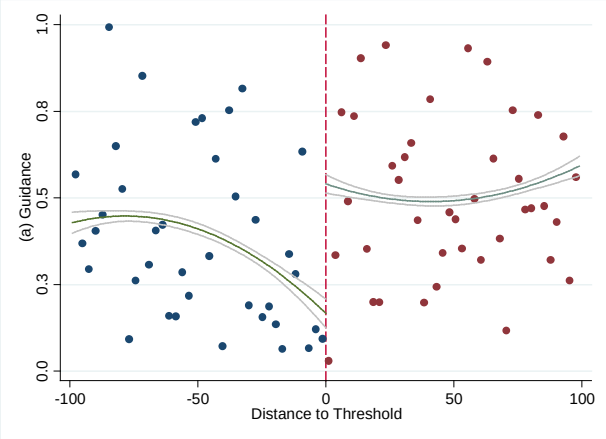

Figure IA2 (a)

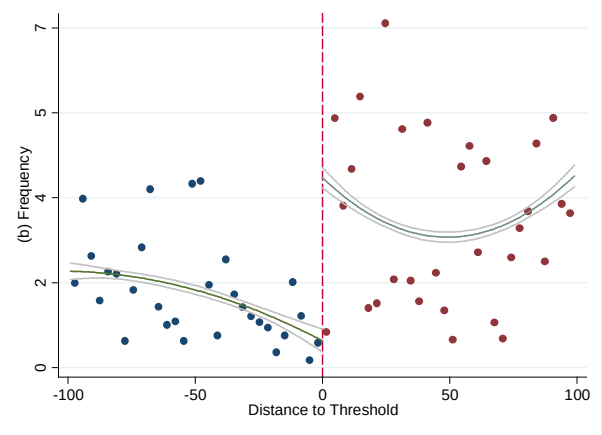

Figure IA2 (b)

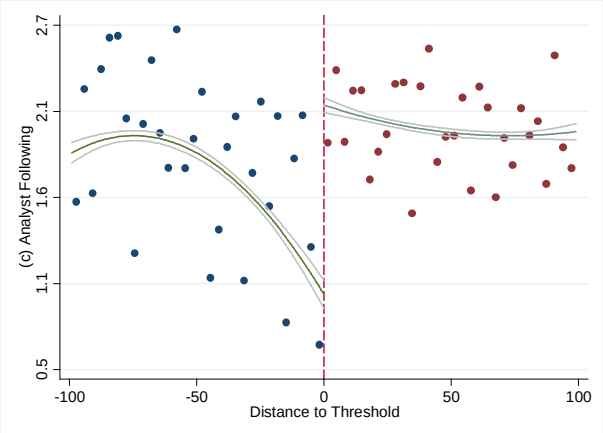

Figure IA2 (c)

Figure IA3. Pre-assignment Firm Characteristics

This graph displays the distribution and fitted curves of the pre-assignment characteristics for the Russell index firms lying within the narrow band of [-100, 100] and their corresponding peer firms. The sample period is from 1998 to 2006. The x-axis represents the distance-to-threshold of the Russell index firms, whereas the y-axis represents the pre-assignment characteristics of the Russell index firms and the corresponding peers. Distance represents the relative position of a firm from the threshold zero, which represents the firm ranked 1000th based on its float-adjusted market capitalization within the Russell 1000 index at the end of June each year. The larger Russell 1000 firms are associated with negative values in distance-to-threshold, and the smaller Russell 2000 firms are associated with positive values. The fitted curves are based on quadratic polynomial regressions. The gray lines represent the 90 percent confidence intervals of the corresponding fitted curves.

Characteristics of Russell index firms:

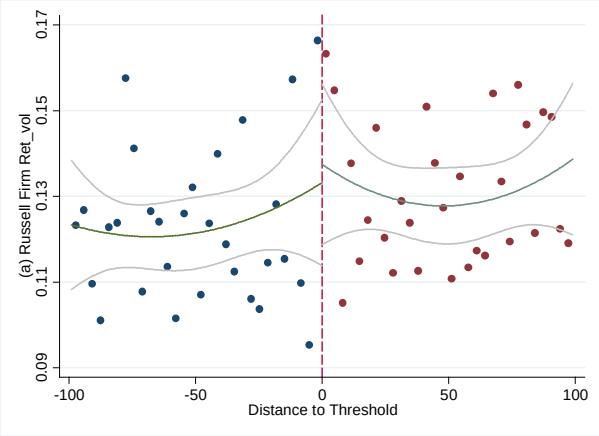

Figure IA3 (a)

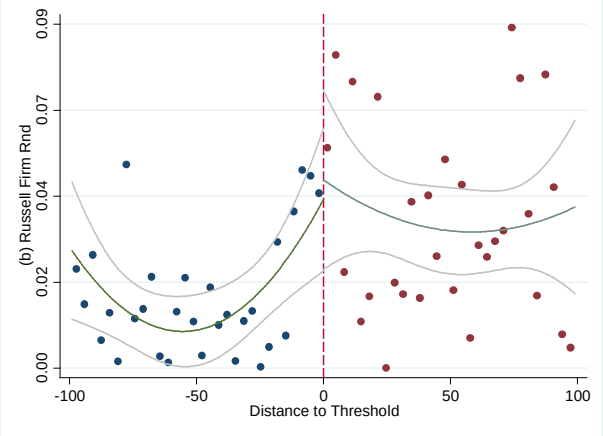

Figure IA3 (b)

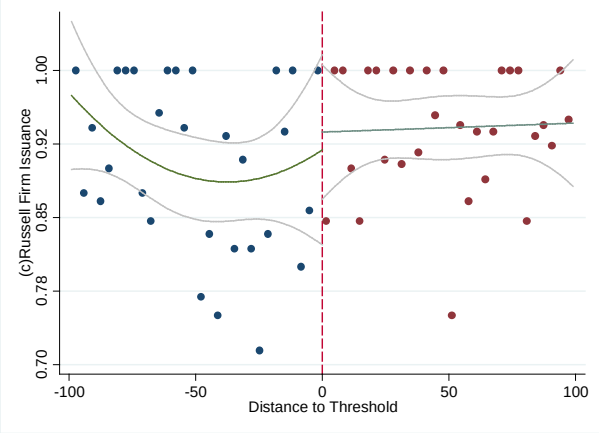

Figure IA3 (c)

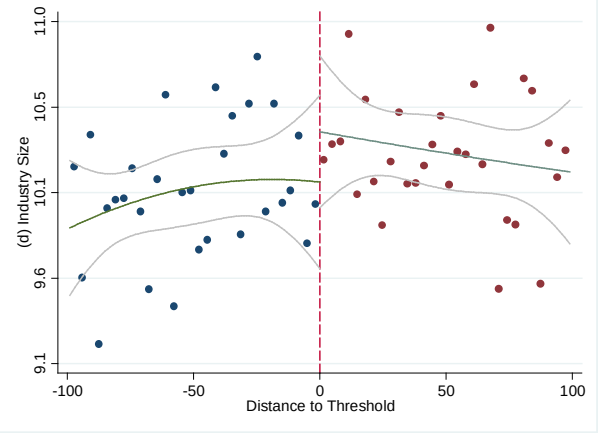

Figure IA3 (d)

Characteristics of peer firms:

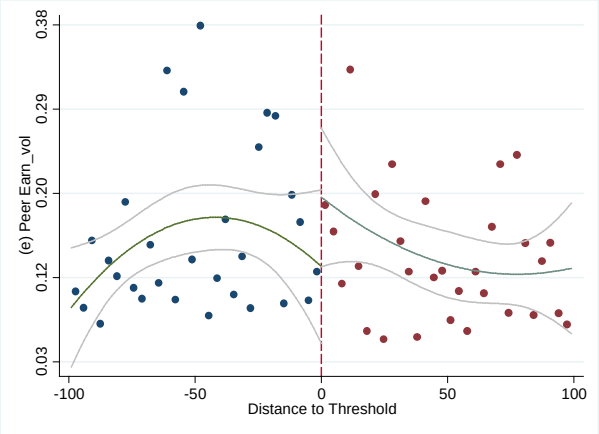

Figure IA3 (e)

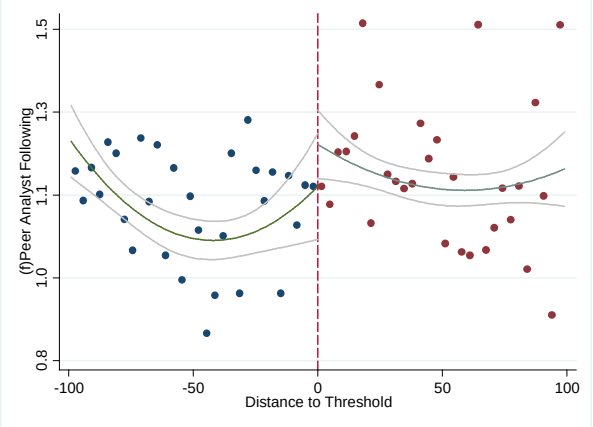

Figure IA3 (f)

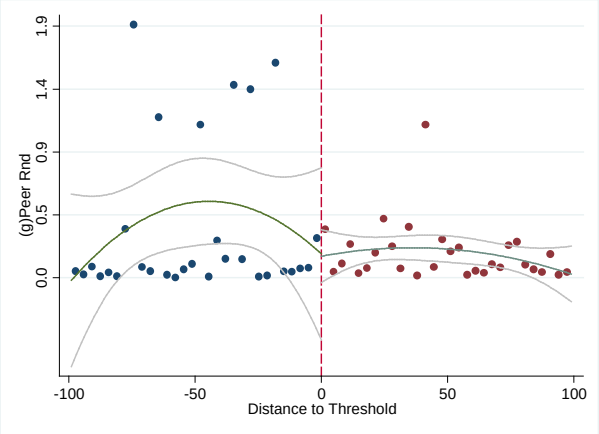

Figure IA3 (g)

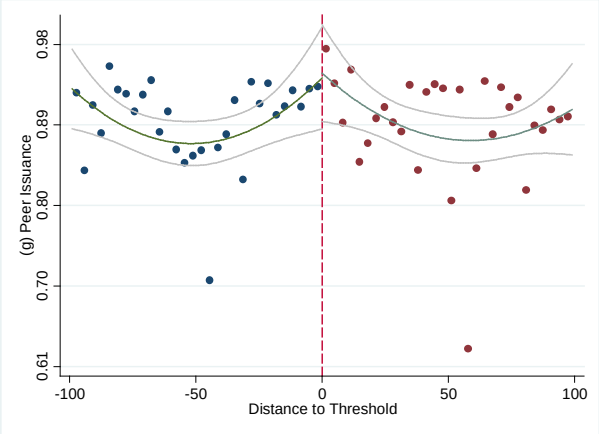

Figure IA3 (h)

Figure IA4. Precision, Horizon, and Accuracy of Corresponding Peer Firms' Management Forecasts

This graph displays the distribution and fitted curves of *Precision*, *Horizon* and *Accuracy* for the corresponding industry peers of the Russell index firms lying within the narrow band of [-100, 100]. *Precision* is a scale index based on the following earnings forecast types: qualitative = 0, open-ended = 1, range = 2, and point = 3. *Horizon* is measured as the number of calendar days between the quarterly (annual) management earnings forecast and the fiscal period-end divided by 90 (365). *Accuracy* is measured as -1*the absolute value of management forecast error, computed as the absolute value of the difference between actual earnings and management forecast (point or mid-point of the range forecast), scaled by the average stock price one week before the management forecast announcement date. The sample period is from 1998 to 2006. The x-axis represents the distance to the threshold of the Russell index firms, whereas the y-axis represents the *Precision*, *Horizon*, and *Accuracy* of corresponding peers in Figures IA4 (a), IA4 (b) and IA4 (c), respectively. Distance represents the relative position of a firm from the threshold zero, which represents the firm ranked 1000th based on its float-adjusted market capitalization within the Russell 1000 index at the end of June each year. The larger Russell 1000 firms are associated with negative values in distance-to-threshold, and the smaller Russell 2000 firms are associated with positive values. The fitted curves are based on quadratic polynomial regressions. The gray lines represent the 90 percent confidence intervals of the corresponding fitted curves.

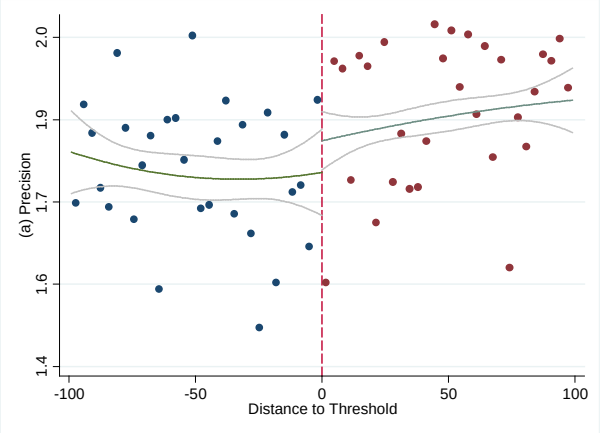

Figure IA4 (a)

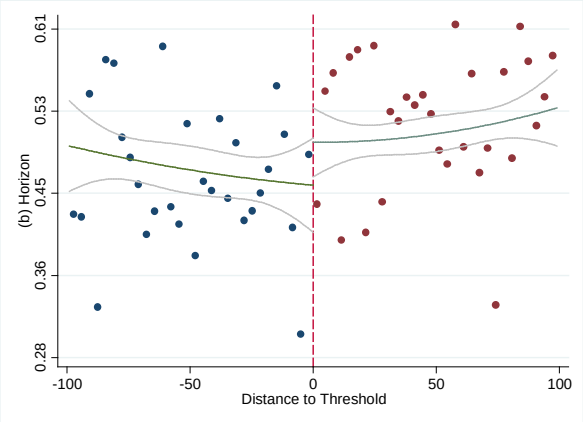

Figure IA4 (b)

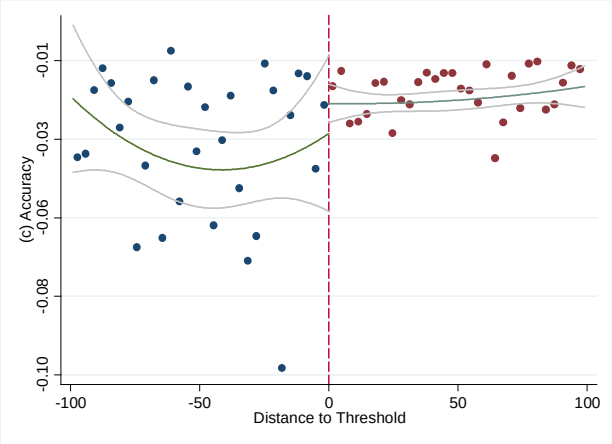

Figure IA4 (c)

Table IA1. Management Forecast Quality

The table presents regressions of peer firm management forecast quality on Russell index firms' institutional ownership. The sample period is from 1998 to 2006. Management forecast quality is proxied by *Precision, Horizon* or *Accuracy*. *Precision* is a scale index based on the following earnings forecast types: qualitative = 0, open-ended = 1, range = 2, and point = 3. *Horizon* is measured as the number of calendar days between the quarterly (annual) management earnings forecast and the fiscal period-end divided by 90 (365). *Accuracy* is measured as -1*the absolute value of management forecast error, computed as the absolute value of the difference between actual earnings and management forecast (point or mid-point of the range forecast), scaled by the average stock price one week before the management forecast announcement date. See Appendix B for all variable definitions. Variables are winsorized at the 1 percent level in both tails. We use order regression for *Precision* and OLS regression for *Horizon* and *Accuracy*. The t-statistics (or z-statistics) reported in parentheses are based on standard errors clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Precision	*Horizon*	*Accuracy*
	(1)	(2)	(3)
Treatment	**0.031**	**-0.033**	**0.004*** **
	(0.34)	**(-1.59)**	**(2.73)**
Period	-0.094	-0.020	-0.016***
	(-1.20)	(-0.83)	(-17.42)
Indsize	-0.058	-0.000	-0.001
	(-1.41)	(-0.05)	(-1.06)
Size_peer	0.071	0.014	0.003***
	(1.40)	(1.22)	(4.69)
Earn_vol_peer	0.032	0.052	0.004*
	(0.13)	(1.39)	(1.79)
Ret_vol_peer	0.178	0.004	-0.033***
	(0.21)	(0.02)	(-3.14)
N_analyst_peer	0.029	0.034*	-0.002*
	(0.28)	(1.80)	(-1.94)
Rnd_peer	0.636	-0.245	0.016*
	(0.73)	(-1.48)	(1.96)
Issuance_peer	0.279	0.040	0.001
	(1.25)	(0.76)	(0.32)
Size_ru	-0.154	-0.021	-0.002
	(-0.98)	(-0.83)	(-0.69)
Earn_vol_ru	-0.080	0.015	0.003*
	(-0.41)	(0.39)	(1.69)
Ret_vol_ru	0.743	-0.126	0.008
	(0.96)	(-0.77)	(0.81)
N_analyst_ru	-0.011	0.006	0.000
	(-0.42)	(1.18)	(0.53)
Rnd_ru	1.295**	0.114	0.011
	(2.26)	(0.88)	(0.83)
Issuance_ru	0.018	0.099***	-0.001
	(0.18)	(3.90)	(-0.85)
Absrank	-0.000	0.000	-0.000

	(-0.33)	(1.59)	(-0.54)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	29,238	29,238	26,999
Pseudo/Adjusted R^2	0.021	0.040	0.143

Table IA2. Industry Distribution of Treatment and Control Russell Index Firms and Their Peer Firms.

This table presents the industry distribution of treatment and control Russell index firms and their peer firms. We eliminate duplicate peer firms in each year. Panel A presents the industry distribution of treatment Russell index (Russell 2000) firms. Panel B presents the industry distribution of control Russell index (Russell 1000) firms. Panel C presents the industry distribution of treatment peer firms. Panel D presents the industry distribution of control peer firms.

Panel A: Treatment Russell Index Firms

Industry	Frequency	Percent	Cumulative percent
Agricultural Production-Crops	1	0.22	0.22
Air Courier Services	1	0.22	0.44
Air Transportation, Scheduled	6	1.33	1.78
Air-Cond & Warm Air Heatg Equip & Comm	3	0.67	2.44
Apparel & Other Finished Prods of Fabri	1	0.22	2.67
Arrangement of Transportation of Freigh	3	0.67	3.33
Bakery Products	1	0.22	3.56
Ball & Roller Bearings	1	0.22	3.78
Biological Products, (No Diagnostic Sub	10	2.22	6
Books: Publishing or Publishing & Print	3	0.67	6.67
Cable & Other Pay Television Services	1	0.22	6.89
Canned, Fruits, Veg, Preserves, Jams &	1	0.22	7.11
Chemicals & Allied Products	1	0.22	7.33
Co-generation Services & Small Power Pr	3	0.67	8
Commercial Banks	3	0.67	8.67
Computer Communications Equipment	5	1.11	9.78
Computer Storage Devices	1	0.22	10
Conglomerates (gv only)	3	0.67	10.67
Construction Machinery & Equip	1	0.22	10.89
Crude Petroleum & Natural Gas	1	0.22	11.11
Cutlery, Handtools & General Hardware	1	0.22	11.33
Dairy Products	2	0.44	11.78
Dental Equipment & Supplies	1	0.22	12
Drawing & Insulating of Nonferrous Wire	4	0.89	12.89
Drilling Oil & Gas Wells	2	0.44	13.33
Electric & Other Services Combined	14	3.11	16.44
Electric Housewares & Fans	1	0.22	16.67
Electric Lighting & Wiring Equipment	4	0.89	17.56
Electric Services	6	1.33	18.89
Electrical Industrial Apparatus	1	0.22	19.11

Electromedical & Electrotherapeutic App	4	0.89	20
Electronic Computers	1	0.22	20.22
Electronic Connectors	1	0.22	20.44
Engines & Turbines	2	0.44	20.89
Farm Machinery & Equipment	2	0.44	21.33
Finance Services	2	0.44	21.78
Gas & Other Services Combined	3	0.67	22.44
General Industrial Machinery & Equipmen	1	0.22	22.67
Grain Mill Products	4	0.89	23.56
Guided Missiles & Space Vehicles & Part	1	0.22	23.78
Hazardous Waste Management	1	0.22	24
Hospital & Medical Service Plans	1	0.22	24.22
Hotels & Motels	5	1.11	25.33
Household Audio & Video Equipment	1	0.22	25.56
Household Furniture	3	0.67	26.22
In Vitro & In Vivo Diagnostic Substance	5	1.11	27.33
Industrial & Commercial Fans & Blowers	3	0.67	28
Industrial Inorganic Chemicals	1	0.22	28.22
Industrial Instruments For Measurement,	3	0.67	28.89
Industrial Organic Chemicals	1	0.22	29.11
Instruments For Meas & Testing of Elect	6	1.33	30.44
Insurance Agents, Brokers & Service	3	0.67	31.11
Investment Advice	1	0.22	31.33
Investors, NEC	1	0.22	31.56
Laboratory Analytical Instruments	2	0.44	32
Lumber & Wood Products (No Furniture)	3	0.67	32.67
Malt Beverages	1	0.22	32.89
Measuring & Controlling Devices, NEC	1	0.22	33.11
Meat Packing Plants	2	0.44	33.56
Medicinal Chemicals & Botanical Product	1	0.22	33.78
Metal Cans	4	0.89	34.67
Metalworkg Machinery & Equipment	5	1.11	35.78
Miscellaneous Chemical Products	5	1.11	36.89
Miscellaneous Electrical Machinery, Equ	1	0.22	37.11
Miscellaneous Fabricated Metal Products	1	0.22	37.33
Miscellaneous Manufacturing Industries	3	0.67	38
Miscellaneous Metal Ores	1	0.22	38.22
Mobile Homes	2	0.44	38.67
Mortgage Bankers & Loan Correspondents	3	0.67	39.33
Motor Vehicle Parts & Accessories	3	0.67	40

Motor Vehicles & Passenger Car Bodies	1	0.22	40.22
Motors & Generators	1	0.22	40.44
National Commercial Banks	4	0.89	41.33
Natural Gas Distribution	23	5.11	46.44
Natural Gas Transmission	1	0.22	46.67
Natural Gas Transmission & Distribution	3	0.67	47.33
Office Furniture	1	0.22	47.56
Oil & Gas Field Exploration Services	2	0.44	48
Oil & Gas Field Machinery & Equipment	2	0.44	48.44
Oil & Gas Field Services, NEC	1	0.22	48.67
Operative Builders	5	1.11	49.78
Operators of Nonresidential Buildings	1	0.22	50
Ophthalmic Goods	1	0.22	50.22
Orthopedic, Prosthetic & Surgical Appli	7	1.56	51.78
Paints, Varnishes, Lacquers, Enamels &	1	0.22	52
Paper Mills	2	0.44	52.44
Paperboard Mills	3	0.67	53.11
Personal Credit Institutions	1	0.22	53.33
Petroleum Refining	1	0.22	53.56
Pharmaceutical Preparations	1	0.22	53.78
Photographic Equipment & Supplies	2	0.44	54.22
Plastic Material, Synth Resin/Rubber, C	4	0.89	55.11
Plastics Products, NEC	4	0.89	56
Printed Circuit Boards	2	0.44	56.44
Public Bldg & Related Furniture	2	0.44	56.89
Pumps & Pumping Equipment	5	1.11	58
Radio & TV Broadcasting & Communication	1	0.22	58.22
Railroad Equipment	2	0.44	58.67
Railroads, Line-Haul Operating	4	0.89	59.56
Real Estate Agents & Managers (For Othe	1	0.22	59.78
Real Estate Investment Trusts	18	4	63.78
Refuse Systems	2	0.44	64.22
Retail-Apparel & Accessory Stores	1	0.22	64.44
Retail-Auto & Home Supply Stores	1	0.22	64.67
Retail-Building Materials, Hardware, Ga	1	0.22	64.89
Retail-Catalog & Mail-Order Houses	2	0.44	65.33
Retail-Drug Stores and Proprietary Stor	1	0.22	65.56
Retail-Eating Places	7	1.56	67.11
Retail-Family Clothing Stores	3	0.67	67.78
Retail-Hobby, Toy & Game Shops	2	0.44	68.22

Retail-Home Furniture, Furnishings & Eq	3	0.67	68.89
Retail-Jewelry Stores	5	1.11	70
Retail-Miscellaneous Shopping Goods Sto	2	0.44	70.44
Retail-Misc General Merchandise Stores	1	0.22	70.67
Retail-Retail Stores, NEC	1	0.22	70.89
Retail-Shoe Stores	3	0.67	71.56
Retail-Variety Stores	4	0.89	72.44
Rolling Drawing & Extruding of Nonferro	4	0.89	73.33
Savings Institution, Federally Chartere	4	0.89	74.22
Sawmills & Planing Mills, General	2	0.44	74.67
Search, Detection, Navigation, Guidance	1	0.22	74.89
Security & Commodity Brokers, Dealers,	1	0.22	75.11
Security Brokers, Dealers & Flotation C	2	0.44	75.56
Semiconductors & Related Devices	7	1.56	77.11
Services-Advertising	1	0.22	77.33
Services-Advertising Agencies	1	0.22	77.56
Services-Commercial Physical & Biologic	3	0.67	78.22
Services-Computer Integrated Systems De	4	0.89	79.11
Services-Computer Processing & Data Pre	2	0.44	79.56
Services-Computer Programming, Data Pro	4	0.89	80.44
Services-Detective, Guard & Armored Car	1	0.22	80.67
Services-Educational Services	1	0.22	80.89
Services-Engineering Services	2	0.44	81.33
Services-Engineering, Accounting, Resea	1	0.22	81.56
Services-Facilities Support Management	2	0.44	82
Services-General Medical & Surgical Hos	1	0.22	82.22
Services-Help Supply Services	2	0.44	82.67
Services-Home Health Care Services	3	0.67	83.33
Services-Management Consulting Services	1	0.22	83.56
Services-Medical Laboratories	1	0.22	83.78
Services-Misc Health & Allied Services,	2	0.44	84.22
Services-Offices & Clinics of Doctors o	4	0.89	85.11
Services-Personal Services	3	0.67	85.78
Services-Prepackaged Software	5	1.11	86.89
Services-Video Tape Rental	1	0.22	87.11
Soap, Detergents, Cleaning Preparations	1	0.22	87.33
Special Industry Machinery, NEC	10	2.22	89.56
State Commercial Banks	1	0.22	89.78
Steel Pipe & Tubes	1	0.22	90
Steel Works, Blast Furnaces & Rolling &	2	0.44	90.44

Steel Works, Blast Furnaces & Rolling M	3	0.67	91.11
Surety Insurance	1	0.22	91.33
Surgical & Medical Instruments & Appara	1	0.22	91.56
Telephone & Telegraph Apparatus	3	0.67	92.22
Textile Mill Products	1	0.22	92.44
Tires & Inner Tubes	3	0.67	93.11
Title Insurance	2	0.44	93.56
Transportation Services	1	0.22	93.78
Trucking (No Local)	2	0.44	94.22
Water Supply	1	0.22	94.44
Water Transportation	3	0.67	95.11
Water, Sewer, Pipeline, Comm & Power Li	2	0.44	95.56
Wholesale-Computers & Peripheral Equipm	5	1.11	96.67
Wholesale-Drugs, Proprietaries & Druggi	3	0.67	97.33
Wholesale-Farm Product Raw Materials	1	0.22	97.56
Wholesale-Groceries, General Line (merc	1	0.22	97.78
Wholesale-Hardware & Plumbing & Heating	3	0.67	98.44
Wholesale-Misc Durable Goods	1	0.22	98.67
Wholesale-Petroleum & Petroleum Product	1	0.22	98.89
Wholesale-Professional & Commercial Equ	3	0.67	99.56
Wood Household Furniture, (No Upholster	1	0.22	99.78
X-Ray Apparatus & Tubes & Related Irrad	1	0.22	100
Total	450	100	

Panel B: Control Russell Index Firms

Industry	Frequency	Percent	Cumulative percent
Abrasive, Asbestos & Misc Nonmetallic M	2	0.52	0.52
Agricultural Chemicals	5	1.3	1.82
Air Transportation, Scheduled	4	1.04	2.86
Air-Cond & Warm Air Heatg Equip & Comm	2	0.52	3.39
Apparel & Other Finished Prods of Fabri	4	1.04	4.43
Bakery Products	1	0.26	4.69
Ball & Roller Bearings	1	0.26	4.95
Bituminous Coal & Lignite Mining	1	0.26	5.21
Books: Publishing or Publishing & Print	3	0.78	5.99
Bottled & Canned Soft Drinks & Carbonat	5	1.3	7.29
Cable & Other Pay Television Services	4	1.04	8.33
Canned, Frozen & Preserved Fruit, Veg &	3	0.78	9.11
Co-generation Services & Small Power Pr	1	0.26	9.38
Communications Equipment, NEC	1	0.26	9.64
Communications Services, NEC	4	1.04	10.68
Computer & office Equipment	1	0.26	10.94
Computer Storage Devices	1	0.26	11.2
Concrete, Gypsum & Plaster Products	7	1.82	13.02
Conglomerates(gv only)	2	0.52	13.54
Crude Petroleum & Natural Gas	6	1.56	15.1
Deep Sea Foreign Transportation of Frei	3	0.78	15.89
Dental Equipment & Supplies	1	0.26	16.15
Drilling Oil & Gas Wells	2	0.52	16.67
Electric Housewares & Fans	2	0.52	17.19
Electric Lighting & Wiring Equipment	2	0.52	17.71
Electrical Industrial Apparatus	1	0.26	17.97
Electrical Work	1	0.26	18.23
Electromedical & Electrotherapeutic App	1	0.26	18.49
Electronic Components & Accessories	8	2.08	20.57
Electronic Components, NEC	1	0.26	20.83
Electronic Connectors	3	0.78	21.61
Farm Machinery & Equipment	2	0.52	22.14
Federal & Federally Sponsored Credit Ag	5	1.3	23.44
Fire, Marine & Casualty Insurance	10	2.6	26.04
Footwear, (No Rubber)	4	1.04	27.08
Functions Related To Depository Banking	1	0.26	27.34
Gaskets, Packg & Sealg Devices & Rubber	1	0.26	27.6

Hazardous Waste Management	1	0.26	27.86
Hospital & Medical Service Plans	1	0.26	28.13
Hotels & Motels	1	0.26	28.39
In Vitro & In Vivo Diagnostic Substance	1	0.26	28.65
Industrial Inorganic Chemicals	3	0.78	29.43
Insurance Agents, Brokers & Service	3	0.78	30.21
Investment Advice	4	1.04	31.25
Investors, NEC	1	0.26	31.51
Laboratory Analytical Instruments	3	0.78	32.29
Land Subdividers & Developers (No Cemet	5	1.3	33.59
Life Insurance	9	2.34	35.94
Manifold Business Forms	1	0.26	36.2
Medicinal Chemicals & Botanical Product	1	0.26	36.46
Men's & Boys' Furnishings, Work Clothin	2	0.52	36.98
Metal Mining	5	1.3	38.28
Miscellaneous Electrical Machinery, Equ	1	0.26	38.54
Miscellaneous Fabricated Metal Products	2	0.52	39.06
Miscellaneous Fabricated Textile Produc	2	0.52	39.58
Miscellaneous Manufacturing Industries	3	0.78	40.36
Mortgage Bankers & Loan Correspondents	1	0.26	40.63
Motor Vehicle Parts & Accessories	1	0.26	40.89
Natural Gas Transmission	1	0.26	41.15
Newspapers: Publishing or Publishing &	5	1.3	42.45
Office Furniture (No Wood)	6	1.56	44.01
Oil & Gas Field Services, NEC	3	0.78	44.79
Operative Builders	4	1.04	45.83
Operators of Nonresidential Buildings	2	0.52	46.35
Ophthalmic Goods	2	0.52	46.88
Optical Instruments & Lenses	1	0.26	47.14
Paperboard Containers & Boxes	3	0.78	47.92
Paperboard Mills	1	0.26	48.18
Patent Owners & Lessors	5	1.3	49.48
Periodicals: Publishing or Publishing &	3	0.78	50.26
Personal Credit Institutions	2	0.52	50.78
Pharmaceutical Preparations	1	0.26	51.04
Photographic Equipment & Supplies	1	0.26	51.3
Poultry Slaughtering and Processing	4	1.04	52.34
Radio Broadcasting Stations	8	2.08	54.43
Radiotelephone Communications	9	2.34	56.77
Railroads, Line-Haul Operating	2	0.52	57.29

Retail-Apparel & Accessory Stores	3	0.78	58.07
Retail-Auto & Home Supply Stores	1	0.26	58.33
Retail-Auto Dealers & Gasoline Stations	3	0.78	59.11
Retail-Building Materials, Hardware, Ga	2	0.52	59.64
Retail-Catalog & Mail-Order Houses	1	0.26	59.9
Retail-Convenience Stores	1	0.26	60.16
Retail-Department Stores	4	1.04	61.2
Retail-Drug Stores and Proprietary Stor	1	0.26	61.46
Retail-Family Clothing Stores	3	0.78	62.24
Retail-Grocery Stores	6	1.56	63.8
Retail-Miscellaneous Shopping Goods Sto	3	0.78	64.58
Retail-Misc General Merchandise Stores	1	0.26	64.84
Retail-Radio, TV & Consumer Electronics	1	0.26	65.1
Retail-Women's Clothing Stores	2	0.52	65.63
Rubber & Plastics Footwear	1	0.26	65.89
Savings Institution, Federally Chartere	6	1.56	67.45
Savings Institutions, Not Federally Cha	4	1.04	68.49
Security & Commodity Brokers, Dealers,	3	0.78	69.27
Security Brokers, Dealers & Flotation C	2	0.52	69.79
Semiconductors & Related Devices	2	0.52	70.31
Services-Advertising	1	0.26	70.57
Services-Amusement & Recreation Service	1	0.26	70.83
Services-Business Services, NEC	13	3.39	74.22
Services-Commercial Physical & Biologic	1	0.26	74.48
Services-Computer Integrated Systems De	2	0.52	75
Services-Computer Processing & Data Pre	3	0.78	75.78
Services-Computer Programming, Data Pro	3	0.78	76.56
Services-Direct Mail Advertising Servic	5	1.3	77.86
Services-Educational Services	2	0.52	78.39
Services-Engineering, Accounting, Resea	1	0.26	78.65
Services-Equipment Rental & Leasing, NE	8	2.08	80.73
Services-General Medical & Surgical Hos	3	0.78	81.51
Services-Mailing, Reproduction, Commerc	1	0.26	81.77
Services-Miscellaneous Amusement & Recr	7	1.82	83.59
Services-Motion Picture & Video Tape Pr	8	2.08	85.68
Services-Motion Picture Theaters	1	0.26	85.94
Services-Racing, Including Track Operat	3	0.78	86.72
Services-Video Tape Rental	2	0.52	87.24
Sporting & Athletic Goods, NEC	1	0.26	87.5
Steel Works, Blast Furnaces & Rolling &	3	0.78	88.28

Steel Works, Blast Furnaces & Rolling M	1	0.26	88.54
Sugar & Confectionery Products	6	1.56	90.1
Telephone & Telegraph Apparatus	1	0.26	90.36
Telephone Communications (No Radiotelep	2	0.52	90.89
Television Broadcasting Stations	12	3.13	94.01
Tires & Inner Tubes	1	0.26	94.27
Transportation Services	1	0.26	94.53
Trucking (No Local)	5	1.3	95.83
Watches, Clocks, Clockwork Operated Dev	1	0.26	96.09
Water, Sewer, Pipeline, Comm & Power Li	1	0.26	96.35
Wholesale-Computers & Peripheral Equipm	2	0.52	96.88
Wholesale-Drugs, Proprietaries & Druggi	1	0.26	97.14
Wholesale-Industrial Machinery & Equipm	6	1.56	98.7
Wholesale-Medical, Dental & Hospital Eq	1	0.26	98.96
Wholesale-Paper & Paper Products	1	0.26	99.22
Wholesale-Professional & Commercial Equ	1	0.26	99.48
Women's, Misses', and Juniors Outerwear	1	0.26	99.74
Wood Household Furniture, (No Upholster	1	0.26	100
Total	384	100	

Panel C: Treatment Peer Firms

Industry	Frequency	Percent	Cumulative percent
Agricultural Production-Crops	9	0.07	0.07
Air Courier Services	2	0.02	0.09
Air Transportation, Scheduled	117	0.92	1
Air-Cond & Warm Air Heatg Equip & Comm	23	0.18	1.19
Apparel & Other Finished Prods of Fabri	14	0.11	1.3
Arrangement of Transportation of Freigh	18	0.14	1.44
Bakery Products	2	0.02	1.45
Ball & Roller Bearings	3	0.02	1.48
Biological Products, (No Diagnostic Sub	755	5.93	7.4
Books: Publishing or Publishing & Print	19	0.15	7.55
Cable & Other Pay Television Services	15	0.12	7.67
Canned, Fruits, Veg, Preserves, Jams &	2	0.02	7.68
Chemicals & Allied Products	8	0.06	7.75
Co-generation Services & Small Power Pr	10	0.08	7.83
Commercial Banks	639	5.02	12.84
Computer Communications Equipment	162	1.27	14.11
Computer Storage Devices	18	0.14	14.25
Conglomerates(gv only)	30	0.24	14.49
Construction Machinery & Equip	5	0.04	14.53
Crude Petroleum & Natural Gas	98	0.77	15.3
Cutlery, Handtools & General Hardware	11	0.09	15.38
Dairy Products	11	0.09	15.47
Dental Equipment & Supplies	7	0.05	15.53
Drawing & Insulating of Nonferrous Wire	35	0.27	15.8
Drilling Oil & Gas Wells	40	0.31	16.11
Electric & Other Services Combined	436	3.42	19.54
Electric Housewares & Fans	4	0.03	19.57
Electric Lighting & Wiring Equipment	52	0.41	19.98
Electric Services	293	2.3	22.28
Electrical Industrial Apparatus	7	0.05	22.33
Electromedical & Electrotherapeutic App	222	1.74	24.07
Electronic Computers	13	0.1	24.18
Electronic Connectors	3	0.02	24.2
Engines & Turbines	9	0.07	24.27
Farm Machinery & Equipment	14	0.11	24.38
Finance Services	5	0.04	24.42
Gas & Other Services Combined	7	0.05	24.47

General Industrial Machinery & Equipmen	10	0.08	24.55
Grain Mill Products	30	0.24	24.79
Guided Missiles & Space Vehicles & Part	2	0.02	24.8
Hazardous Waste Management	9	0.07	24.87
Hospital & Medical Service Plans	13	0.1	24.98
Hotels & Motels	75	0.59	25.57
Household Audio & Video Equipment	10	0.08	25.64
Household Furniture	17	0.13	25.78
In Vitro & In Vivo Diagnostic Substance	202	1.59	27.36
Industrial & Commercial Fans & Blowers	27	0.21	27.57
Industrial Inorganic Chemicals	18	0.14	27.72
Industrial Instruments For Measurement,	48	0.38	28.09
Industrial Organic Chemicals	10	0.08	28.17
Instruments For Meas & Testing of Elect	151	1.19	29.36
Insurance Agents, Brokers & Service	64	0.5	29.86
Investment Advice	12	0.09	29.95
Investors, NEC	14	0.11	30.06
Laboratory Analytical Instruments	47	0.37	30.43
Lumber & Wood Products (No Furniture)	15	0.12	30.55
Malt Beverages	6	0.05	30.6
Measuring & Controlling Devices, NEC	13	0.1	30.7
Meat Packing Plants	6	0.05	30.75
Medicinal Chemicals & Botanical Product	8	0.06	30.81
Metal Cans	12	0.09	30.9
Metalworkg Machinery & Equipment	37	0.29	31.19
Miscellaneous Chemical Products	46	0.36	31.55
Miscellaneous Electrical Machinery, Equ	18	0.14	31.7
Miscellaneous Fabricated Metal Products	14	0.11	31.81
Miscellaneous Manufacturing Industries	32	0.25	32.06
Miscellaneous Metal Ores	1	0.01	32.06
Mobile Homes	10	0.08	32.14
Mortgage Bankers & Loan Correspondents	23	0.18	32.32
Motor Vehicle Parts & Accessories	94	0.74	33.06
Motor Vehicles & Passenger Car Bodies	15	0.12	33.18
Motors & Generators	10	0.08	33.26
National Commercial Banks	188	1.48	34.73
Natural Gas Distribution	406	3.19	37.92
Natural Gas Transmission	7	0.05	37.97
Natural Gas Transmission & Distribution	33	0.26	38.23
Office Furniture	1	0.01	38.24

Oil & Gas Field Exploration Services	7	0.05	38.3
Oil & Gas Field Machinery & Equipment	30	0.24	38.53
Oil & Gas Field Services, NEC	14	0.11	38.64
Operative Builders	125	0.98	39.62
Operators of Nonresidential Buildings	12	0.09	39.72
Ophthalmic Goods	6	0.05	39.76
Orthopedic, Prosthetic & Surgical Appli	236	1.85	41.62
Paints, Varnishes, Lacquers, Enamels &	5	0.04	41.66
Paper Mills	23	0.18	41.84
Paperboard Mills	20	0.16	41.99
Personal Credit Institutions	9	0.07	42.06
Petroleum Refining	24	0.19	42.25
Pharmaceutical Preparations	126	0.99	43.24
Photographic Equipment & Supplies	23	0.18	43.42
Plastic Material, Synth Resin/Rubber, C	15	0.12	43.54
Plastics Products, NEC	73	0.57	44.11
Printed Circuit Boards	37	0.29	44.4
Public Bldg & Related Furniture	7	0.05	44.46
Pumps & Pumping Equipment	18	0.14	44.6
Radio & TV Broadcasting & Communication	61	0.48	45.08
Railroad Equipment	4	0.03	45.11
Railroads, Line-Haul Operating	39	0.31	45.42
Real Estate Agents & Managers (For Othe	3	0.02	45.44
Real Estate Investment Trusts	2,408	18.9	64.34
Refuse Systems	14	0.11	64.45
Retail-Apparel & Accessory Stores	6	0.05	64.5
Retail-Auto & Home Supply Stores	4	0.03	64.53
Retail-Building Materials, Hardware, Ga	1	0.01	64.54
Retail-Catalog & Mail-Order Houses	50	0.39	64.93
Retail-Drug Stores and Proprietary Stor	9	0.07	65
Retail-Eating Places	393	3.08	68.08
Retail-Family Clothing Stores	49	0.38	68.47
Retail-Hobby, Toy & Game Shops	5	0.04	68.51
Retail-Home Furniture, Furnishings & Eq	15	0.12	68.63
Retail-Jewelry Stores	34	0.27	68.89
Retail-Miscellaneous Shopping Goods Sto	22	0.17	69.07
Retail-Misc General Merchandise Stores	3	0.02	69.09
Retail-Retail Stores, NEC	8	0.06	69.15
Retail-Shoe Stores	16	0.13	69.28
Retail-Variety Stores	51	0.4	69.68

Rolling Drawing & Extruding of Nonferro	41	0.32	70
Savings Institution, Federally Chartere	424	3.33	73.33
Sawmills & Planing Mills, General	7	0.05	73.38
Search, Detection, Navigation, Guidance	18	0.14	73.52
Security & Commodity Brokers, Dealers,	4	0.03	73.56
Security Brokers, Dealers & Flotation C	58	0.46	74.01
Semiconductors & Related Devices	619	4.86	78.87
Services-Advertising	8	0.06	78.93
Services-Advertising Agencies	5	0.04	78.97
Services-Commercial Physical & Biologic	67	0.53	79.5
Services-Computer Integrated Systems De	254	1.99	81.49
Services-Computer Processing & Data Pre	36	0.28	81.77
Services-Computer Programming, Data Pro	283	2.22	84
Services-Detective, Guard & Armored Car	1	0.01	84
Services-Educational Services	9	0.07	84.07
Services-Engineering Services	20	0.16	84.23
Services-Engineering, Accounting, Resea	13	0.1	84.33
Services-Facilities Support Management	4	0.03	84.36
Services-General Medical & Surgical Hos	5	0.04	84.4
Services-Help Supply Services	46	0.36	84.76
Services-Home Health Care Services	17	0.13	84.9
Services-Management Consulting Services	9	0.07	84.97
Services-Medical Laboratories	13	0.1	85.07
Services-Misc Health & Allied Services,	20	0.16	85.23
Services-Offices & Clinics of Doctors o	12	0.09	85.32
Services-Personal Services	35	0.27	85.6
Services-Prepackaged Software	850	6.67	92.27
Services-Video Tape Rental	1	0.01	92.28
Soap, Detergents, Cleaning Preparations	3	0.02	92.3
Special Industry Machinery, NEC	376	2.95	95.25
State Commercial Banks	43	0.34	95.59
Steel Pipe & Tubes	4	0.03	95.62
Steel Works, Blast Furnaces & Rolling &	10	0.08	95.7
Steel Works, Blast Furnaces & Rolling M	67	0.53	96.22
Surety Insurance	20	0.16	96.38
Surgical & Medical Instruments & Appara	29	0.23	96.61
Telephone & Telegraph Apparatus	124	0.97	97.58
Textile Mill Products	7	0.05	97.64
Tires & Inner Tubes	4	0.03	97.67
Title Insurance	8	0.06	97.73

Transportation Services	4	0.03	97.76
Trucking (No Local)	59	0.46	98.23
Water Supply	11	0.09	98.31
Water Transportation	35	0.27	98.59
Water, Sewer, Pipeline, Comm & Power Li	11	0.09	98.67
Wholesale-Computers & Peripheral Equipm	88	0.69	99.36
Wholesale-Drugs, Proprietaries & Druggi	38	0.3	99.66
Wholesale-Farm Product Raw Materials	3	0.02	99.69
Wholesale-Groceries, General Line (merc	4	0.03	99.72
Wholesale-Hardware & Plumbing & Heating	7	0.05	99.77
Wholesale-Misc Durable Goods	1	0.01	99.78
Wholesale-Petroleum & Petroleum Product	7	0.05	99.84
Wholesale-Professional & Commercial Equ	13	0.1	99.94
Wood Household Furniture, (No Upholster	7	0.05	99.99
X-Ray Apparatus & Tubes & Related Irrad	1	0.01	100
Total	12,740	100	

Panel D: Control Peer Firms

Industry	Frequency	Percent	Cumulative percent
Abrasive, Asbestos & Misc Nonmetallic M	9	0.12	0.12
Agricultural Chemicals	53	0.74	0.86
Air Transportation, Scheduled	97	1.35	2.21
Air-Cond & Warm Air Heatg Equip & Comm	15	0.21	2.41
Apparel & Other Finished Prods of Fabri	57	0.79	3.2
Bakery Products	2	0.03	3.23
Ball & Roller Bearings	4	0.06	3.29
Bituminous Coal & Lignite Mining	1	0.01	3.3
Books: Publishing or Publishing & Print	16	0.22	3.52
Bottled & Canned Soft Drinks & Carbonat	51	0.71	4.23
Cable & Other Pay Television Services	44	0.61	4.84
Canned, Frozen & Preserved Fruit, Veg &	23	0.32	5.16
Co-generation Services & Small Power Pr	4	0.06	5.22
Communications Equipment, NEC	15	0.21	5.42
Communications Services, NEC	50	0.69	6.12
Computer & office Equipment	2	0.03	6.15
Computer Storage Devices	23	0.32	6.47
Concrete, Gypsum & Plaster Products	48	0.67	7.13
Conglomerates(gv only)	23	0.32	7.45
Crude Petroleum & Natural Gas	675	9.36	16.81
Deep Sea Foreign Transportation of Frei	31	0.43	17.24
Dental Equipment & Supplies	8	0.11	17.36
Drilling Oil & Gas Wells	39	0.54	17.9
Electric Housewares & Fans	8	0.11	18.01
Electric Lighting & Wiring Equipment	30	0.42	18.42
Electrical Industrial Apparatus	9	0.12	18.55
Electrical Work	2	0.03	18.58
Electromedical & Electrotherapeutic App	65	0.9	19.48
Electronic Components & Accessories	60	0.83	20.31
Electronic Components, NEC	23	0.32	20.63
Electronic Connectors	12	0.17	20.8
Farm Machinery & Equipment	16	0.22	21.02
Federal & Federally Sponsored Credit Ag	21	0.29	21.31
Fire, Marine & Casualty Insurance	639	8.87	30.17
Footwear, (No Rubber)	53	0.74	30.91
Functions Related To Depository Banking	8	0.11	31.02
Gaskets, Packg & Sealg Devices & Rubber	3	0.04	31.06

Hazardous Waste Management	17	0.24	31.3
Hospital & Medical Service Plans	9	0.12	31.42
Hotels & Motels	18	0.25	31.67
In Vitro & In Vivo Diagnostic Substance	45	0.62	32.3
Industrial Inorganic Chemicals	45	0.62	32.92
Insurance Agents, Brokers & Service	58	0.8	33.73
Investment Advice	70	0.97	34.7
Investors, NEC	15	0.21	34.91
Laboratory Analytical Instruments	36	0.5	35.41
Land Subdividers & Developers (No Cemet	38	0.53	35.93
Life Insurance	219	3.04	38.97
Manifold Business Forms	7	0.1	39.07
Medicinal Chemicals & Botanical Product	6	0.08	39.15
Men's & Boys' Furnishings, Work Clothin	20	0.28	39.43
Metal Mining	27	0.37	39.8
Miscellaneous Electrical Machinery, Equ	20	0.28	40.08
Miscellaneous Fabricated Metal Products	30	0.42	40.5
Miscellaneous Fabricated Textile Produc	7	0.1	40.59
Miscellaneous Manufacturing Industries	38	0.53	41.12
Mortgage Bankers & Loan Correspondents	10	0.14	41.26
Motor Vehicle Parts & Accessories	27	0.37	41.63
Natural Gas Transmission	8	0.11	41.75
Newspapers: Publishing or Publishing &	62	0.86	42.61
Office Furniture (No Wood)	15	0.21	42.81
Oil & Gas Field Services, NEC	33	0.46	43.27
Operative Builders	64	0.89	44.16
Operators of Nonresidential Buildings	24	0.33	44.49
Ophthalmic Goods	10	0.14	44.63
Optical Instruments & Lenses	11	0.15	44.78
Paperboard Containers & Boxes	15	0.21	44.99
Paperboard Mills	6	0.08	45.07
Patent Owners & Lessors	71	0.99	46.06
Periodicals: Publishing or Publishing &	18	0.25	46.31
Personal Credit Institutions	16	0.22	46.53
Pharmaceutical Preparations	119	1.65	48.18
Photographic Equipment & Supplies	16	0.22	48.4
Poultry Slaughtering and Processing	16	0.22	48.63
Radio Broadcasting Stations	66	0.92	49.54
Radiotelephone Communications	227	3.15	52.69
Railroads, Line-Haul Operating	22	0.31	53

Retail-Apparel & Accessory Stores	18	0.25	53.25
Retail-Auto & Home Supply Stores	5	0.07	53.32
Retail-Auto Dealers & Gasoline Stations	40	0.55	53.87
Retail-Building Materials, Hardware, Ga	5	0.07	53.94
Retail-Catalog & Mail-Order Houses	23	0.32	54.26
Retail-Convenience Stores	2	0.03	54.29
Retail-Department Stores	33	0.46	54.74
Retail-Drug Stores and Proprietary Stor	10	0.14	54.88
Retail-Family Clothing Stores	45	0.62	55.51
Retail-Grocery Stores	138	1.91	57.42
Retail-Miscellaneous Shopping Goods Sto	30	0.42	57.84
Retail-Misc General Merchandise Stores	1	0.01	57.85
Retail-Radio, TV & Consumer Electronics	5	0.07	57.92
Retail-Women's Clothing Stores	28	0.39	58.31
Rubber & Plastics Footwear	7	0.1	58.41
Savings Institution, Federally Chartere	596	8.27	66.68
Savings Institutions, Not Federally Cha	202	2.8	69.48
Security & Commodity Brokers, Dealers,	11	0.15	69.63
Security Brokers, Dealers & Flotation C	67	0.93	70.56
Semiconductors & Related Devices	170	2.36	72.92
Services-Advertising	8	0.11	73.03
Services-Amusement & Recreation Service	1	0.01	73.04
Services-Business Services, NEC	369	5.12	78.16
Services-Commercial Physical & Biologic	36	0.5	78.66
Services-Computer Integrated Systems De	146	2.03	80.69
Services-Computer Processing & Data Pre	50	0.69	81.38
Services-Computer Programming, Data Pro	237	3.29	84.67
Services-Direct Mail Advertising Servic	5	0.07	84.74
Services-Educational Services	23	0.32	85.06
Services-Engineering, Accounting, Resea	10	0.14	85.2
Services-Equipment Rental & Leasing, NE	105	1.46	86.65
Services-General Medical & Surgical Hos	16	0.22	86.88
Services-Mailing, Reproduction, Commerc	2	0.03	86.9
Services-Miscellaneous Amusement & Recr	211	2.93	89.83
Services-Motion Picture & Video Tape Pr	49	0.68	90.51
Services-Motion Picture Theaters	3	0.04	90.55
Services-Racing, Including Track Operat	12	0.17	90.72
Services-Video Tape Rental	4	0.06	90.77
Sporting & Athletic Goods, NEC	18	0.25	91.02
Steel Works, Blast Furnaces & Rolling &	13	0.18	91.2

Steel Works, Blast Furnaces & Rolling M	29	0.4	91.61
Sugar & Confectionery Products	36	0.5	92.11
Telephone & Telegraph Apparatus	35	0.49	92.59
Telephone Communications (No Radiotelep	122	1.69	94.28
Television Broadcasting Stations	189	2.62	96.91
Tires & Inner Tubes	2	0.03	96.93
Transportation Services	4	0.06	96.99
Trucking (No Local)	104	1.44	98.43
Watches, Clocks, Clockwork Operated Dev	1	0.01	98.45
Water, Sewer, Pipeline, Comm & Power Li	5	0.07	98.52
Wholesale-Computers & Peripheral Equipm	39	0.54	99.06
Wholesale-Drugs, Proprietaries & Druggi	14	0.19	99.25
Wholesale-Industrial Machinery & Equipm	25	0.35	99.6
Wholesale-Medical, Dental & Hospital Eq	9	0.12	99.72
Wholesale-Paper & Paper Products	3	0.04	99.76
Wholesale-Professional & Commercial Equ	4	0.06	99.82
Women's, Misses', and Juniors Outerwear	8	0.11	99.93
Wood Household Furniture, (No Upholster	5	0.07	100
Total	7,208	100	