Competition Management in Corporate Filings

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ABSTRACT

Analyzing more than 25,000 10-Ks suggests that public firms tend to "inflate" their competition position by listing much larger firms as their competitors even if they operate in different industries and produce different products. This behavior is more pronounced in firms where the executives' compensations are more closely tied to the value of equity. The over-positioning leads to temporarily higher stock returns, higher executive compensation, and higher takeover likelihood, yet it is not coupled with a significant improvement in firm fundamentals, such as asset value and profitability.

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1. Introduction

It is well documented that managers often use discretion in accounting methods to manipulate reported earnings for a variety of motives. These include executive compensation (e.g., Healy (1985), Kaplan (1985), Healy, Kang, and Palepu (1987), and Holthausen, Larcker, and Sloan (1995)), tax relief (e.g., Wong (1988) and Jones (1991)), contracting (e.g., Liberty and Zimmerman (1986) and Malmquist (1990)), management buyout offers (e.g., DeAngelo (1986) and Perry and Williams (1994)), debt covenant violations (e.g., DeFond and Jiambalvo (1994) and Sweeny (1994)), and others.

In this paper we investigate whether firms manipulate not only the numbers in the financial reports, but also the written text. We refer to this behavior as 'text management'. Financial statements typically include a competition section in which the company can list and discuss the firms it views as competitors. Because the identification of the true competitors of a company is not definite in many cases, the choice of which companies to list as competitors is subject to managerial discretion. This means that a company can use the competition section to deliver a message to investors that it competes with very strong and highly reputed firms, even if those firms are not its real competitors.

It is easy to understand why managers would have incentives to "over-position" their companies in the market competition. Such strategy can enhance the managers' and firms' reputation, "put" them in the major league of competitors, attract more attention in the financial market and the financial media, improve executive compensation, attract potential acquirers, and others. An anecdotal example of high positioning is given by Bsquare Corp. ('BSQR'). Bsquare is a relatively small company that provides business-to-business (B2B) technology products and services, headquartered in Bellevue, WA. The market capitalization of the company as of December 2017 was $61.3M. In its annual report for 2017 Bsquare listed industry giants as competitors, including GE, IBM, and MSFT. For example, the company states: "*Although we are closely partnered with AWS and Microsoft, there are elements of their solutions with which we compete directly*". These mentioned companies are thousands of times larger than Bsquare, where none of them recognize Bsquare back as a competitor.

To assess whether firms tend to inflate their competition status we use a textual analysis to identify the competitor lists for all publicly traded firms in the U.S. over the period 1995-2017.

Out of ~120K 10-Ks scanned, ~27K contain competitor discussions with a total of ~110K specific competitor mentions. A first look at these data provides three preliminary indications of potential text management. First, the filing firms typically list as competitors firms that are much larger than them, by close to 40 billion dollars on average. Second, the traditional definition of competition is symmetric by nature, i.e., a pair of firms in competition are both assumed as competitors. The competition mentions in 10-Ks however are directional—a mentioning of a firm as a competitor by another firm does not imply the reverse mentioning for the most part; the percentage of mutual mentioning over our sample period is only 5.67% (and 3% if restricted to the same year). Third, a large fraction of the competitors mentioned do not appear to have a clear relation to the filing firm; about 20 percent of the competitors mentioned operate in a different industry than that of the filing firm, and based on product similarity (Hoberg and Phillips (2010, 2016)), about 50 percent are outside the peer group of the filing firm.

To gain further insight into the motives in listing competitors in 10-Ks, we examine the relation between the size of the mentioned firms and their similarity to the filing firm. The rationale is straightforward. If a company chooses to list only its true competitors based on an objective assessment, then the size of these companies should be random and not necessarily much larger than that of the filing firm. In contrast, managers that aim to list strong companies as competitors will put less weight on the similarity between the companies; such considerations in identifying competitors, therefore, imply a negative relation between the market value of the listed competitors and their similarity to the filing firm.

We conduct two tests to assess the size/similarity relation. In the first we consider only financial reports that recognize at least five firms as competitors (a total of 5,691 reports). For each report we compute the correlation between the size (market value of equity) of the mentioned firm and its similarity to the filing firm, where similarity is proxied both by same-industry dummy and product similarity score. We then average this correlation across all reports. The average correlation is significantly negative, indicating that firms tend to enhance their competition status in 10-K filings by associating themselves with strong companies that are less related to them.

In the second test, for each 10-K that specifies at least one competitor (a total of 24,256 reports) we compute the average (log) market values of the listed competitors minus that of the filing firm (referred to as 'size gap'). We then examine the relation between the size gap and the average

similarity between the filing firm and each of its listed competitors; the average similarity is based on two proxies: the Hoberg-Phillips' product similarity score and the same-industry indicator. Pooled regressions of the average similarity on size gap show a strong negative relation, consistent with text management behavior; that is, small firms that are listed as competitors are more similar to the filing firm, whereas large firms that are listed as competitors are less similar to the filing firms. This result is robust to a variety of measures and model specifications and is meaningful in economic terms; for example, a one standard deviation increase in size gap is associated with a decrease of 0.3 standard deviations in average product similarity.

It is important to note that we do not claim that every mention of a non-peer competitor is necessary biased, and that every mention of a peer competitor is necessary unbiased; rather we argue that the evidence that the largest firms that are listed as competitors are on average less similar to the filing firm indicates that firms tend to over-position their competition status.

We next turn to exploring the motives behind competition positioning. We begin with ex-ante managerial incentives. Because the information content of financial reports is mostly relevant for the equity value, we expect a stronger incentive to position competition among managers with higher potential equity-based compensation. Bergstresser and Philippon (2006) shows that earnings manipulations using discretionary accruals is more pronounced in firms where the CEO's potential total compensation is more closely tied to the value of stock and option holdings. In a similar setting, we show that managerial equity-based compensation incentives significantly affect the size gap in 10-K, while controlling for discretionary accruals. This result provides further evidence that size-based positioning considerations are present in listing competitors in 10-Ks.

Given the ex-ante incentives to engage in text management behavior, a natural question is what the ex-post benefits of such behavior are. We investigate three types of benefits: stock price, executive compensation, and likelihood of being taken over. To assess whether competition positioning affects equity value, we run Fama and MacBeth (1973) regressions of monthly stock return on size gap in each of the last three 10-Ks while controlling for common determinants of stock returns. The results reveal an interesting pattern in stock price movement following competition positioning; an increase in size gap from the 10th to the 90th percentile increases the stock price by close to 10% in the first 15 months after the filing, which is almost completely reversed by the end of the third year. This pattern in stock price movement can indicate that

investors are misled by the inflated competition power presented by the filing firm, and later on realize its true competition status. This hypothesis can be tested by looking into the real effects of competition positioning. If indeed the high competition positioning does not represent a real change in the firm's competition strength, then we should not observe any significant changes to firm fundamentals in the years following the positioning. Consistent with this hypothesis, we do not find any evidence of abnormal growth in firm assets, sales, and income, in the three years following large size gaps in 10-Ks.

The temporary increase in stock price during the year following 10-K competition positioning might be coupled with an increase in the executive compensation, due to two reasons. First, as discussed above, the compensation value of managers who engage in over-positioning is more likely tied to the equity value. We further show that competition positioning is followed by higher option exercise and stock sale activity by firm executives. Second, positive stock returns are associated with a successful managerial performance, and thus can lead to granting higher compensation to the firm managers. Regression results support this argument, indicating that large size gaps in 10-Ks increase the executive total compensations in the subsequent year. Uncovering the ex-post actual compensation benefits from competition positioning behavior complements the ex-ante compensation-based incentives of managers to engage in such behavior.

Last, we examine whether competition positioning by a firm increases the likelihood of the firm to be taken over. Logit regression of future takeover on current 10-K positioning reveals a significant effect, statistically and economically; a one standard deviation increase in size gap increases takeover probability by 74 basis points (18 percent change) in the following year. We acknowledge that acquisitions of highly positioned companies do not necessarily imply that these positioning are manipulated, but rather that they are more likely to reflect real competition power. To verify this conjecture, we add to the regression an interaction term between size gap and average product similarity between the filing firm and the mentioned firms. The coefficient of the interaction term is positive and significant, suggesting that when the competition section includes less similar companies, and thus is more likely based on size considerations, the firm is less likely to be acquired. This result provides another piece of evidence of competition positioning considerations in financial reports.

The paper contributes to the literature that documents manipulation of financial statements. Prior studies focus on earnings manipulation through managerial discretion in accounting methods or discretionary accruals. We provide evidence of manipulation of information using the text in 10-Ks, particularly in the competition section; firms often mention strong and unrelated companies as competitors just to artificially inflate their competition status. The paper also contributes to the recent strand of studies that apply advanced learning techniques such as textual analysis to 10-Ks to gauge economic insight (e.g., Hoberg and Phillips (2010, 2016), Garcia and Norli (2012), and Cohen, Malloy, and Nguyen (2020)). A closely related study is Eisdorfer, Froot, Ozik, and Sadka (2022) who shows that firms highly mentioned in the 10-K competition sections of other firms gain abnormal future stock returns. In this paper we dig into the motives and implications of firms decisions on which companies to mention as competitors.

2. Competition Mentions

We run a textual analysis on 10-Ks to identify the competitor lists for all publicly traded firms in the U.S. over the period 1995-2017. We use an open-source natural language processing (NLP) tool, StanfordNER,[1] which is designed to label names of "things" in sequences of words. We observe a total of 119,785 10-Ks filed by 11,304 firms, out of which 68,952 reports (58%) include a competition section, where 26,845 of them (24%) mention specific companies that they view as competitors. The average number of competitors mentioned in such sections is 4 and the median number is 3, with a total of 108,720 mentions. Table 1 shows the competition mention statistics.

The mention statistics reveal several interesting figures that provide a first indication that managers use their discretion in listing competitors to show a strong competition power of their companies. First, a large fraction of the companies mentioned as competitors seem unrelated to the filing firm by common measures. Specifically, about 20% of the companies listed as competitors operate in a different industry (by GIC) than the filing firm. Moreover, about 50% of the companies are outside the network the filing firm according to the product similarity scores of

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[1] Jenny Rose Finkel, Trond Grenager, and Christopher Manning. 2005. Incorporating Non-local Information into Information Extraction Systems by Gibbs Sampling. Proceedings of the 43nd Annual Meeting of the Association for Computational Linguistics (ACL 2005), pp. 363-370. http://nlp.stanford.edu/~manning/papers/gibbscrf3.pdf https://nlp.stanford.edu/software/CRF-NER.shtml.

Hoberg and Phillips (2010, 2016).[2] This raises the question of what the reasons behind listing those seemingly unrelated companies as competitors are.

Second, while competition refers to two (or more) firms and is symmetric by nature, one would except a symmetrical competitor mentions, at least to some degree. The competition mentions we observe, however, are directional—a mentioning of a firm as a competitor by another firm does not necessarily imply the reverse mentioning. In fact, the percentage of mutual mentioning over our sample period is only 5.67% (and 3% if restricted to the same year). That is, for the vast majority of cases, when Firm A believes that it is in competition with Firm B, Firm B does not share the same view. This may also suggest that choosing which firms to list as competitors in 10-Ks involves considerations other than pure competition.

Third, the companies that are mentioned as competitors are typically much larger than the firm that lists them as competitors. The average difference in size is 38 billion dollars, and the median is 4 billion dollars. Indeed, the companies that get the highest number of mentions as competitors by other firms are often among the largest companies in the market; for example, the company with the most mentions at a given time is IBM Corp. ('IBM') which was recognized as a competitor by 136 companies in the annual reports filed during 1997, followed by Microsoft Corp. ('MSFT') with 113 mentions in the reports filed during 1999. The descriptive statistics in Table 2 show that the average size of the firms that are mentioned as competitors is more than six times than that of the mentioning firms (average equity market value of 16.3 vs. 2.6 billion dollars, respectively), and the median size ratio is even higher at 9.5 (5.8 vs. 0.6 billion dollars). These differences might suggest that filing firms have size-based considerations in listing competitors, as they can reflect on their own reputation as a competitor. Consistent with the size difference, the mentioned firms are also more profitable, less volatile, and are held more by institutional investors.

3. Competition Positioning

To investigate whether firms tend to inflate their competition status in 10-Ks, we begin with examining the relation between the size of the firms listed as competitors by the filing firm and their similarity to the filing firm. Conventional wisdom suggests that competing companies should

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[2] We use the two-digit calibrated product similarity scores from the Hoberg and Phillips data library. The results are robust to using also three-digits calibrated scores.

typically share similarity in the products or services they provide and the industry or sector they operate in. As shown above, however, this is not the case for a large fraction of the listed competitors in 10-Ks. We acknowledge that there may be situations where companies from different peer groups can compete, for example, when a company expands its traditional line of products, or that somewhat different types of products satisfy the same customer need. But, if a company chooses to list only its true competitors from non-peer groups, then the size of these companies should be random and not necessarily larger than that of the listed companies from their peer group. That is, if companies list their competitors based on objective assessments, then there should not be any relation between the size of the listed competitors and their similarity to the filing firm. In contrast, firms that aim to list strong companies as competitors will put less weight on the similarity between the companies, resulting therefore in a negative relation between the size of the listed competitors and their similarity to the filing firm.

To get a first idea about the size/similarity relation we divide all competition mentions into peer mentions (positive product similarity score between the filing firm and the mentioned firm) and non-peer mentions (zero product similarity score). The sample contains a total of 84,058 mentions with product similarity score data, consisting of 41,605 peer mentions and 42,453 non-peer mentions. We then look at the distribution of the size difference between the (log) equity market values of the mentioned firm and the filing firm. The two size gap distributions plotted in Figure 1 are not identical, where the distribution is more tilted to the right for the non-peer mentions. This can indicate size-based considerations in listing non-peer competitors.

To assess the significance of the size/similarity relation we conduct two tests. The first focuses on the relation within each report. To get a valid measure of the relation within a report, we consider only 10-Ks with at least five competitors mentions (a total 5,691 of 10-Ks). For each mentioned competitor we assign two measures that represent the similarity between the mentioned firm and the filing firm: (i) a dummy variable indicating if the competitor operates in the same industry (GIC) as the filing firm, and (ii) the similarity score between the products of the competitor and the filing firm, based on Hoberg and Phillips (2010, 2016). For each report, we calculate the correlation between each of the two similarity measures and the size (log of equity market value) of the mentioned competitor. Table 2 shows the average of the size/similarity correlations across all reports. The average correlation is negative for both similarity measures, about −0.04 using the same-industry dummy, and about −0.22 using the product similarity score,

both are statistically significant. That is, for the average 10-K, the largest firms listed as competitors are less similar the filing firm, suggesting that firms tend to enhance their competition status by tying themselves to strong companies that are less related to them.

In the second test we look at the size/similarity relation across 10-Ks. For each 10-K that specifies at least one competitor (a total of 24,256 reports), we measure the extent to which the filing firm positions its competition status by the difference between the average (log) size of the competitors it mentions and the (log) size of the filing firm (referred to as 'size gap' henceforth). We further calculate for each 10-K the averages of the two peer measures described above (the same-industry dummy and the product similarity score). We run a 10-K pooled regression of the average similarity measures on size gap. The control variables includes the filing firm's (log) size, (log) market-to-book ratio, past stock return, profitability, investment, and institutional ownership. All regressions include industry (by GIC classification) and year dummies to account for industry-specific effects and general time-varying changes in firm similarity. To address the potential correlation of the residuals for multiple 10-Ks of specific firms, we cluster the standard errors by firm.

Table 4 presents the regression results. All specifications show that the size gap between the mention firms and the filing firm in a 10-K has a negative and significant effect on the average similarity between the mentioned firms and the filing firm (t-statistics of -3.28 to -15.46). This result provides further support to the hypothesis of competition management in corporate filings; small firms that are listed as competitors are more similar to the filing firm, whereas large firms that are listed as competitors are less similar to the filing firms. This result is significant also in economic terms; for example, for the specification with all control variables, a one standard deviation increase in size gap is associated with a decrease of 0.3 standard deviations in average product similarity.

We examine the robustness of the size/similarity regression results in Table 4 with respect to four aspects. In the first we add to the regressions firm fixed effects to account for different average similarities across firms. The second robustness check addresses a potential general relation between the size of a firm and its similarity to other firms. Large firms are more likely to operate in multiple lines of businesses and to provide a variety of products and services. This implies that on average large firms will be less similar to small firms that focus on one line of business. Such

relation might contribute to the negative effect of size gap on product similarity in 10-Ks. We address this concern by replacing the dependent variable of average product similarity score with a size-adjusted score, measured as follows. Each year we sort all stocks by firm size into ten equal-sized deciles. For each pair of deciles, we calculate the average product similarity scores between each firm in one decile and each firm in the other decile, yielding 10x10 average scores. The size-adjusted product similarity score between the mentioning firm and the mentioned firm is defined as the raw score minus the average score of their corresponding size deciles.

In the third robustness check we use the three-digit calibrated product similarity scores (instead of two-digit), obtained from Hoberg and Phillips data library. In the fourth robustness check we replace the firm size with an alternative measure of competitive strength. Strong competitors are more likely to be recognized in 10-Ks of other firms. Thus, instead of size gap between the mentioned firm and the filing firm, we use a mention gap. We compute the mention gap by the difference between the average (log 1+) number of 10-Ks in which the competitors are mentioned in the past twelve months and the (log 1+) number of 10-Ks in which the filing firm is mentioned. Table 5 shows the robustness checks for the full specification regression model of product similarity in Table 4 (rightmost column). In all regressions the coefficient of size gap (mention gap) remains negative and significant (t-statistics between -9.67 and -13.14), verifying the robustness of the regressions in Table 4.

Overall the results in this section uncover a pattern in the way companies choose to list their competitors in their annual filings−the largest and strongest firms that are listed as competitors share less similarity with the filing firm. This pattern does not mean that every mention of a non-peer competitor is necessary biased, and that every mention of a peer competitor is necessary unbiased. But rather we argue that the evidence that the largest firms that are listed as competitors are on average less similar to the filing firm indicates that firms tend to over-position their competition status.

4. Managerial Incentives of Competition Positioning

Our next step in detecting competition management in 10-Ks is exploring the ex-ante managerial incentives to engage in such behavior. Showing a better competition power in financial statements should benefit the firm in general. Such strategy can enhance the managers' and firms' reputation

and visibility, attract business partners and potential acquirers, improve executive compensation, and others. Hence, it is reasonable that managers will have a natural tendency to enhance their competition position in the filings. We argue that such incentives should also depend on the compensation structure of the managers.

The literature on financial statement manipulations focuses insofar on earnings managements, mainly via discretionary accruals or accounting methos. Because corporate earnings serve as a criterion for a variety of governance and contracting mechanisms, managers often manipulate the earrings to maximize the benefits of these mechanisms. For example, Healy (1985) shows that managers select accounting procedures and accruals to report the level of earnings that maximizes their bonus awards; Jones (1991) shows that firms defer income when seeking import tax relief; Defond and Jiambalvo (1994) and Sweeny (1994) find that managers manage earnings upward in order to avoid debt covenant violations.

Unlike earnings, the competition discussion in 10-K is not a numeric value that is tied to specific mechanisms, rather it can be merely used to portray a better picture of the company with respect to its competitive strength. Because the information content of financial reports is mostly relevant for the equity value, we expect a stronger incentive to position competition among managers with higher potential equity-based compensation. We follow Bergstresser and Philippon (2006) and estimate the executive equity-based incentives by the ratio $\frac{ONEPCT}{ONEPCT+SALARY+BONUS}$, where $ONEPCT$ is the dollar change in the value of the executive's stock and options holdings that would come from a one percentage point increase in the company stock price, measured by (assuming delta=1 for all options) $0.01 \times PRICE \times (SHARES + OPTIONS)$, $PRICE$ is the company share price, and $SHARES$ and $OPTIONS$ are the number of shares and options held by the executive.

Bergstresser and Philippon (2006) shows that earnings manipulations using discretionary accruals is more pronounced in firms with higher CEO's equity-based incentive ratios. In a similar setting, we run a pooled report regression of size gap on executive incentive ratio. The control variables include the filing firm's (log) size as well as other firm characteristics as described in Table 2 plus the controls used in Bergstresser and Philippon (2006): entrenchment index (from Bebchuk, Cohen, and Ferrell (2009)), firm age, volatility of sales growth, based on most recent eight quarters, and book leverage (book value of debt over book value of assets). We also control

for discretionary accruals, measured by the modified Jones model (Jones (1991) and Dechow et al. (1995)).

Table 6 shows the regression results for the average incentive ratio of all executives and for the CEO only. All specifications show that managerial equity-based compensation incentives significantly affect the size gap in 10-K (*t*-statistics between 2.28 to 2.50). Interestingly, the coefficient of discretionary accruals is insignificant, suggesting that size gap and discretionary accruals are not related, even though both can be viewed as measures of 10-K management. The evidence that size gap is more pronounced where the executives can benefit more from higher equity value provides further indication that size-based positioning considerations are present in listing competitors in 10-Ks.

5. Ex-Post Benefits of Competition Positioning

Given the ex-ante incentives to engage in competition management behavior, a natural question is what the ex-post benefits of such behavior are. We investigate whether the extent of competition positioning in 10-K, as reflected in the size gap between the mentioned firms and the filing firm, leads to subsequent material changes in the market value of the filing firm, in the compensation of its executives, and in the likelihood of the filing firm to be acquired.

5.1. Stock Return

We examine whether competition positioning in 10-K filing affects equity value by observing stock returns during the three years following the filing. We run Fama and MacBeth (1973) regressions of monthly stock return on size gap in each of the last three 10-Ks while controlling for common determinants of stock returns. To ensure a sufficient number of observations in each calendar month, the sample includes only firms with December fiscal year-end, where returns for a referenced year begin in April of the following year(s); for example, the cross-sectional regressions for the return in March 2015 will use the size gap in the 10-K of December 2013 for the first year (and the 10-Ks of December 2012 and December 2011 for the second and third years), where the regressions for the return in April 2015 will use the size gap in the 10-K of December 2014 for the first year (and the 10-Ks of December 2013 and December 2012 for the second and third years). To eliminate the impact of penny stocks on returns we exclude stocks with a price

below $5. To capture the economic effect of size gap on stock return, the size gap as well as all other independent variables are standardized to zero mean and one standard deviation each month.

The regression results presented in Table 7 reveal an interesting pattern in stock price movement following competition positioning. In the first year the stock price is significantly increasing with size gap in 10-K, with a coefficient of 0.22% (t-statistic=2.52). This means that the difference between the stock returns to firms at the top and bottom interval of 2.5 standard deviations of size gap around the mean (which is equivalent to the difference between top and bottom decile portfolios) is 0.55% per month, which is 6.57% annually. This increase in stock price, however, is reversed in the third year, with an equivalent annual negative return of −5.15% (t-statistic=−1.89). Figure 2 illustrates the movement of stock price month-by-month after the filing, as implied by the Fama-MacBeth regressions. The figure plots the cumulative coefficient of the size gap variables over the 36 months, multiplied by 2.5 to account for equivalent top/bottom decile portfolio spread. The stock price increases by up to 9.81% during the 15 months after the filing, and then reverses to a level of 1.52% cumulative return in the 36th month.

This pattern in stock price can indicate that investors are misled by the inflated competition power presented by the filing firm, and later on realize its true competition status. We test this hypothesis by looking into the real effects of competition positioning. If indeed the high competition positioning does not represent a real change in the firm's competition strength, then we should not observe any significant changes to firm fundamentals in the years following the positioning. We look at the percentage growth rate of total assets, sales, and net income. For each 10-K, we measure the growth based on the 10-Ks in the subsequent one to three years. We regress the growth measures on the 10-K's size gap and control for firm characteristics. The regressions reported in Table 8 do not show any evidence of abnormal growth in firm assets, sales, and income, in the three years following large size gaps in 10-Ks. On the contrary, the coefficient of size gap is negative and significant for sales growth two and three years after the filing. This result is consistent with the hypotheses that the temporary increase in stock price following competition positioning in 10-K does not represent a real improvement in the competitive power of the filing firm.

5.2. Executive Compensation

The short-term increase in stock price following 10-K competition positioning should increase, by construction, the value of the stocks and options held by the firm's managers. And as shown above, competition positioning is more pronounced in firms where the executives' potential total compensations are more closely tied to the value of equity. Beyond the increase in the value of the existing equity-based compensation components, managers can enjoy form compensation improvement through two other channels. First, managers can actively engage in financial transactions to capitalize on the stock price implications of competition positioning in 10-Ks, namely option exercises and stock sales. Second, positive stock returns following 10-K competition positioning can be associated with a successful managerial performance, and thus can lead boards of directors to award the firms' managers with higher compensation. Such awards are not restricted to equity-based claims, but rather could be given in any form of compensation components, including salary and bonus.

5.2.1. Option Exercising and Stock Sales

We examine whether competition positioning in financial statements predicts option exercise and stock sale activity by the firm managers. We obtain the value realized from option exercises from Execucomp database. We regress option exercises (scaled by firm size) reported in the 10-K of a given year on the size gap in the 10-K of the previous year. We obtain data on executive stock sales from Thomson Reuters. We define a net stock sales dummy variable, which equals one if the market value of total stock sales by executives during the year exceeds the market value of total stock purchase, and zero otherwise. Unlike option exercise data, which are reported annually, the executive stocks sales can be traced monthly. Therefore, to match the stocks sales with the monthly stock return tests, the sample includes firms with December fiscal year-end, where referenced sales are measured in the twelve-month period beginning in April of the following year. Results are presented separately for the averages of option exercising and net sales by all executives and by the CEO only.

The regression results are reported in Table 9. As expected, the extent of stock sales is increasing with past stock returns and firm size, as managers naturally tend to capitalize on the relatively high value of their claims. For option exercise, however, past return and size have

negative coefficients. This might be due two reason. First, the stock sales data are recorded monthly, and thus can be matched with past return in a timely manner; for example, the stocks sales in August 2015 is matched with the stock return from February to July in 2015. The option exercise activity is recorded annually and thus does not allow a direct matchup with stock price movement. The second reason is that unlike stock sales that are likely driven mainly by stock price movement, option exercises are often restricted and subject to meeting certain conditions, resulting therefore in a weaker relation to past stock return or firm size.

More importantly, the regression results indicate that managers exercise more of their options following 10-K reporting with larger size gaps, both when considering all executives and only the CEO (*t*-statistics of the size gap coefficient are 2.08 and 2.18, respectively). This result can indicate that managers that are expected to exercise options tend to over-position its competition in 10-K in order to increase the stock price and thereby their value realized when exercising the options. Similarly, the results also show a positive effect of size gap on the average net stock sales by all executives (*t*-statistic=1.96). When considering the stock sales by the CEO, no significant effect is found. Overall, the results in Table 9 show a positive association between size gap in 10-Ks and the subsequent financial transaction activity by managers, which is consistent with competition management in financial statements.

5.2.2. Total Compensation

We examine whether competition positioning in 10-Ks improves the total compensation of the firm executives. We use Execucomp data to obtain the percent increase in executive total compensation in the year following the 10-K reporting. Table 10 shows regression results of the (log 1+) percent increase in executive total compensation on size gap and other firm characteristics. Results are presented separately for the average compensation of all executives and for the CEO only. The coefficient of size gap is positive in all specifications and statistically significant for the most part (*t*-statistics between 1.72 and 3.17), indicating that large size gaps in 10-Ks increase the executive total compensations in the subsequent year. Uncovering the ex-post actual compensation benefits from competition positioning behavior complements the ex-ante compensation-based incentives of managers to engage in such behavior.

5.3. Takeover Activity

Listing large firms and potentially industry leaders as competitors can also increase the likelihood of the filing firm to be taken over. This might be due to a natural higher visibility of the filing firm following the competition positioning, and also due to a real competition power that the filing firm has developed which justifies the listing of strong companies as competitors. We examine whether competition positioning predicts future takeovers using a Logit regression for a sample of 13,237 10-Ks over 1995-2017. The dependent variable equals one if the firm has been announced as a merger target during the twelve months following the 10-K reporting, and zero otherwise. The sample contains 821 takeovers. The independent variable of interest is the size gap in the 10-K. To control for the firm's unconditional probability of being taken over, we use the model of Billett and Xue (2007). This model relies on a set of merger-related characteristics, such as firm size, profitability, leverage ratio, and others. The regression also includes firm and time fixed effects.

The left column in Table 11 indicates a significant effect of competition positioning on future takeovers, statistically and economically; a one standard deviation increase in size gap increases takeover probability by 74 basis points (18 percent change) in the following year. We acknowledge that acquisitions of highly positioned companies do not necessarily imply that these positioning are manipulated, but rather that they can also reflect real competition power. To verify this conjecture, we add to the regression an interaction term between size gap and average product similarity between the filing firm and the mentioned firms. The coefficient of the interaction term is positive and significant, suggesting that when the competition section includes less similar companies, and thus is more likely based on size considerations, the filing firm is less likely to be acquired. This result provides another piece of evidence of competition positioning considerations in financial reports.

6. Conclusions

We argue and find that firm mangers use their discretion in financial reports to "inflate" the competition power of their companies. Analyzing more than 25,000 10-Ks over more than 20 years indicates that the filing firms tend to list much larger firms as their competitors even if they operate in different industries and produce different products. Exploring the motives behind such

competition positioning indicates that it is more pronounced when the managers' potential total compensations are more closely tied to the value of stock and option holdings. Ex-post implications of competition positioning are consistent with the ex-ante incentives; competition positioning leads to a temporary increase in the stock price of the filing firm, and to higher option exercise and stock sale activity by firm executives. In addition, competition positioning improves the future compensation packages of executives. Yet, the competition positioning is not followed by real improvements in the firm fundamentals, such as sales and income, which is consistent with over-inflation of competition power in 10-Ks.

References

Bebchuk, L., A. Cohen, and A. Ferrell, 2009, What Matters in Corporate Governance? *Review of Financial Studies* 22:783–827.

Bergstresser, D., and T. Philippon, 2006, CEO incentives and earnings management, *Journal of Financial Economics* 80:511–529.

Billett, M. T., and H. F. Xue. 2007. The takeover deterrent effect of open market share repurchases. *Journal of Finance* 62:1827−1850.

Cohen, L., C. Malloy, and Q. Nguyen. 2020. Lazy prices. *Journal of Finance* 75:1371−1415.

DeAngelo, L., 1986, Accounting numbers as market valuation substitutes: A study of management buy outs of public stockholders, *The Accounting Review* 61:400−420.

Dechow, P. M., R. G. Sloan, and A. P. Sweeney, 1995, Detecting earnings management, *The Accounting Review* 70:193−225.

DeFond, M. L., and J. Jiambalvo, 1994, Debt covenant effects and the manipulation of accruals, *Journal of Accounting and Economics* 17:145−176.

Eisdorfer, A., K. Froot, G. Ozik, and R. Sadka, 2022, Competition links and stock returns, *Review of Financial Studies* 35:4300−4340.

Garcia, D., and Ø. Norli. 2012. Geographic dispersion and stock returns. *Journal of Financial Economics* 106:547−565.

Fama, E. F., and J. D. MacBeth. 1973. Risk, return and equilibrium: Empirical tests. *Journal of Political Economy* 81:607−636.

Healy, P. M., 1985, The effect of bonus schemes on accounting decisions, *Journal of Accounting and Economics* 7:85−107.

Healy, P. M., S.-H. Kang, and K. G. Palepu, 1987, The effect of accounting procedure changes on CEOs' cash salary and bonus compensation, *Journal of Accounting and Economics* 9:7−34.

Hoberg, G., and G. Phillips. 2010. Product market synergies and competition in mergers and acquisitions: A text-based analysis. *Review of Financial Studies* 23:3773−3811.

Hoberg, G., and G. Phillips. 2016. Text-based network industries and endogenous product differentiation. *Journal of Political Economy* 124:1423−1465.

Holthausen, R., D. Larcker, D., and R. Sloan, 1995, Annual bonus schemes and the manipulation of earnings, *Journal of Accounting and Economics* 19:29−74.

Jones, J. F., 1991, Earnings management during import relief investigations, *Journal of Accounting Research* 29:193−228.

Kaplan, R. S., 1985, Comments on Paul Healy: Evidence on the effect of bonus schemes on accounting procedure and accrual decisions, *Journal of Accounting and Economics* 7:109−113.

Liberty, S. E., and J. L. Zimmerman, 1986, Labor union contract negotiations and accounting choices, *The Accounting Review* 66:692−712.

Malmquist, D. H., 1990, Efficient contracting and the choice of accounting method in oil and gas industry, *Journal of Accounting and Economics* 12:173−205.

Perry, S. E., and T. H. Williams, 1994, Earnings management preceding management buyout offers, *Journal of Accounting and Economics* 18: 157−179.

Sweeney, A. 1994, Debt covenant violations and managers' accounting responses, *Journal of Accounting and Economics* 17: 281−308.

Wong, J., 1988, Political costs and an intraperiod accounting choice for export tax credits, *Journal of Accounting and Economics* 10:37−51.

Table 1. 10-K Competition Mentions

The table provides statistics on 10-Ks competition mentions over the period 1995-2017. Size gap is the difference between the equity market values of the mentioned firm and the filing firm.

Total number of 10-Ks	119,785
Number of 10-Ks with a competition section	68,952
Number of 10-Ks that mention competitors	26,845
Average number of competitors mentions	4.0
Median number of competitors mentions	3.0
Total number of competitors mentions	108,720
Percent of mentions in the same industry (GIC)	79.6%
Percent of mentions of peers by product similarity	49.5%
Percent of mutual mentions	5.67%
Percent of mutual mentions in the same year	2.95%
Size gap ($ Billions)	
Mean	38.3
Median	3.8

Table 2. Descriptive Statistics

The table presents descriptive statistics for all CRSP/Compustat stock universe, and separately for the sample of the filing firms (those mentioning competitors in their reports) and the sample of mentioned firms (those mentioned as competitors by other companies). For all variables, observations outside the top and bottom percentiles are excluded. For each variable, we first calculate the cross-sectional mean and median across stocks for each sample. We then report the time-series averages of these means/medians for each sample. Size is equity value (in millions of dollars). Market-to-book ratio is equity market value divided by equity book value. Past return is the cumulative return over the past six months. Profitability is the annual income before extraordinary items divided by the previous year's book equity value. Investment is the annual change in gross property, plant, and equipment, plus the change in inventories, scaled by lagged book value of assets. Market beta is measured by the regression of stock returns on market returns over the past 60 months. Idiosyncratic volatility is the standard deviation of the residuals of regression of daily stock returns on the daily market returns over the previous month. Standard deviation of analyst forecasts is calculated from IBES data. Institutional ownership is the sum of all shares held by institutions divided by total shares outstanding. The sample period is 1995 to 2021.

		CRSP/Compustat universe	Mentioning firms	Mentioned firms
Size	Mean	2,663.0	2,629.7	16,343.5
	Median	327.5	615.4	5,844.6
Market-to-book	Mean	2.80	3.09	4.01
	Median	1.79	2.11	2.86
Past stock return	Mean	6.26%	7.60%	8.12%
	Median	2.62%	2.95%	5.05%
Profitability	Mean	−2.41%	−1.00%	9.60%
	Median	8.34%	7.22%	13.47%
Investment	Mean	6.40%	5.87%	5.49%
	Median	3.48%	4.08%	3.70%
Market beta	Mean	1.13	1.28	1.32
	Median	0.99	1.18	1.25
Idiosyncratic volatility	Mean	2.99%	3.08%	2.12%
	Median	2.30%	2.54%	1.76%
SD of analyst forecasts	Mean	6.40%	6.56%	6.86%
	Median	5.56%	6.24%	5.33%
Institutional ownership	Mean	46.3%	51.4%	65.2%
	Median	47.6%	54.5%	68.5%

Table 3. Correlation between Firm Size and Firm Similarity within a Report

We consider only filing firms that mention at least five competitors in their annual reports (5,691 reports over 1995-2017). For each mentioned competitor we assign two peer measures: (i) a dummy variable indicating if the competitor operates in the same industry (GIC) as the filing firm, and (ii) the similarity score between the products of the competitor and the filing firm, based on Hoberg and Phillips (2010, 2016). For each report of a filing firm, we calculate the correlation between the two peer measures and the size of the mentioned competitor.

| | Similarity to the mentioned firm | |
	Same-industry dummy	Product similarity score
Mentioned firm's size	−0.0402	−0.2205
P-value	0.0003	<.0001

Table 4. Regression of the Similarity between the Filing Firm and the Competitors it Mentions on Size Gap

For each 10-K, we measure the extent to which the filing firm positions its competition status by the difference between the average (log) size of the competitors it mentions and the (log) size of the filing firm ('size gap'). We further calculate for each 10-K the averages of two peer measures as described in Table 2 (the same-industry dummy and the product similarity score). The table shows results of regressions of the two average peer measures on size gap. The control variables include the filing firm's (log) size as well as other firm characteristics as described in Table 2. All regressions include industry-year fixed effects (by GIC classification), and the standard errors are clustered by firm. All coefficients are multiplied by 100, and *t*-statistics are in parentheses. The sample period 1995-2017.

	Average same-industry indicator		Average product similarity score	
Intercept	46.72	18.59	7.23	8.20
	(5.14)	(1.80)	(23.21)	(5.98)
Size gap	−1.11	−1.05	−0.54	−0.60
	(−5.14)	(−3.28)	(−15.46)	(−12.46)
Log(size)		0.19		−0.13
		(0.35)		(−1.11)
Log(market-to-book)		0.54		−0.14
		(0.83)		(−1.34)
Past return		0.38		−0.31
		(0.55)		(−3.03)
Profitability		−0.39		−0.26
		(−0.65)		(−3.27)
Investment		1.33		0.55
		(0.49)		(1.41)
Inst. ownership		1.07		0.77
		(0.43)		(1.71)
# Observations	17,304	13,228	19,447	13,980
Adj R-square	0.091	0.092	0.110	0.112

Table 5. Robustness

We replicate the regressions in Table 4 of the average product similarity score ('Base results') with four modifications: (1) We include firm fixed effects; (2) We replace the dependent variable of average product similarity score with a size-adjusted score, measured as follows. Each year we sort all stocks by firm size into ten equal-sized groups. We then calculate the average product similarity score for each pair of size deciles, yielding 10x10 average scores. The size-adjusted product similarity score between the mentioning firm and the mentioned firm is the raw score minus the average score of their corresponding size deciles; (3) We use the 3-digit calibrated product similarity score (instead of two-digit); And (4) We use an alternative measure to size gap: the difference between the average (log 1+) number of 10-Ks in which the competitors are mentioned and the (log 1+) number of 10-Ks in which the filing firm is mentioned.

	Base results	Firm Fixed Effects	Size-adjusted product similarity	3-digit calibrated product similarity	Mention gap
Intercept	8.20	5.07	8.27	6.50	3.63
	(5.98)	(8.33)	(5.82)	(5.25)	(3.77)
Size gap	−0.60	−0.54	−0.67	−0.52	−1.17
	(−12.46)	(−9.67)	(−13.11)	(−13.14)	(−13.03)
Log(size)	−0.13	−0.22	−0.21	−0.14	0.19
	(−1.11)	(−2.43)	(−1.79)	(−1.29)	(2.05)
Log(market-to-book)	−0.14	−0.15	−0.16	−0.12	0.00
	(−1.34)	(−1.82)	(−1.46)	(−1.37)	(−0.05)
Past return	−0.31	−0.20	−0.27	−0.23	−0.31
	(−3.03)	(−2.45)	(−2.55)	(−2.86)	(−3.12)
Profitability	−0.26	−0.14	−0.34	−0.25	−0.28
	(−3.27)	(−1.74)	(−3.79)	(−3.79)	(−3.64)
Investment	0.55	−0.36	0.50	0.48	0.70
	(1.41)	(−1.18)	(1.20)	(1.47)	(1.87)
Inst. ownership	0.77	0.42	0.81	0.55	1.06
	(1.71)	(1.16)	(1.74)	(1.38)	(2.44)
# Observations	13,980	13,980	13,790	13,980	14,921
Adj R-square	0.112	0.054	0.116	0.102	0.105

Table 6. Effect of Executives' Equity-Based Incentives on Size Gap

We measure the equity-based incentives of firm i executives at the end of fiscal year t following the procedure of Bergstresser and Philippon (2006):

$$Incentive\ ratio_{i,t} = \frac{ONEPCT_{i,t}}{ONEPCT_{i,t} + SALARY_{i,t} + BONUS_{i,t}}$$

where $ONEPCT_{i,t} = 0.01 \times PRICE_{i,t} \times (SHARES_{i,t} + OPTIONS_{i,t})$, $PRICE$ is the company share price, $SHARES$ and $OPTIONS$ are the number of shares and options held by the executive. The table shows results of regressions of size gap in the 10-K on the executive incentive ratio. The control variables include the filing firm's (log) size as well as other firm characteristics as described in Table 2 plus an entrenchment index (from Bebchuk, Cohen, and Ferrell (2009)), firm age, volatility of sales growth, based on most recent eight quarters, book leverage (book value of debt over book value of assets), and discretionary accruals, measured by the modified Jones model (Jones (1991) and Dechow et al. (1995)). Results are presented separately for the average incentive ratio of all executives and for the CEO only. All regressions include industry-year fixed effects (by GIC classification), and the standard errors are clustered by firm. All coefficients are multiplied by 100, and t-statistics are in parentheses. The sample period is 1995-2017.

	Dependent variable: 10-K size gap			
	All Executives Incentive		CEO Incentive	
Intercept	1388.79	1376.55	1373.34	1404.17
	(27.45)	(12.98)	(27.42)	(13.72)
Exec. Incentive ratio	93.50	110.78	53.90	69.82
	(2.45)	(2.28)	(2.50)	(2.50)
Log(size)	−82.63	−77.35	−81.55	−76.39
	(−24.48)	(−16.22)	(−25.22)	(−16.50)
Log(market-to-book)	14.43	15.01	14.82	15.85
	(2.42)	(1.91)	(2.53)	(2.05)
Past return	−6.11	−8.56	−4.63	−6.47
	(−0.92)	(−0.76)	(−0.67)	(−0.56)
Profitability	−5.53	−6.62	−6.36	−9.28
	(−0.78)	(−0.64)	(−0.95)	(−0.88)
Investment	−21.68	13.59	−19.78	10.46
	(−0.93)	(0.38)	(−0.85)	(0.29)
Institutional ownership	−39.87	−51.26	−39.56	−54.79
	(−2.02)	(−1.69)	(−2.04)	(−1.92)
Entrenchment index		8.95		8.50
		(1.96)		(1.87)
Firm age		−0.89		−0.93
		(−1.94)		(−2.04)
Volatility of sales growth		19.41		22.53

		(0.54)		(0.63)
Book leverage		−39.99		−43.12
		(−1.28)		(−1.37)
Discretionary accruals		−51.83		−42.01
		(−1.01)		(−0.81)
# Observations	6,414	3,302	6,170	3,262
Adj R-square	0.381	0.365	0.383	0.368

Table 7. Effect of 10-K Size Gap on Stock Returns: Fama-MacBeth Regressions

We run cross-sectional Fama and MacBeth (1973) regressions of monthly stock returns on size gap in the most recent 10-K and those in prior two and three years. The sample includes all firms with December fiscal year-end, and returns for a referenced year begin in April of the following year(s). The control variables are based on the firm characteristics described in Table 2. All independent variables are standardized to zero mean and one standard deviation each month. All coefficients are multiplied by 100 and *t*-statistics are in parentheses. The sample period is 1995-2017.

	The year at which 10-K size gap was measured		
	Year(-1)	Year(-2)	Year(-3)
Intercept	2.11	2.06	2.23
	(5.13)	(4.93)	(5.27)
Size gap	0.22	0.00	−0.17
	(2.52)	(0.04)	(−1.89)
Log(size)	−1.14	−1.33	−1.48
	(−9.21)	(−9.88)	(−9.95)
Log(market-to-book)	−0.10	−0.02	0.01
	(−0.81)	(−0.20)	(0.06)
Past return	−0.08	−0.07	0.01
	(−0.59)	(−0.47)	(0.05)
Profitability	−0.37	−0.45	−0.35
	(−3.61)	(−4.53)	(−2.87)
Investment	−0.37	−0.38	−0.17
	(−4.91)	(−4.83)	(−2.19)

Table 8. Effect of Size Gap on Firm Growth

For each 10-K, we measure the firm growth based on the 10-Ks in the subsequent one to three years. We look at the percentage growth rate of total assets, sales, and net income. We regress the growth measures on the 10-K's size gap and control variables as described in Table 2. All regressions include firm and year fixed effects (by GIC classification), and the standard errors are clustered by firm. All coefficients are multiplied by 100, and *t*-statistics are in parentheses. The sample period is 1995-2017.

	Asset growth			Sales growth			Net income growth		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Intercept	2.95	5.75	9.67	4.35	8.88	16.51	31.31	49.59	64.75
	(5.12)	(5.72)	(7.81)	(5.98)	(5.64)	(5.99)	(4.66)	(4.52)	(5.13)
Size gap	0.43	0.84	1.42	0.58	1.30	1.95	4.06	6.24	8.90
	(−0.39)	(−1.05)	(−1.51)	(−0.71)	(−2.21)	(−2.47)	(1.58)	(1.43)	(0.15)
Log(size)	0.90	2.17	3.61	1.33	3.10	5.33	7.41	11.34	15.14
	(−9.59)	(−12.83)	(−14.42)	(−3.59)	(−5.86)	(−7.16)	(−6.70)	(−6.19)	(−7.14)
Log(market-to-book)	1.12	2.54	3.99	1.53	3.49	5.64	10.07	15.72	25.12
	(18.80)	(16.71)	(15.85)	(6.93)	(5.65)	(5.82)	(3.12)	(0.53)	(−0.05)
Past return	1.41	2.36	3.58	1.58	3.06	4.59	12.54	19.04	29.33
	(3.17)	(1.37)	(1.03)	(3.49)	(2.62)	(3.09)	(−0.51)	(0.72)	(0.29)
Profitability	1.20	2.03	3.45	1.80	4.21	7.69	11.46	19.13	28.60
	(1.90)	(0.99)	(0.49)	(−1.13)	(−1.51)	(−0.80)	(−1.53)	(−2.67)	(−2.20)
Investment	3.31	7.93	11.93	4.64	12.08	19.29	35.17	56.01	87.56
	(−2.99)	(−1.17)	(−1.89)	(−2.69)	(−2.00)	(−0.85)	(−0.95)	(−0.45)	(−0.16)
# Observations	11,843	10,815	9,889	11,681	10,670	9,760	5,799	5,121	4,662
Adj R-square	0.099	0.123	0.143	0.052	0.062	0.073	0.038	0.047	0.057

Table 9. Effect of Size Gap on Executive Option Exercising and Stock Sale

The table shows the results of regressions of option exercising and net stock sales by firm executives in the year following the 10-K reporting. Option exercising is the value realized from option exercises scaled by firm size, as reported by the next 10-K for the full sample of firms. Net stock sales is a dummy variable that equals one if the market value of total stock sales by executives during the year exceeds the market value of total stock purchase, and zero otherwise. The sample for net stock sales includes firms with December fiscal year-end, where referenced sales are measured in the twelve-month period beginning in April of the following year. The independent variables are the size gap in the 10-K and firm characteristics. Results are presented separately for the averages of option exercising and net sales by all executives and by the CEO only. All regressions include industry-year fixed effects (by GIC classification), and the standard errors are clustered by firm. All coefficients are multiplied by 100, and *t*-statistics are in parentheses. The samples period is 1995-2017.

	Option exercising		Net stock sales	
	All Executives	CEO	All Executives	CEO
Intercept	19.62	39.80	−27.92	−36.29
	(4.03)	(2.75)	(−2.81)	(−2.52)
Size gap	0.29	0.95	0.79	0.12
	(2.08)	(2.18)	(1.96)	(0.20)
Log(size)	−1.16	−2.19	6.08	6.60
	(−4.25)	(−2.87)	(9.43)	(6.64)
Log(market-to-book)	0.44	0.20	−0.46	1.82
	(0.74)	(0.12)	(−0.51)	(1.41)
Past return	−5.03	−12.77	11.96	13.08
	(−4.94)	(−3.63)	(8.57)	(6.51)
Profitability	1.56	4.99	4.08	4.02
	(1.07)	(1.41)	(3.98)	(3.01)
Investment	23.48	54.68	8.11	7.06
	(2.44)	(1.66)	(1.81)	(1.04)
Institutional ownership	−2.76	−8.29	19.58	28.87
	(−1.36)	(−1.22)	(6.02)	(6.07)
# Observations	6,284	6,038	5,803	3,126
Adj R-square	0.052	0.028	0.166	0.236

Table 10. Effect of Size Gap on Executive Compensation

The table shows the results of regressions of the (log 1+) percent increase in executive total compensation in the year following the 10-K reporting. The independent variables are the size gap in the 10-K and firm characteristics as described in Table 2. Results are presented separately for the average compensation of all executives and for the CEO only. All regressions include firm and year fixed effects (by GIC classification), and the standard errors are clustered by firm. All coefficients are multiplied by 100, and *t*-statistics are in parentheses. The sample period is 1995-2017.

| | Dependent variable: % change in executive compensation | | | |
	All Executives		CEO	
Intercept	13.28	2.29	2.68	1.15
	(2.89)	(0.41)	(0.43)	(0.16)
Size gap	2.24	1.78	3.13	1.87
	(3.06)	(2.01)	(3.17)	(1.72)
Log(size)		−7.33		−7.04
		(−4.37)		(−3.61)
Log(market-to-book)		4.34		2.21
		(2.07)		(0.87)
Past return		7.69		5.19
		(2.43)		(1.19)
Profitability		2.09		0.70
		(0.85)		(0.15)
Investment		12.00		15.56
		(1.20)		(1.20)
# Observations	7,153	6,102	6,740	5,784
Adj R-square	0.029	0.035	0.015	0.019

**Table 11. Effect of Size Gap on Future Takeovers**

The table shows the results of Logit regressions for the sample of 13,237 annual reports over 1995-2017. The dependent variable equals one if the firm has been announced as merger target in the next twelve months, and zero otherwise. The sample contains 821 takeovers. The independent variables include the 10-K's size gap (as described in Table 4) and the average product similarity score between the filing firm and the mentioned firms (as well as interaction terms). The control variable is the firm's takeover probability, estimated by the model of Billett and Xue (2007). The p-values of the coefficients are reported in parentheses.

Intercept	−3.90	−3.99
p-value	(<0.001)	(<0.001)
Size gap	0.07	0.06
p-value	(<0.001)	(0.008)
Average product similarity		1.09
p-value		(0.229)
Size gap x Average product similarity		0.63
p-value		(0.058)
Billett and Xue model	13.05	12.83
p-value	(0.005)	(0.006)

Figure 1. Size Gap Distribution by Product Similarity

For each competition mention we measure the size gap (the difference between the (log) equity market values of the mentioned firm and the filing firm) and the product similarity score between the mention firm and the mentioning firm (based on Hoberg and Phillips (2010, 2016)). The figure shows the distribution of the size gap for peer mentions (positive product similarity score) and non-peer mentions (zero product similarity score). The sample contains 84,058 competition mentions over 1995-2017.
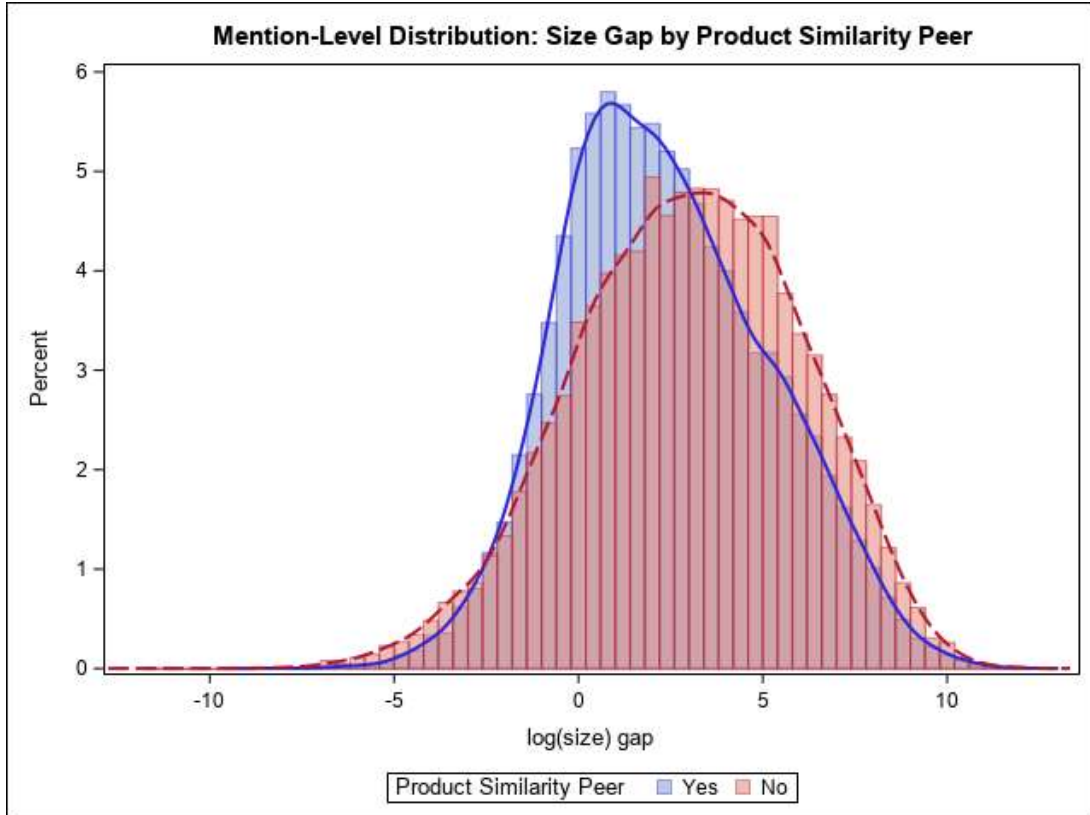
Figure 2. Size Gap and Long-Term Stock Returns

For all 10-K with December fiscal year-end, we run 36 sets of monthly Fama and MacBeth (1973) regressions, starting from April of the following year. The main independent variable is the size gap in the 10-K. The control variables are (log) size, (log) market-to-book ratio, past stock return, profitability, and investment, ad described in Table 2. All independent variables are standardized to zero mean and one standard deviation each month. The figure plots the cumulative coefficient of the size gap variables over the 36 months times 2.5. The sample contains 16,524 annual reports over 1995-2017.