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The timing and consequences of seasoned equity offerings: A regression discontinuity approach

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Abstract

The likelihood of seasoned equity offerings (SEOs) jumps discontinuously when the stock price equals the most recent equity offer price. Anchoring on the last offer price holds after considering executive turnovers, stock splits, earnings management, or dividend adjustments. Using a fuzzy regression discontinuity design around this cutoff, which exploits local randomness in stock prices, we investigate the consequences of anchoring in SEOs. We find significant increases in cash holdings and acquisitions of lower quality, with no real effects on investment or employment. Overall, we provide some of the cleanest estimates, to date, of the timing and causal effects of SEOs.

JEL classification: G30; G31; G32

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1. Introduction

Market timing is a prominent explanation for seasoned equity offerings (SEOs), with the intuition that firms issue equity when the cost of equity appears to be low, i.e., when shares appear overvalued (e.g., Loughran and Ritter, 1995, 1997; Baker and Wurgler, 2000, 2002). While survey evidence supports the prominence of market timing in equity issuance (e.g., Graham and Harvey, 2001; Bancel and Mittoo, 2004), identifying it in observational data is notoriously hard. First, SEO decisions and firm valuations are simultaneously and endogenously determined. Second, the usual proxies for market timing, including market-to-book ratios and recent or future abnormal stock returns, may reflect stronger economic fundamentals instead of overvaluation. Third, although several papers developed measures of mispricing to explain equity issuances (e.g., Dong, Hirshleifer, and Teoh, 2012; Khan, Kogan, and Serafeim, 2012), there is little evidence on the valuation benchmarks that are used in practice to time SEOs. Consequently, we still know relatively little about the decision-making process and real effects of SEOs.

The purpose of this paper is to fill these gaps. It provides causal evidence on the timing of SEOs using a new instrument that does not rely on measures of mispricing. We depart from prior work by focusing on the valuation benchmarks that are used in initiating SEOs rather than empirical proxies for stock overvaluation. Specifically, we show that the last equity offer price serves as a valuation benchmark in subsequent SEOs and the likelihood of SEOs jumps discontinuously around it. We then use a fuzzy regression discontinuity design (RDD), which exploits the local randomness around this benchmark driven by stock market fluctuations, to investigate the real effects of SEOs. Our contribution is twofold. First, we provide clean evidence for an explicit model of SEO timing, which is based on a perceived valuation benchmark (or anchor). Second, we provide novel causal evidence on the implications of SEOs for firms' financial and real policies.

Our theoretical framework builds on a growing literature that shows the use of anchors in decision-making. This approach has compelling psychological microfoundations (e.g., Tversky and Kahneman, 1974) and has been used to explain various corporate decisions. For example, Baker, Pan, and Wurgler (2012) find a spike in the distribution of merger offer prices at the target's 52-week high and at other recent peak prices; Ma, Whidbee, and Zhang (2019) show that the acquirer's 52-week high serves as a reference price for acquirer valuation; Hovakimian and Hu (2019) show that SEOs and share repurchases are anchored on the 52-week high and low prices, respectively; and Loughran and Ritter (2002) provide a reference point-based explanation for leaving money on the table in initial public offerings (IPOs). Dougal, Engelberg, Parsons, and Van Wesep (2015) find that a firm's current cost of borrowing is strongly influenced by its historical borrowing cost. These results show that anchoring applies to highly sophisticated agents such as managers and bankers.

We begin our empirical analyses by constructing a new measure of SEO timing, *Price ratio*, defined as the ratio between the average stock price of the previous quarter and the firm's most recent equity offer price.[1] We find a discontinuous jump of 54% in the probability of equity issuances around the cutoff of *Price ratio* equaling one. This finding suggests that when the stock price reaches the last equity offer price, the firm is significantly more likely to issue equity again. In multivariate regressions explaining the likelihood of SEOs, we find that the indicator variable *Above one* (defined as one for observations with *Price ratio*≥1 and zero otherwise) is highly statistically and economically significant, even after controlling for the firm's share price and market capitalization. These results hold in linear probability models that allow saturating the regressions with industry, firm, and year-quarter fixed effects to control for unobservable variation across industries, firms, and through time as well as nonlinear logit regression models. They suggest that the most recent equity offer price serves as an important valuation benchmark in SEO decisions.

[1] On average, the time between two consecutive issuances is eight quarters. In unreported tests, we control for the time since the last SEO and find similar results.

It is possible that *Price ratio* is correlated with, and serves as a proxy for, past stock prices, and if so, the evidence we present here is not due to anchoring but to the trend in past prices. To address this concern, we compare the new measure to prior measures of market timing: Tobin's Q, recent abnormal stock returns, and future abnormal stock returns. These three measures are used in numerous studies to explain equity issues (e.g., DeAngelo, DeAngelo, and Stulz, 2010; McLean, 2011; Altı and Sulaeman, 2012). After controlling for these measures, we find that the *Above one* indicator remains positive and highly statistically significant. Moreover, in the bandwidth 0.9≤*Price ratio*≤1.1, our measure often drives out both Tobin's Q and future stock returns.

We also consider the ratio of the current stock price to the historical 52-week high price since Hovakimian and Hu (2019) show that historical high prices are important in SEO decisions. Their approach is related to ours, as it puts forth another anchor—one that is based on market timing relative to the historical 52-week high price rather than the most recent equity offer price. Consistent with Hovakimian and Hu (HH henceforth), we find that the likelihood of an SEO increases when the stock price reaches the 52-week high price. However, the economic importance of the HH anchor is substantially weaker than that of the most recent equity offer price. Moreover, the HH measure does not generate a discontinuity in the likelihood of SEOs, and consequently, it cannot be used in an RDD setting to study the causal effects of SEOs. We therefore focus the remainder of the analyses on the most recent equity offer price.

We confirm in placebo tests around other stock price-based benchmarks, including higher values of *Price ratio* such as 1.5 and 2, that the effects are not mechanical or driven by high stock valuations per se. We also show that the effects hold at different price frequencies (monthly and quarterly) and remain similar if the company performed a stock split since the last equity offer. Baker and Xuan (2016) investigate the implications of CEO turnover and show that equity issuance is more sensitive to changes in Tobin's Q during the current CEO's tenure. We show that the effect of *Price ratio* persists even if the CEO or the CFO has changed since the last equity offer.

Having established the importance of the most recent equity offer price as an anchor in the decision to issue equity, we next analyze its causal consequences by exploiting the discontinuity around *Price ratio*=1 in a fuzzy RDD framework. We study the effects after restricting the sample to a small bandwidth where *Price ratio* is between 0.9 and 1.1 and use the indicator *Above one* to compare between firms whose stock price is just above their last SEO price (*Above one*=1) and firms whose stock price is just below their last SEO price (*Above one*=0). This approach ensures that we are identifying the effects of the discontinuity in the likelihood of SEOs and therefore addresses the concern that unobserved factors such as investment opportunities confound the causal effects of SEOs. The identifying assumption is that firms whose stock price is just below their last offer price, and firms whose stock price is just above their last offer price, are similar except for the propensity to issue equity. This assumption implies that there are no other discontinuous differences around *Price ratio*=1 that directly affect the outcome variables.

We provide several analyses that support this key assumption. First, we compare the treatment firms (*Price ratio≥1*) and the control firms (*Price ratio*<1) along important firm characteristics and outcome variables measured in the prior quarter. We do not find significant preexisting differences between the two groups after controlling for *Price ratio*. Second, we investigate whether treatment firms are also more likely to issue debt. We find that debt issuance is unaffected by *Price ratio*, consistent with the conjecture that treatment firms do not have access to higher investment opportunities or have different motivations to raise capital.

Third, we explore the possibility that firms manage their stock prices around the cutoff.[2] We do not find significant differences in earnings management or earnings surprises between

[2] Efforts to manipulate/manage the share price around the anchor *Price ratio*=1 would be evidence in themselves that the most recent equity offer price is important in SEO decisions.

the treatment firms and the control firms. We also do not find significant differences in dividend adjustments or delays between the two groups. Moreover, following Baker, Pan, and Wurgler (2012), we show that the results continue to hold when we focus on the variation in a firm's share price that is driven by market-wide movements outside the control of the firm. Fourth, we perform the McCrary (2008) test and show that the density of the running variable *Price ratio* is smooth around the cutoff. The McCrary (2008) test statistic is insignificant. Finally, all the analyses control for linear associations between *Price ratio* and the outcome variables.

Last, we exploit cross-sectional variation in the discontinuity in SEOs around *Price ratio*=1 to weaken the assumptions that are required for causal inference. We show that the discontinuity in SEOs is much weaker when the firm is financially constrained or is facing high investment opportunities. This evidence is consistent with the identifying assumption since the SEOs of financially constrained firms, or firms with high investment opportunities, are less likely to be driven by anchoring.

In the RDD analyses, the causal effects of anchoring in SEOs suggest that the proceeds from these SEOs are used to increase cash balances. We find that cash holdings increase by 7.4–9.2 percentage points following SEOs. We do not find, however, evidence that capital expenditures are significantly affected by anchoring in SEOs. We also do not find significant changes in research and development (R&D) investment or employment.

While SEOs do not impact capital expenditures and employment, they do impact acquisitions. We find that firms' acquisitions increase following SEOs. The likelihood of acquisitions increases by 3.7 percentage points in the year following the SEO. These acquisitions, however, generate 1.1–2.4 percentage points lower announcement returns.

In a final step, we investigate who anchors on past SEO prices. Both managers and shareholders may be irrational and anchor on the most recent equity offer price. While we cannot distinguish between the beliefs of managers and investors, we can gain insight into investors' beliefs by investigating the reaction and anchoring behavior of buy-side investors. First, we provide evidence on institutional investors' shareholdings using data from the Thomson-Reuters 13F database. Our findings indicate that both participation and changes in holdings of institutional investors are significantly higher for the treatment issuers (*Price ratio*≥1) than for the control issuers (*Price ratio*<1). This behavior of buy-side investors provides an additional rationale for firms' increased propensity to initiate an SEO when the stock price reaches the offer price of the previous SEO.

Second, we investigate the stock market reaction to anchored SEOs by studying SEO announcement returns. In the small bandwidth around *Price ratio=1*, the cumulative abnormal returns (CARs) around SEO announcements are slightly higher for the treatment issuers (*Price ratio*≥1) than for the control issuers (*Price ratio*<1). The differences in announcement returns between *Above one* (treatment) issuers and *Below one* (control) issuers range between 40–70 basis points, are often statistically significant at conventional levels, and are highly persistent across different event windows and models. These findings indicate that investors perceive *Above one* SEOs favorably relative to *Below one* SEOs, consistent with the evidence on the behavior of buy-side investors. In the cross-section, announcement returns vary with the outcomes of the SEOs. Specifically, *Above one* issuers earn higher CARs if they subsequently build up financial slack, refrain from making acquisitions, and have real investment needs.

Our findings relate to prior work showing that nonfundamental movements in stock prices affect investment via equity issuance (e.g., Baker, Stein, and Wurgler, 2003; Campello and Graham, 2013). They also complement prior studies showing that a cash windfall increases acquisitions but not investment (Blanchard, Lopez-de-Silanes, and Shleifer, 1994) and managers spend excess cash on value-destroying acquisitions (Harford, 1999). The results are also related to studies of anchoring in investors' trading behavior such as Ben-David and Hirshleifer (2012).

Overall, our paper contributes to the literature on SEOs by providing a new hypothesis of anchoring-based timing of SEOs. This hypothesis proposes a concrete, contextual valuation benchmark rooted in the assumption that prior equity offer terms are a natural starting point for the terms of subsequent SEOs. This hypothesis also puts forth a relatively clean way to measure the real effects of SEOs because a firm's position relative to the anchor is determined by stock market fluctuations. We estimate that anchoring on the most recent equity offer price plays a role in at least 23% of SEOs.

2. Data sources and sample construction

To identify SEOs, we start with all SEOs reported by Thomson One from 1983 to 2015. The sample period begins in 1983 because the filing date is missing for SEOs prior to 1983. We impose the following sample selection criteria: (i) the issuer is a publicly traded US firm trading on the NYSE, Nasdaq, or Amex; (ii) the issue is defined as a follow-on issue of common stocks and is not a pure secondary offering or a rights or units offering; and (iii) the firm has done an SEO in the past five years. This last selection criterion guarantees that the ratio between the stock price of the previous quarter and the last offering price can be calculated and the prior SEO is recent enough to serve as a reference point. In later analyses, we investigate how the recency of the previous SEO affects the estimates.

We merge the SEO data with firm-quarter observations from Standard and Poor's quarterly Compustat file. We exclude regulated utility firms (Standard Industrial Classification (SIC) codes 4900–4999) and financials (SIC codes 6000–6999) as well as firm-quarters with missing or nonpositive assets. We also merge these observations with stock-level data from the Center for Research in Security Prices (CRSP). Our final sample consists of 3021 SEOs, of which 350 occurred in 1983–1989, 1,074 occurred in 1990–1999, 975 occurred in 2000–2009, and 622 occurred in 2010–2015.

Table 1 describes the main variables used in our analyses. Panel A reports summary statistics for the full sample of firm-quarter observations, whereas Panel B describes the sample of firm-quarter observations in the bandwidth where *Price ratio* is between 0.9 and 1.1. The average (median) *Price ratio* in the full sample is 0.94 (0.87), whereas the average *Price ratio* in the small bandwidth around *Price ratio*=1 is 1. *Above one* is a dummy variable equal to one if *Price ratio* is greater than or equal to one and zero otherwise. In the full sample, *Price ratio* is greater than one in 39.2% of the observations. In the symmetric bandwidth around one, *Price ratio* is greater than one in 50% of the observations. Further, firms announce SEOs in 3% of the quarters in the full sample, compared to 5.5% in the small bandwidth around *Price ratio*=1. A comparison between Panels A and B reveals that observations in the small bandwidth around *Price ratio*=1 are similar to those in the full sample based on observable characteristics such as market capitalization, leverage, and Tobin's Q.

3. The likelihood and timing of SEOs

3.1 Baseline evidence

In this section, we investigate the timing of SEOs, focusing on the offer price of the firm's most recent SEO. Fig. 1 plots the probability of an SEO against *Price ratio*. Fig. 1 aggregates *Price ratio* into decile bins and plots, for each bin, the probability of an SEO, defined as the fraction of firm-quarters with an SEO out of all firm-quarters in that bin.

Fig. 1 shows that the probability of an SEO jumps discontinuously by three percentage points (or 54% relative to the unconditional SEO probability of 5.5%) around *Price ratio*=1. The likelihood of an SEO in quarters when *Price ratio* is between 0.9 and 1 is roughly 4%, whereas the likelihood of an SEO in quarters when *Price ratio* is between 1 and 1.1 is about 7%. Importantly, Fig. 1 shows that compared to other values of *Price ratio*, the increase in the likelihood of SEOs is substantially higher around *Price ratio*=1. Moreover, the likelihood of SEOs declines when *Price ratio* is higher than 1.1, suggesting that firms tend to announce an SEO when their stock price crosses the offer price of the previous SEO.

In Table 2, we estimate a linear probability model (LPM) in which the unit of analysis is a firm-quarter pair, and the dependent variable *SEO dummy* equals one if the firm announces an SEO in the quarter and zero otherwise. The LPM is estimated in a small bandwidth around *Price ratio*=1: $0.9 \leq$ *Price ratio* ≤ 1.1. Motivated by the evidence in Fig. 1, the main explanatory variable of interest is the indicator *Above one*, which equals one when *Price ratio* is higher than or equal to one and zero otherwise.

The main finding in columns 1–5 of Table 2 is that the likelihood of an SEO is substantially higher in quarters when the stock price exceeds the offer price of the most recent SEO. In particular, the likelihood of an SEO increases by roughly two percentage points when *Above one* equals one. These estimates are economically large—they represent an increase of 36% in the likelihood of an SEO relative to the unconditional likelihood of an SEO of 5.5%. They are also statistically significant at the 5% level or better and also hold in logit regressions (unreported). In columns 6–7 of Table 2, we show that we obtain similar results when we consider the SEO issuance amount rather than the likelihood of the SEO.

These results hold after including year-quarter fixed effects to control for market-wide time trends and industry or firm fixed effects to control for industry- or firm-level unobservable, time-invariant attributes. They also hold after controlling for the continuous running variable *Price ratio* and its interaction with the variable *Above one*.

The local linear regressions in columns 1–7 are based on a small bandwidth around the cutoff. An alternative approach is to use more data, which could provide better extrapolation but could introduce greater bias (Roberts and Whited, 2013). Therefore, in columns 8–11, we use the full sample and mitigate the bias through higher order polynomials of the running variable *Price ratio* and their interaction with *Above one*. As shown in columns 8–11, we obtain similar results, both qualitatively and quantitatively, in the full sample rather than in the narrow bandwidth around *Price ratio*=1. The results hold for the likelihood of SEOs (columns 8–9) and for issuance amounts (columns 10–11).

The evidence suggests that the last equity offer price is used as a reference point in subsequent SEOs. It highlights the role of the perception of pricing in the timing of equity issuance. This anchoring-based model is different from standard measures of market timing, such as market-to-book ratios and past or future abnormal stock returns, along two dimensions. First, it provides a concrete, well-defined benchmark, which underlies the pricing perception of managers and investors rather than overvaluation. Second, while existing proxies for market timing likely reflect economic fundamentals, the discontinuous jump in the likelihood of an SEO around the offer price of the most recent SEO is unlikely related to economic fundamentals.

To further establish that our results are driven by anchoring rather than a trend in past prices, we include prior measures of market timing in our empirical model: Tobin's Q, recent abnormal stock returns, and future abnormal stock returns. These measures are used in numerous studies to explain equity issues (e.g., DeAngelo, DeAngelo, and Stulz, 2010; McLean, 2011; Altı and Sulaeman, 2012). After controlling for these measures, we find that *Above one* remains positive and is statistically significant. In the bandwidth 0.9≤*Price ratio*≤1.1, it often drives out Tobin's Q and future stock returns.

3.2 Robustness and extensions

In this section, we consider several robustness tests and extensions. First, we consider an alternative reference point based on the ratio of the current stock price to the 52-week high price since HH show that historical high prices are important in SEO decisions. Second, we investigate alternative test specifications, including placebo cutoff points and higher frequency data. Last, we study the effect of related factors such as executive turnovers, stock splits, and the recency of the last equity offering.

In Panel A of Table 3, we consider an alternative anchor proposed by HH. Contrary to our approach that focuses on the most recent equity offer price, HH focus on the 52-week high price as an alternative valuation benchmark. Our analyses consider two versions of the HH measure defined in Eq. (1) and (3) in the HH paper. The first definition (Eq. (1)) considers the previous quarter's closing price. The second definition (Eq. (3)) considers the highest price over the previous quarter. Using both definitions, we consider an indicator variable, *Above historical high*, which equals one if the stock price in the previous quarter reaches the 52-week high and zero otherwise. The HH measure, *Above historical high*, is constructed in the same way as our measure, *Above one,* to facilitate a meaningful comparison between the two instruments.

The results in Panel A of Table 3 indicate that the HH anchor has a positive, significant effect on the likelihood of an SEO. These results hold across the different definitions of the HH measure. Further, they hold both in the full sample and in the small bandwidth 0.9≤*Price ratio_HH*≤1.1. The estimates are highly statistically significant at the 1% level and suggest that when the previous quarter's stock price hits the 52-week high, the likelihood of an SEO increases by 1.1–2.7 percentage points. However, when we include *Above one* in the regressions, the economic importance of the HH measures decreases substantially from 1.1–2.7 percentage points to 0.7–1.8 percentage points. The economic magnitude of *Above one* is two to four times higher, varying from 2.9 to 3.8 percentage points.

In the second set of analyses, we investigate whether the HH anchor generates a discontinuous jump that can be exploited to draw causal inferences about the implications of SEOs for firm outcomes. We provide two sets of results. First, columns 7 and 10 of Table 3, Panel A repeat the analyses after controlling for the continuous measure *Price ratio_HH* and its interaction with *Above historical high*. The results indicate that the coefficient on *Above historical high* is small and indistinguishable from zero, suggesting that the HH anchor does not generate a discontinuity in SEO likelihood. Second, Panel A of Fig. 2 plots the probability of an SEO as a function of the HH measure, which is defined as the ratio of the previous quarter high price to the historical high price over the past 52 weeks. Fig. 2, Panel A clearly shows that the likelihood of SEOs does not exhibit any discontinuity around the cutoff *High price*$_{t-1}$/*High price*$_{t-2,t-5}$=1.

Based on the above empirical analyses, we conclude that the HH measure is a relevant benchmark in explaining the likelihood of SEOs. Nevertheless, its economic importance is substantially weaker than that of *Above one*. Moreover, reaching the 52-week high does not generate a discontinuity in the likelihood of SEOs, and consequently, the HH measure cannot be used in an RDD setting to draw causal inferences about the consequences of SEOs. Thus, the remainder of the paper focuses on anchoring on the most recent equity offer price.

Panels B through F of Table 3 provide additional analyses of placebo cutoff points, higher frequency data, executive turnovers, stock splits, and the recency of the last equity offering. For brevity, we only report the results for models estimating the likelihood of an SEO. We note, however, that all the results continue to hold if we consider SEO issuance amounts.

In Panel B of Table 3, we investigate whether *Price ratio* captures high valuation relative to historical prices rather than a reference point around the offer price of the most recent SEO. As before, we estimate an LPM in which the unit of analysis is a firm-quarter pair. Specifically, we replace *Price ratio* with different valuation ratios that are not related to the last equity offer price.

In column 1, the valuation ratio is the ratio between the average stock price in quarter $t-1$ and the average stock price in quarter $t-2$. In column 2, the valuation ratio is the ratio between the average stock price in quarter $t-1$ and the highest stock price in quarter $t-2$. In column 3, the valuation ratio is the ratio between the average stock price in quarter $t-1$ and the highest stock price from quarter $t-5$ to quarter $t-2$. In column 4, the valuation ratio is the ratio between the end-of-quarter stock price and the beginning-of-quarter stock price in quarter $t-1$. This last valuation ratio attempts to capture recent momentum in the firms' stock price. Across all columns, we restrict the sample to the [0.9, 1.1] bandwidth of the respective valuation ratios.

The results in columns 1–4 suggest that the likelihood of an SEO does not increase discontinuously around placebo cutoff points unrelated to the offer price of the last SEO. Fig. 2, Panels B–E also illustrate these results. They show that there is no discontinuous jump in the likelihood of an SEO around the placebo cutoff points. We therefore conclude that our results are not driven by high valuation ratios. Instead, they capture the role that the last equity offer price plays as a reference point in subsequent issuance decisions.

In Panel C of Table 3, we examine whether the results continue to hold at a monthly frequency. Specifically, we estimate an LPM in which the unit of analysis is a firm-month pair. We measure SEO announcements and *Price rati*o at a monthly frequency and restrict the sample to the 0.9≤*Price ratio*≤1.1 bandwidth. The results in Panel C of Table 3 indicate that the findings hold robustly with monthly data. Thus, the evidence is not driven by measurement errors due to low frequency data.

In Panel D of Table 3, we consider the effect of CEO and CFO turnovers. Baker and Xuan (2016) find that CEO turnovers weaken the link between equity issuance and past stock market performance, as measured by Tobin's Q. Thus, if the last offer price proxies for past performance, a possible hypothesis is that it only serves as a reference point as long as the top executives remain in the company. To test this hypothesis, we estimate an LPM in which the unit of analysis is once again a firm-quarter pair.

We obtain CEO and CFO turnover information from Execucomp. The results in Panel D are therefore restricted to firms with available data on Execucomp, starting in 1992. In columns 1–2, the sample includes all observations with available turnover data. In columns 3–4, the sample includes observations where the CEO turned over since the firm's last SEO. In columns 5–6, the sample includes observations where either the CEO or the CFO turned over since the firm's last SEO.

The results in Panel D of Table 3 suggest that executive turnover does not affect the findings. In the full sample (column 2), the estimates suggest that the likelihood of an SEO is 2.2 percentage points higher when *Above one* equals one. When we restrict the attention to the subset of firms whose CEO turned over since the last SEO (column 4), we find that the likelihood of an SEO is 2.7 percentage points higher when *Above one* equals one. Similarly, when either the CEO or the CFO turned over (column 6), the likelihood of an SEO is 3.1 percentage points higher when *Above one* equals one. While the point estimates in columns 4 and 6 are statistically insignificant at conventional levels, in unreported tests, we do not find a statistically significant difference between the estimates across the different turnover and no-turnover samples. We therefore conclude that both incumbent and incoming CEOs and CFOs use the last equity offer price as a reference point in their equity issuance decisions. This result also further supports the notion that the last equity offer price is not merely a proxy for past performance.

In Panel E of Table 3, we explore the implications of stock splits. The analyses focus on firms that did a stock split since their last SEO. For these firms, the cutoff point *Price ratio*=1 is even more removed from fundamentals that are correlated with investment opportunities and value. We obtain stock split information from CRSP. The results in column 2 of Panel E indicate that the likelihood of SEOs is 3.6 percentage points higher when *Above one* equals one, even if the company did a stock split since its last SEO. The effects reported in Panel E are economically similar to those in Table 2, albeit statistically weaker.

Finally, in Panel F of Table 3, we investigate how the recency of the previous SEO affects the estimates. We argue that the offer price of the last SEO should be a more salient reference point when the last SEO is more recent. Therefore, we estimate the SEO probability regressions when we require the firm's last SEO to be within five years, four years, three years, two years, and one year, respectively. Each column corresponds to a separate regression in which the time window varies from five years (column 1) to one year (column 5).

We find that as we shorten the time window from the last SEO, the coefficient on the variable *Above one* increases monotonically from 0.020 to 0.035. The results indicate that the discontinuous jump in the probability of an SEO around *Price ratio*=1 is bigger when the last

SEO is more recent. Thus, compared to more distant SEOs, the more recent SEOs serve as a stronger reference point in managers' decision to issue equity.

4. Financial policies and real effects

4.1 Identification strategy

To address the endogeneity of a firm's decision to issue equity and its real or financial policies, we exploit the discontinuity in equity issuance around *Price ratio*=1 in a fuzzy RDD framework. We study the effects in a small bandwidth where *Price ratio* is between 0.9 and 1.1 and use the indicator *Above one* to compare firms whose stock price is closely above their last SEO price (*Above one*=1) and firms whose stock price is closely below their last SEO price (*Above one*=0). This approach addresses the concern that unobserved factors such as investment opportunities confound the causal effects of SEOs.

The key identifying assumption is that firms whose stock price is just below their last offer price and firms whose stock price is just above their last offer price are similar except for the propensity to issue equity. This assumption implies that there are no other discontinuous differences around *Price ratio*=1 that directly affect our outcome variables.

To explore the validity of our identifying assumption, Table 4 compares the treatment firms (*Price ratio*≥1) and the control firms (*Price ratio*<1) in the bandwidth where *Price ratio* is between 0.9 and 1.1. The table provides regression estimates along important firm characteristics in Panel A and outcome variables in Panel B, all measured in the prior quarter. In particular, each column corresponds to a separate regression in which the dependent variable is a firm-level variable measured in the prior quarter. The key independent variable in the regressions is the indicator variable *Above one*, which captures the difference between treatment and control firms.

As Panels A and B of Table 4 indicate, we do not find significant preexisting differences between the treatment and control firms after controlling for *Price ratio*. The coefficients on

Above one are economically tiny and never statistically significant at conventional levels. These findings support our identifying assumption that the treatment and control firms are indistinguishable in the prior quarter.

In Table 5, we further investigate the validity of our identifying assumption by comparing the debt issuance policies of treatment firms (*Price ratio*≥1) and control firms (*Price ratio*<1) in the bandwidth where *Price ratio* is between 0.9 and 1.1. If the identifying assumption holds, and the treatment and control firms do not differ in their investment opportunities or other potentially unobservable motivations for raising capital, we should not observe significant differences in debt issuance around the threshold *Price ratio*=1.

To test this prediction, we obtain Compustat data on firms' debt issuance from their statement of cash flow. We consider two measures of debt issuance. The first measure, net long-term debt issuance, is defined as long-term debt issuance minus long-term debt reduction. The second measure, net total debt issuance, is defined as long-term debt issuance minus long-term debt reduction plus current debt changes.

Table 5 provides estimates from regressions where the dependent variable is either an *Issuance dummy* (columns 1, 2, 5, 6), which is defined as an indicator equal to one if the debt issuance measure (specified in the column's heading) is positive in the quarter and zero otherwise, or *Issuance amount* (columns 3, 4, 7, 8), which is defined as the natural logarithm of one plus the amount of the debt issuance measure. The key independent variable in the regressions is the indicator variable *Above one*, which captures the difference between treatment and control firms.

Across all eight columns of Table 5, we do not find significant differences in debt issuance between treatment and control firms. The regression coefficient on the variable *Above one* is never statistically significant at conventional levels. These results hold true for both long-term debt and total debt issuances. They also hold both when we consider the likelihood of debt issuance and when we consider the amount of debt issuance. Taken together, these findings support the validity of the identifying assumption. Firms whose stock price is closely below their last offer price and firms whose stock price is closely above their last offer price appear similar in their propensity to raise capital through means other than equity issuance, suggesting that they are not facing different investment opportunity sets or financing needs.

A remaining concern is that firms can manage or manipulate their stock price. Teoh, Welch, and Wong (1998) show that firms aggressively manage their earnings at the time of SEOs. Under this view, the fluctuations in stock prices around *Price ratio*=1 are nonrandom, and consequently, the RDD identifying assumption does not hold. We provide several analyses to investigate this possibility. To conserve space, these results are presented in Table A.1 of the Online Appendix. Table A.1 shows that there are no significant differences across treatment and control firms in earnings management, measured by discretionary accruals (Kothari, Leone, and Wasley, 2005), earnings surprises, or dividend policy (e.g., Michaely, Thaler, and Womack, 1995; Grullon, Michaely, and Swaminathan, 2002; Li and Lie, 2006). Furthermore, we show that the results continue to hold for the subset of firms whose stock price variation is determined "exogenously" by market-wide price movements. We also find that the likelihood of SEOs does not increase discontinuously around "placebo" values of *Price ratio* such as 1.5 and 2. Collectively, these findings are inconsistent with the manipulation of *Price ratio*.

To further test the identifying assumption, in Fig. 3 we conduct a McCrary (2008) density test of manipulation of the running variable (*Price ratio*). This procedure tests for a discontinuity in the density of the running variable. Fig. 3 plots the estimated density of *Price ratio* in the bandwidth where *Price ratio* is between 0.9 and 1.1 and shows that the distribution is smooth. The value of the McCrary (2008) test statistic is −0.31, which is statistically insignificant at conventional levels. Thus, we cannot reject the null hypothesis that the density of the running variable is smooth and thus conclude that there is no evidence of price manipulation around the cutoff.

Last, we exploit cross-sectional variation in the discontinuity in SEOs around *Price ratio*=1 to weaken the assumptions that are required for the identifying assumption to hold. These analyses are reported in Table 6. As before, we estimate an LPM in which the unit of analysis is a firm-quarter pair and restrict the sample to the [0.9, 1.1] bandwidth around *Price ratio*=1.

In columns 1–2 of Table 6, we investigate the cross-sectional variation in firms' financial needs, measured by the variable *Financial deficit*, defined as the amount raised to cover expenditures last year. *Financial deficit* equals cash dividends plus net investment plus the change in working capital minus cash flow after interest and taxes, scaled by total assets at the beginning of the year. The coefficient on the interaction term *Financial deficit**Above one* is negative and is statistically significant in both columns, suggesting that anchoring is more pronounced when the SEO is not driven by fundamental demand for liquidity.

In columns 3–4, we consider the cross-sectional heterogeneity in investment opportunities, measured by *Industry Tobin Q*, defined as the industry median *Tobin Q* in the previous quarter. The results indicate that anchoring is more pronounced when investment opportunities are low. These findings further suggest that anchoring around the prior offering price is orthogonal to economic fundamentals—including investment opportunities.

Taken together, these findings support the validity of the assumptions required for a causal interpretation of the RDD-based analyses. In the next section, we provide RDD-based estimates of the causal effect of SEOs on firms' financial policies and real outcomes.

4.2 Corporate cash holdings, acquisitions, investment, and employment

In this section, we study the financial and real effects of SEOs. Previous research shows that nonfundamental movements in stock prices affect investment via equity issuance (e.g., Baker, Stein, and Wurgler, 2003; Campello and Graham, 2013). Further, McLean (2011) shows that firms are increasingly retaining cash from equity issuance. Harford (1999) presents evidence that managers spend excess cash on value-destroying acquisitions, and Blanchard, Lopez-de-Silanes, and Shleifer (1994) show that a cash windfall increases acquisitions but not investment. We therefore use a fuzzy RDD to establish the causal impact of anchoring in equity issuances on corporate cash holdings, acquisitions, investment, and employment.

In Table 7, we consider the effect of SEOs on corporate cash holdings. In columns 1–3, we use a two-stage least squares (2SLS) specification where the *SEO dummy* is instrumented using the indicator *Above one*. In columns 4–6, we use a reduced form specification where the indicator *Above one* is used directly in the regressions. Across all six columns, the dependent variable, *Cash,* is defined as cash and short-term investments divided by book assets. We measure cash holdings over three different periods: $Cash_t$ is measured in the quarter when the firm issues equity, $Cash_{t+1}$ is measured in the quarter immediately following the SEO, and $Cash_{t,t+3}$ is measured as the average cash holdings over the four quarters immediately following the SEO. We restrict the sample to the [0.9, 1.1] bandwidth of *Price ratio* and include firm and year-quarter fixed effects in all the regressions.

The results in columns 1–3 of Table 7 indicate that cash holdings increase by 7.4–9.2 percentage points following SEOs (instrumented by the indicator *Above one*). These findings hold robustly across all three columns and are statistically significant at the 5% level or better. We find similar results in the reduced form regressions reported in columns 4–6. Overall, these findings suggest that following SEOs initiated around the previous equity offer price, firms increase their cash holdings substantially. In the next set of analyses, we investigate whether in addition to increasing cash balances, firms also increase their discretionary spending along various budget items.

In Table 8, we examine whether firms use the proceeds from SEOs to finance acquisitions. We gather data on acquisitions from Thomson One for the period 1983–2015. Following prior studies (e.g., Masulis, Wang, and Xie, 2007), we impose the following sample screens: (i) the deal is completed, (ii) the acquirer owns less than 50% of the target's shares prior to the deal and owns 100% of the target's shares afterward, and (iii) the deal value is more than $1 million and greater than 1% of the acquirer's market capitalization on the 11th day prior to the announcement. After imposing the above sample screens, the sample includes 3,254 unique acquisitions over the period 1983–2015.

As before, we consider two model specifications. In Panel A of Table 8, we use a 2SLS specification where the *SEO dummy* is instrumented using the indicator variable *Above one*. In Panel B of Table 8, we use a reduced form specification where the indicator *Above one* is used directly in the regressions. The dependent variables in both panels of Table 8 measure firms' acquisition activity. Columns 1–3 focus on the likelihood of an acquisition by explaining one of the three indicator variables $\textit{Acquisition dummy}_{t}$, $\textit{Acquisition dummy}_{t+1}$, or $\textit{Acquisition dummy}_{t,t+3}$, which are equal to one if the firm makes any acquisitions in quarter t (the SEO quarter), quarter t+1 (the quarter following the SEO), or from quarter t to quarter t+3 (the four quarters immediately following the SEO), respectively. Columns 4–6 focus on the amount spent on acquisitions by explaining one of the three variables $\textit{Acquisition amount}_{t}$, $\textit{Acquisition amount}_{t+1}$, or $\textit{Acquisition amount}_{t,t+3}$, defined as the natural logarithm of one plus the total acquisition value in quarter t, quarter t+1, or from quarter t to quarter t+3, respectively. We restrict the sample to the [0.9, 1.1] bandwidth of *Price ratio* and include firm and year-quarter fixed effects in all the regressions.

The evidence in Panel A of Table 8 suggests that acquisition activity (both likelihood and amount) significantly increases following SEOs (instrumented by the indicator *Above one*). The regression coefficients on the instrumented *SEO dummy* are statistically significant at conventional levels and are economically important. In particular, the estimates suggest that the likelihood of an acquisition rises by 2.1–3.7 percentage points, and the amount spent on acquisitions increases by 8.7%–11.3%. We find similar results in the reduced form regressions reported in Panel B. Overall, these findings suggest that following SEOs initiated around the previous equity offer price, firms increase their acquisition activity.

The increase in acquisition activity following SEOs can either create or destroy value. To disentangle the two possibilities, Panel C of Table 8 investigates acquisition announcement returns. The dependent variable is the three-day [−1, +1] CAR, which is calculated using the Fama and French 5×5 size and book-to-market portfolio as a benchmark. In these analyses, we only include acquisitions announced in the four quarters following SEOs where *Price ratio* is between 0.9 and 1.1.

The results in Panel C of Table 8 indicate that announcement returns are 1.1–2.4 percentage points lower following SEOs initiated just above the previous equity offer price, compared to acquisitions following SEOs initiated just below the previous equity offer price. These findings are more consistent with the hypothesis that anchoring in SEOs leads to lower quality acquisitions.

The results in Tables 7 and 8 suggest that anchoring in SEOs leads to increases in cash holdings and acquisitions of lower quality. It is still possible, however, that firms spend some of the proceeds to finance investment in both physical and human capital.

We explore this possibility in Table 9, which seeks to provide evidence on changes in capital expenditures, R&D expenditures, and the number of employees following SEOs. As before, we consider two model specifications. In Panel A of Table 9, we use a 2SLS specification where the *SEO dummy* is instrumented using the indicator variable *Above one*. In Panel B of Table 9, we use a reduced form specification where the indicator *Above one* is used directly in the regressions. We restrict the sample to the [0.9, 1.1] bandwidth of *Price ratio* and include firm and year-quarter fixed effects in all the regressions.

Columns 1–6 of Table 9 consider quarterly investment in capital expenditure and R&D, whereas column 7 considers the annual investment in employment expenditure. *Capex* is defined as capital expenditures divided by lagged assets. *Rnd* is defined as the research and development expense divided by lagged assets. *Employment* is defined as the number of employees divided by lagged assets. The dependent variables $Capex_t$ and Rnd_t are measured in quarter *t*, when the firm initiates the SEO. The dependent variables $Capex_{t+1}$ and Rnd_{t+1} are measured in quarter *t*+1, the quarter that immediately follows the SEO quarter. Finally, $Capex_{t,t+3}$ and $Rnd_{t,t+3}$ are measured as the average from quarter *t* to quarter *t*+3. Since the number of employees is only reported annually, *Employment* is measured for the fiscal year that follows the SEO.

Across all the regressions in Table 9, we find insignificant effects on investment in physical capital (capital expenditure and R&D) and human capital (number of employees). The regression coefficients on the instrumented *SEO dummy* are tiny (virtually zero) and are statistically insignificant at conventional levels.

A possible concern with the previous analyses is that the size of the SEO is an important determinant of its subsequent effect on investment and employment. In particular, it is unlikely that small SEOs have a material effect on firms' investment and employment levels, and therefore the estimates based on an instrumented *SEO dummy* might reflect a lower bound on the investment and employment effects of SEOs.

To address this concern, in Table A.2 in the Online Appendix, we investigate the effect of the size of the SEO. We provide two sets of analyses. First, we redefine the *SEO dummy* to indicate only large SEOs with offer size greater than the sample median offer size, which equals roughly $50 million. Second, as an alternative analysis of the size of the SEO, we reestimate the 2SLS regressions with the instrumented *SEO amount* rather than the instrumented *SEO dummy*. In these analyses of large SEOs and SEO amounts, we continue to find significant increases in cash holdings and acquisitions and find no changes in investment or employment following SEOs. Collectively, these findings suggest that the results are not driven by small SEOs.

Overall, these findings suggest that when managers initiate SEOs anchored around the most recent equity offer price, the proceeds are used to increase cash holdings and low-quality acquisitions, without any real effects on investment in physical or human capital. In unreported tests, we find that the results continue to hold in a broader [0.8, 1.2] bandwidth of *Price ratio.*

5. Shareholder reaction

In the final set of analyses, we explore investors' reaction to the anchoring of SEOs on the most recent equity offer price. We consider two hypotheses. The first hypothesis posits that while anchoring reflects a manager's irrationality (or behavioral bias), shareholders are rational. The hypothesis that managers are influenced by reference points is related to prior studies such as Loughran and Ritter (2002), Ljungqvist and Wilhelm (2005), Baker, Pan, and Wurgler (2012), and Baker and Xuan (2016). Under this view, the manager incorrectly pivots her decision to issue equity around the most recent equity offer price, which is purely historical data and hence does not provide a useful valuation benchmark or information about the firm's expected investment opportunities. Since shareholders are rational, they recognize that the SEO is a product of a managerial bias and thus react negatively to the SEO.

The second hypothesis posits that shareholders are irrational and anchor on the most recent equity offer price. The hypothesis that investors are influenced by reference points dates back to Kahneman and Tversky (1979) and more recently to Kaustia (2004), Huddart, Lang, and Yetman (2009), and others. Under this view, bankers and buy-side shareholders would be more willing to buy in when the share price is not below the most recent equity offer price. Consequently, we would expect a more positive reaction and wider participation of institutional investors in *Above one* SEOs.

We provide two sets of analyses to explore these hypotheses. First, Table 10 provides analyses that focus on buy-side investor behavior. In particular, we provide evidence on institutional investors' shareholdings using data from the Thomson-Reuters 13F database, which provides quarterly data on institutional ownership. In our first set of analyses, we investigate whether following an SEO, institutional ownership increases more for *Above one* issuers (treatment group) than for *Below one* issuers (control group). To do so, we compare the mean and median change in aggregate institutional ownership from the quarter prior to the SEO to the quarter after the SEO across *Above one* issuers and *Below one* issuers. In these analyses, we focus on SEOs for which *Price ratio* is between 0.9 and 1.1.

The results in Panel A of Table 10 suggest that both the average and median increases in aggregate institutional ownership are significantly higher for *Above one* issuers. The mean increase in institutional ownership is 2.4 percentage points higher for *Above one* issuers than for *Below one* issuers, and the difference is statistically significant at the 1% level. Similarly, the median increase in institutional ownership is 2.7 percentage points higher for *Above one* issuers than for *Below one* issuers, and this difference is also highly statistically significant at the 1% level.

In Panel B of Table 10, we focus on institutional owners from the last SEO and examine whether they are more likely to increase their share of ownership in *Above one* issuers (treatment group) than in *Below one* issuers (control group). To this end, we compare the mean and median percentage of prior SEO institutional buyers that also buy shares in the current SEO across *Above one* issuers and *Below one* issuers. We also compare the mean and median change in the aggregate ownership of prior SEO buyers from the quarter prior to the current SEO to the quarter after the current SEO across *Above one* issuers and *Below one* issuers.

We find that prior buyers are more likely to participate in the current SEO of *Above one* issuers compared to *Below one* issuers. The average and median percentage of prior buyers that increase their holdings in the current SEO are 3.2 percentage points and 4.3 percentage points higher for *Above one* issuers than for *Below one* issuers, respectively. These differences are statistically significant at conventional levels. Further, in the current SEO, prior buyers increase their holdings of *Above one* issuers by an average of 0.5 percentage points and a median of 0.3 percentage points more than their holdings of *Below one* issuers, and these differences are once again statistically significant at conventional levels.

Taken together, these findings indicate that the most recent equity offer price serves as an important reference point in the behavior of buy-side investors around subsequent SEOs. Indeed, both participation and changes in holdings of institutional investors are significantly higher for issuers whose current stock price crosses the offer price of the previous SEO. The behavior of buy-side investors provides a possible motivation for firms' increased propensity to initiate an SEO when the stock price reaches the most recent equity offer price.

Second, Table 11 investigates announcement returns around SEOs. The dependent variable is the SEO CAR. In Panel A of Table 11, we consider several definitions of abnormal returns, including characteristics-adjusted CARs using the Fama and French 5×5 size and book-to-market portfolio as the benchmark, CARs using the one-factor market model, and CARs using the Fama and French three-factor model as well as several event windows: [0, +1], [−1, +1], and [−2, +2].[3] As before, we only include SEOs for which *Price ratio* is between 0.9 and 1.1.

Across all the columns in Panel A of Table 11, we compare SEO announcement returns around the threshold *Price ratio*=1, controlling for the firm's market capitalization, Tobin's Q, and return on assets (ROA). The estimates suggest that the market reaction to *Above one* SEOs is roughly 40–70 basis points higher than the reaction to *Below one* SEOs. While the estimates are positive across all model specifications, they are statistically significant at the 5% or 10% level in six out of the nine models. Interpreted conservatively, these findings suggest that anchored SEOs are not discounted, or even valued at a slight premium, compared to other SEOs, consistent with the findings in Table 10 that the most recent equity offer price

[3] We obtain similar results when we consider market-adjusted CARs or CARs using the four-factor model.

is an important anchor in the behavior of buy-side investors around subsequent SEOs.

In Panel B of Table 11, we investigate the cross-sectional variation in SEO announcement returns. In each of these columns, the indicator variable *Increase* is equal to one if the corresponding outcome variable (specified in the column's heading) has increased after the SEO and zero otherwise. The increase is identified by comparing the average from quarter t to quarter t+3 (i.e., the year immediately following the SEO), and the average from quarter t−4 to quarter t−1 (i.e., the year immediately preceding the SEO), except that for *Employment* the increase is identified by comparing the year following the SEO and the prior year. Conversely, the indicator variable *No increase* is equal to one if the corresponding outcome variable has not increased and zero otherwise. The results in Panel B of Table 11 suggest that announcement returns vary with the outcomes of the SEOs. Specifically, announcement returns of *Above one* SEOs are significantly higher when firms increase cash holdings, investment in capital expenditures, R&D, and employment and refrain from making acquisitions following the SEO.

Collectively, these results suggest that investors can identify the motives/outcomes of SEOs and value the use of the proceeds for investment in physical and human capital. Conversely, they discount the use of the proceeds for increases in acquisitions.

6. Conclusion

This paper shows that the most recent equity offer price serves as a reference point in initiating subsequent SEOs. The evidence is consistent with reference point-based theories of behavior and provides a unique laboratory to study the causal effects of SEOs on firms' financial and real policies.

We use a fuzzy RDD, which exploits the local randomness around the reference point, driven by stock market fluctuations, to investigate the real effects of SEOs. We find that SEOs anchored on the most recent equity offer price lead to increases in cash holdings and inefficient acquisitions but do not affect real investments in capital expenditures, R&D, or employment.

We provide extensive evidence supporting the identifying assumption required for the RDD analyses. Firms just below and just above the cutoff appear observationally identical and do not exhibit meaningful differences in earnings management or dividend adjustments, which might affect their stock price relative to the anchor.

We also investigate investors' response to anchored SEOs and find evidence consistent with shareholder irrationality. Both participation and changes in holdings of institutional investors are significantly higher for issuers whose stock price crosses the most recent equity offer price. In the analyses of SEO announcement returns, we find evidence that anchored SEOs are valued at a slight premium compared to other SEOs.

Overall, our contribution is twofold. First, we provide evidence that managers use a reference point in timing equity issues. The evidence gives rise to an explicit model of SEO timing, which is based on anchoring around a perceived valuation benchmark. Second, we provide causal evidence on the implications of anchoring in SEOs for firms' financial and real policies.

Our findings have important implications because the majority of corporate decisions rely on managerial and investor judgment. While we focus on equity issuance, reference points can also influence the timing and consequences of other financing decisions such as equity repurchases.

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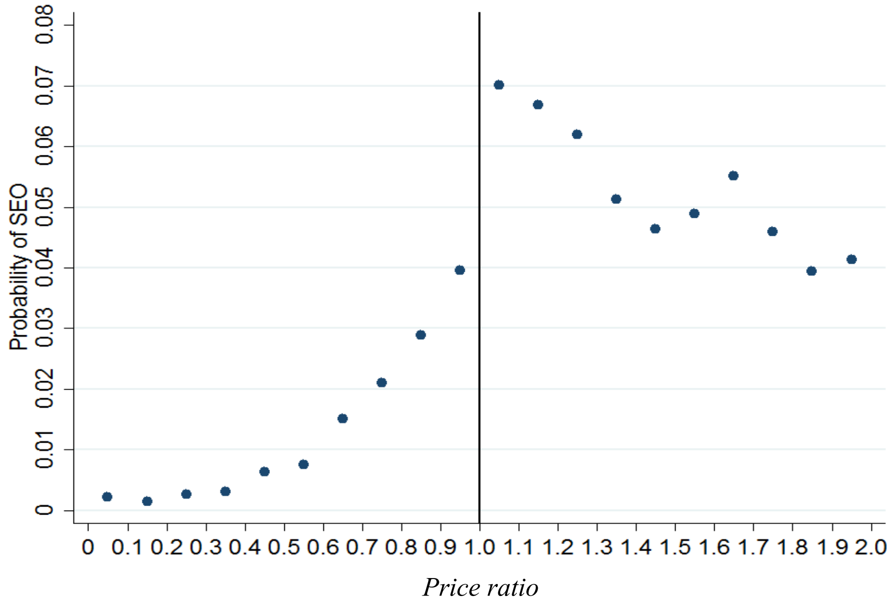

Fig. 1. Probability of an SEO and *Price ratio*. This figure reports the probability of an SEO as a function of *Price ratio*. For every *Price ratio* bin, the dots represent the probability of an SEO—the fraction of firm-quarters with an SEO out of all firm-quarters in that bin. We define *Price ratio* as the ratio of the average stock price of the previous quarter to the offer price of the firm's most recent SEO. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015.

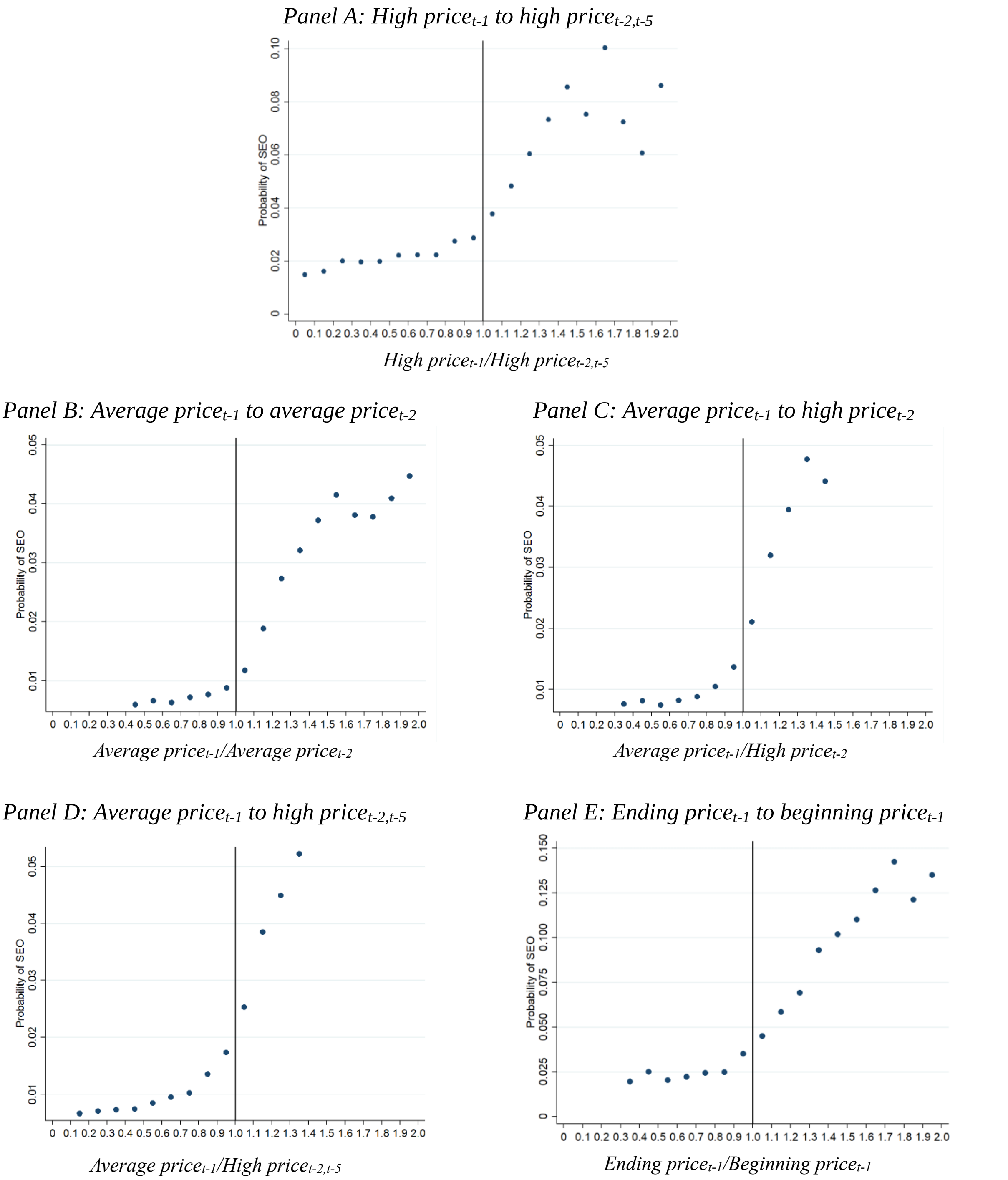

Fig. 2. Probability of an SEO and other valuation ratios. This figure reports the probability of an SEO as a function of other valuation ratios. For every valuation ratio bin, the dots represent the probability of an SEO—the fraction of firm-quarters with an SEO out of all firm-quarters in that bin. In Panel A, the valuation ratio is the ratio of the highest stock price in quarter $t-1$ to the highest stock price from quarter $t-5$ to quarter $t-2$. In Panel B, the valuation ratio is the ratio of the average stock price in quarter $t-1$ to the average stock price in quarter $t-2$. In Panel C, the valuation ratio is the ratio of the average stock price in quarter $t-1$ to the highest stock price in quarter $t-2$. In Panel D, the valuation ratio is the ratio of the average stock price in quarter $t-1$ to the highest stock price from quarter $t-5$ to quarter $t-2$. In Panel

E, the valuation ratio is the ratio of the end-of-quarter stock price to the beginning-of-quarter stock price in quarter *t*−1. The baseline sample includes Compustat firms that are trading on the NYSE, Nasdaq or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015.

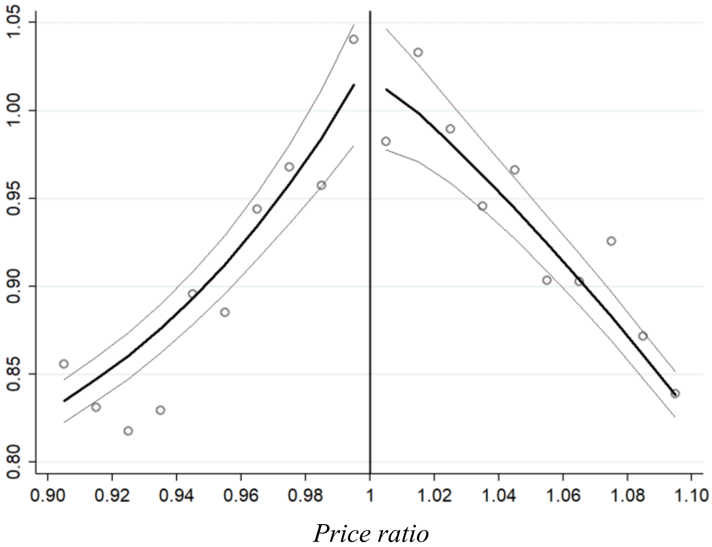

Fig. 3. Density of *Price ratio*. This figure reports the McCrary (2008) density test of manipulation of the running variable *Price ratio* around the cutoff of one. This figure shows the histogram, the estimated density, and the 95% confidence intervals of *Price ratio* in the bandwidth, where *Price ratio* is between 0.9 and 1.1. The value of the McCrary (2008) test statistic is −0.31, which is not statistically different from 0 at conventional levels. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from1983 to 2015.

Table 1
Summary statistics.
Panel A reports summary statistics for the full sample. Panel B reports summary statistics for the main sample used throughout the paper: the small sample with *Price ratio* between 0.9 and 1.1. *Price ratio* is the ratio of the average stock price of the previous quarter to the offer price of the firm's most recent SEO. *Above one* is a dummy variable equal to one if *Price ratio* is greater than or equal to one and zero otherwise. *SEO dummy* is a dummy variable equal to one if the firm announces an SEO in the quarter and zero otherwise. The SEO data are obtained from Thomson One. We include only common stock issuances and exclude pure secondary offerings, unit offerings, and rights offerings. *Log mktcap* is the natural logarithm of the market value of equity. *Leverage* is the ratio of long-term debt plus debt in current liabilities to total assets. *ROA* is the ratio of operating income before depreciation to total assets. *Tobin Q* is the ratio of the market value of assets to the book value of assets. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015.

Panel A: Full sample (Obs.=99,308)			
Variable	Mean	Median	Std. dev.
Price ratio	0.936	0.868	0.616
Above one	0.392	0.000	0.488
SEO dummy	0.030	0.000	0.188
Log mktcap	5.775	5.793	1.786
Leverage	0.243	0.207	0.238
ROA	0.013	0.028	0.074
Tobin Q	2.225	1.580	2.130
Panel B: Small sample 0.9≤*Price ratio*≤1.1 (Obs.=18,857)			
Variable	Mean	Median	Std. dev.
Price ratio	1.000	1.000	0.057
Above one	0.498	0.000	0.500
SEO dummy	0.055	0.000	0.281
Log mktcap	6.197	6.203	1.623
Leverage	0.248	0.225	0.219
ROA	0.021	0.033	0.068
Tobin Q	2.310	1.703	1.909

Table 2

The likelihood of SEOs.

This table reports results for the linear probability model of SEOs. In columns 1–7, we restrict the sample to observations with *Price ratio* between 0.9 and 1.1. In columns 8–11, we use the full sample. In columns 1–5 and 8–9, the dependent variable *SEO dummy* equals one if the firm announces an SEO in the quarter and zero otherwise. In columns 6–7 and 10–11, the dependent variable *SEO amount* is the natural logarithm of one plus the SEO amount. *Prior abnormal return* (*Future abnormal return*) is the stock return in excess of the Fama and French 5×5 size and book-to-market portfolio return, measured over the previous (next) four quarters. Other variables are defined in Table 1. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Small bandwidth: 0.9≤*Price ratio*≤1.1							Full sample			
Dependent variable	*SEO dummy*					*SEO amount*		*SEO dummy*		*SEO amount*	
Above one	0.035***	0.020**	0.020**	0.020**	0.022***	0.086**	0.078**	0.024***	0.021***	0.105***	0.095***
	(0.005)	(0.010)	(0.010)	(0.010)	(0.008)	(0.041)	(0.037)	(0.005)	(0.005)	(0.022)	(0.023)
Price ratio−1		0.194**	0.579***	0.504***	0.712***	1.901***	2.865***	0.387***	0.466***	1.643***	1.906***
		(0.079)	(0.099)	(0.105)	(0.138)	(0.446)	(0.589)	(0.031)	(0.034)	(0.128)	(0.141)
*Price ratio−1*Above one*			−0.779***	−0.728***	−0.851***	−2.674***	−3.217***	−0.576***	−0.635***	−2.472***	−2.657***
			(0.160)	(0.169)	(0.207)	(0.727)	(0.903)	(0.035)	(0.038)	(0.148)	(0.159)
Tobin Q				0.003	0.030***	0.013	0.128***	0.002***	0.007***	0.007***	0.030***
				(0.002)	(0.006)	(0.010)	(0.022)	(0.001)	(0.001)	(0.003)	(0.005)
Prior abnormal return				0.038***	0.040***	0.161***	0.169***	0.027***	0.022***	0.115***	0.094***
				(0.007)	(0.012)	(0.031)	(0.051)	(0.002)	(0.002)	(0.009)	(0.009)
Future abnormal return				−0.002	−0.030***	−0.012	−0.132***	−0.002*	−0.006***	−0.010**	−0.026***
				(0.006)	(0.009)	(0.020)	(0.035)	(0.001)	(0.001)	(0.004)	(0.006)
Log mktcap	0.001	0.001	0.001	−0.001	−0.112***	0.030***	−0.452***	−0.002***	−0.035***	0.009***	−0.124***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.011)	(0.008)	(0.049)	(0.001)	(0.002)	(0.002)	(0.009)
Leverage	0.124***	0.124***	0.125***	0.146***	0.203***	0.629***	0.763***	0.054***	0.113***	0.240***	0.463***
	(0.015)	(0.015)	(0.015)	(0.018)	(0.048)	(0.077)	(0.204)	(0.005)	(0.010)	(0.021)	(0.041)
ROA	−0.089*	−0.090**	−0.090*	−0.155***	0.036	−0.346	0.485	−0.178***	−0.093***	−0.559***	−0.284***
	(0.046)	(0.046)	(0.046)	(0.059)	(0.108)	(0.218)	(0.420)	(0.022)	(0.026)	(0.066)	(0.084)
Polynomials of *Price ratio−1* & interaction with *Above one*	1-order	1-order	1-order	1-order	1-order	1-order	1-order	3-order	3-order	3-order	3-order
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No
Firm FE	No	No	No	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	18,857	18,857	18,857	18,857	18,857	18,857	18,857	99,308	99,308	99,308	99,308
Adj. R^2	0.029	0.034	0.034	0.035	0.088	0.040	0.073	0.049	0.073	0.048	0.067

Table 3
Robustness and extensions.
This table reports robustness and extension analyses. The dependent variable is *SEO dummy* that equals one if the firm announces an SEO and zero otherwise. In Panel A, we consider the 52-week high price as an alternative valuation benchmark. In Panel B, we consider other valuation ratios and restrict the sample to observations with the corresponding valuation ratio between 0.9 and 1.1. In Panels C–F, we restrict the sample to observations with *Price ratio* between 0.9 and 1.1. In Panel C, we repeat the analysis using monthly prices to construct *Price ratio*, and the observations are firm-months. In Panel D, the sample is restricted to firms with available information on executive turnovers from Execucomp. In Panel E, we restrict the sample to observations with a stock split since the firm's last SEO. In Panel F, we vary the time window from five years to one year. We require that the last SEO is within five years, four years, three years, two years, and one year, respectively. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Historical high price

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Full sample				Small bandwidth: 0.9≤*Price ratio_HH*≤1.1					
Price ratio_HH	*Closing price$_{t-1}$/ High price$_{t-2,t-5}$*		*High price$_{t-1}$/ High price$_{t-2,t-5}$*		*Closing price$_{t-1}$/High price$_{t-2,t-5}$*			*High price$_{t-1}$/High price$_{t-2,t-5}$*		
Above historical high	0.027***	0.018***	0.016***	0.007***	0.016***	0.014***	0.001	0.011***	0.009***	0.003
	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)	(0.004)	(0.007)	(0.003)	(0.003)	(0.005)
Price ratio_HH−1							0.154**			0.078
							(0.075)			(0.059)
*Price ratio_HH−1*Above historical high*							0.019			0.095
							(0.129)			(0.091)
Above one		0.037***		0.038***		0.029***			0.029***	
		(0.002)		(0.002)		(0.004)			(0.003)	
Log mktcap	0.004***	0.001**	0.004***	0.001*	0.001	−0.001	0.001	0.001	−0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Leverage	0.030***	0.033***	0.031***	0.033***	0.082***	0.082***	0.082***	0.048***	0.049***	0.048***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.012)	(0.012)	(0.012)	(0.008)	(0.008)	(0.008)
ROA	−0.108***	−0.122***	−0.108***	−0.122***	−0.127**	−0.145***	−0.128***	−0.098***	−0.124***	−0.100***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.049)	(0.050)	(0.049)	(0.033)	(0.033)	(0.033)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	94,034	94,034	94,034	94,034	16,581	16,581	16,581	26,540	26,540	26,540
Adj. R^2	0.030	0.036	0.029	0.036	0.037	0.040	0.038	0.024	0.029	0.025

Panel B: Other valuation ratios				
	(1)	(2)	(3)	(4)
Placebo price ratio	*Average price$_{t-1}$ /Average price$_{t-2}$*	*Average price$_{t-1}$ /High price$_{t-2}$*	*Average price$_{t-1}$ /High price$_{t-2,t-5}$*	*Ending price$_{t-1}$ /Beginning price$_{t-1}$*
Placebo above one	−0.004	0.004	0.001	−0.004
	(0.003)	(0.005)	(0.007)	(0.004)
Placebo price ratio−1	0.083**	0.212***	0.271***	0.181***
	(0.040)	(0.049)	(0.071)	(0.050)
*Placebo price ratio−1*Placebo above one*	0.073	−0.072	−0.152	−0.095
	(0.061)	(0.090)	(0.128)	(0.069)
Log mktcap	0.003***	0.003***	−0.002*	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
Leverage	0.038***	0.069***	0.097***	0.042***
	(0.006)	(0.008)	(0.012)	(0.007)
ROA	−0.086***	−0.126***	−0.143***	−0.107***
	(0.023)	(0.035)	(0.051)	(0.026)
Year-quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	39,320	33,250	20,216	32,639
Adj. R^2	0.018	0.023	0.033	0.019

Panel C: Monthly prices		
	(1)	(2)
Above one	0.019***	0.012***
	(0.001)	(0.003)
Price ratio−1		0.949***
		(0.046)
*Price ratio−1*Above one*		−1.690***
		(0.073)
Log mktcap	−0.015***	−0.015***
	(0.001)	(0.001)
Leverage	0.036***	0.034***
	(0.006)	(0.006)
ROA	−0.021***	−0.022***
	(0.006)	(0.006)
Year-quarter FE	Yes	Yes
Industry FE	Yes	Yes
Obs.	61,669	61,669
Adj. R^2	0.037	0.045

Panel D: Firms with executive turnovers since the last SEO						
	(1)	(2)	(3)	(4)	(5)	(6)
	Both turnover firms and no-turnover firms		CEO turnover firms		CEO or CFO turnover firms	
Above one	0.043***	0.022**	0.042***	0.027	0.037***	0.031
	(0.005)	(0.010)	(0.015)	(0.026)	(0.011)	(0.025)
Price ratio−1		1.240***		1.575**		1.548***
		(0.206)		(0.748)		(0.561)
*Price ratio−1*Above one*		−1.563***		−1.933*		−1.186
		(0.328)		(1.122)		(0.924)
Log mktcap	−0.020***	−0.020***	−0.041***	−0.040***	−0.055***	−0.055***
	(0.004)	(0.004)	(0.014)	(0.014)	(0.010)	(0.010)
Leverage	0.180***	0.180***	0.579***	0.566***	0.145*	0.147*
	(0.030)	(0.030)	(0.139)	(0.140)	(0.078)	(0.077)
ROA	−0.082	−0.083*	−0.262	−0.269	−0.163	−0.183
	(0.050)	(0.050)	(0.179)	(0.177)	(0.221)	(0.214)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	7,531	7,531	937	937	1,405	1,405
Adj. R^2	0.073	0.077	0.191	0.195	0.160	0.163

Panel E: Firms with stock splits since the last SEO		
	(1)	(2)
Above one	0.040**	0.036*
	(0.019)	(0.021)
Price ratio−1		0.873**
		(0.425)
*Price ratio−1*Above one*		−1.112***
		(0.414)
Log mktcap	−0.052***	−0.052***
	(0.010)	(0.011)
Leverage	0.422***	0.423***
	(0.080)	(0.080)
ROA	−0.434	−0.431
	(0.401)	(0.401)
Year-quarter FE	Yes	Yes
Industry FE	Yes	Yes
Obs.	1,336	1,336
Adj. R^2	0.175	0.177

Panel F: Recency of the last SEO					
	(1)	(2)	(3)	(4)	(5)
Last SEO within	5 years	4 years	3 years	2 years	1 year
Above one	0.020**	0.023**	0.025**	0.031**	0.035**
	(0.010)	(0.010)	(0.011)	(0.013)	(0.016)
Price ratio−1	0.579***	0.612***	0.642***	0.701***	0.834***
	(0.099)	(0.105)	(0.114)	(0.128)	(0.159)
*Price ratio−1*Above one*	−0.779***	−0.833***	−0.890***	−0.973***	−1.200***
	(0.160)	(0.170)	(0.183)	(0.205)	(0.249)
Log mktcap	0.001	0.002	0.002	0.002	0.003
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Leverage	0.125***	0.128***	0.135***	0.153***	0.182***
	(0.015)	(0.016)	(0.017)	(0.019)	(0.022)
ROA	−0.090*	−0.081*	−0.078	−0.065	−0.052
	(0.046)	(0.047)	(0.049)	(0.052)	(0.057)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Obs.	18,857	15,237	12,087	10,503	8,187
Adj. R^2	0.034	0.053	0.057	0.064	0.080

Table 4
Preexisting differences between treatment and control firms.
This table reports the preexisting differences between treatment firms (*Price ratio*≥1) and control firms (*Price ratio*<1). We restrict the sample to observations with *Price ratio* between 0.9 and 1.1. We examine preexisting differences in firm characteristics in Panel A and outcome variables in Panel B, all measured in the previous quarter (except that *Employment* is measured in the previous year). The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Firm characteristics				
	(1)	(2)	(3)	(4)
Dependent variable	*Log mktcap*	*Leverage*	*ROA*	*Tobin Q*
Above one	0.017	0.006	0.002	−0.002
	(0.041)	(0.005)	(0.002)	(0.042)
Price ratio−1	0.951*	−0.111*	0.027	1.039**
	(0.510)	(0.067)	(0.020)	(0.488)
*Price ratio−1*Above one*	0.154	0.173*	−0.020	−1.012
	(0.725)	(0.096)	(0.029)	(0.735)
Year-quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18,857	18,857	18,857	18,857
Adj. R^2	0.197	0.184	0.296	0.213

Panel B: Outcome variables						
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*Cash*	*Acquisition dummy*	*Acquisition amount*	*Capex*	*Rnd*	*Employment*
Above one	−0.011	0.003	0.016	0.001	−0.001	−0.001
	(0.009)	(0.004)	(0.014)	(0.001)	(0.001)	(0.001)
Price ratio−1	0.011	0.001	−0.039	−0.009	−0.014*	0.001
	(0.049)	(0.038)	(0.148)	(0.013)	(0.008)	(0.003)
*Price ratio−1*Above one*	−0.067	−0.005	0.038	−0.006	0.012	0.002
	(0.096)	(0.048)	(0.192)	(0.028)	(0.012)	(0.008)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	17,507	18,556	18,556	17,625	17,637	16,440
Adj. R^2	0.375	0.031	0.029	0.426	0.406	0.515

Table 5
Debt issuance.
This table reports results for the analyses of debt issuance. We restrict the sample to observations with *Price ratio* between 0.9 and 1.1. We use items in the statement of cash flow from Compustat to identify debt issuance. In columns 1–4, we consider net long-term debt issuance, which is defined as long-term debt issuance minus long-term debt reduction. In columns 5–8, we consider net total debt issuance, which is defined as long-term debt issuance minus long-term debt reduction plus current debt changes. In columns 1–2 and 5–6, the dependent variable *Issuance dummy* equals one if the debt issuance is positive in the quarter and zero otherwise. In columns 3–4 and 7–8, the dependent variable *Issuance amount* is the natural logarithm of one plus the debt issuance amount. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Net long-term debt issuance				Net total debt issuance			
Dependent variable	*Issuance dummy*		*Issuance amount*		*Issuance dummy*		*Issuance amount*	
Above one	0.003	0.007	0.020	0.040	0.004	0.015	0.016	0.034
	(0.007)	(0.014)	(0.026)	(0.049)	(0.007)	(0.014)	(0.027)	(0.051)
Price ratio−1		−0.027		−0.320		−0.201		−0.692
		(0.169)		(0.593)		(0.171)		(0.607)
*Price ratio−1*Above one*		−0.032		0.247		0.193		1.026
		(0.245)		(0.864)		(0.251)		(0.890)
Log mktcap	0.016***	0.016***	0.274***	0.274***	0.012***	0.012***	0.295***	0.295***
	(0.003)	(0.003)	(0.012)	(0.012)	(0.003)	(0.003)	(0.012)	(0.012)
Leverage	0.227***	0.227***	1.063***	1.063***	0.201***	0.201***	1.101***	1.099***
	(0.022)	(0.022)	(0.080)	(0.080)	(0.021)	(0.021)	(0.081)	(0.081)
ROA	−0.037	−0.037	−0.376**	−0.376**	0.017	0.018	−0.198	−0.197
	(0.069)	(0.069)	(0.156)	(0.156)	(0.075)	(0.075)	(0.159)	(0.159)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	16,872	16,872	16,872	16,872	16,872	16,872	16,872	16,872
Adj. R^2	0.095	0.095	0.155	0.154	0.076	0.076	0.153	0.153

Table 6
Cross-sectional variation.
This table reports cross-sectional variation in the SEO probability. The dependent variable is SEO *dummy*, which equals one if the firm announces an SEO and zero otherwise. We restrict the sample to observations with *Price ratio* between 0.9 and 1.1. We interact *Above one* with a variable described in the column's heading. In columns 1–2, *Financial deficit* is defined as the amount the firm raised to cover expenditures in the previous year (cash dividends plus net investment plus the change in working capital minus cash flow after interest and taxes, scaled by total assets at the beginning of the year). In columns 3–4, *Industry Tobin Q* is defined as the industry median *Tobin Q* in the previous quarter. The column's heading indicates whether the interaction variable is measured as a continuous variable or a dummy variable (equal to one for above-median observations and zero otherwise). The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
X	*Financial deficit*		*Industry Tobin Q*	
	continuous	dummy	continuous	dummy
Above one	0.019	0.030**	0.029**	0.030***
	(0.012)	(0.012)	(0.011)	(0.011)
*X*Above one*	−0.039**	−0.023**	−0.005**	−0.024***
	(0.016)	(0.011)	(0.002)	(0.009)
X	0.082***	0.046***	0.004**	0.017***
	(0.011)	(0.007)	(0.002)	(0.007)
Price ratio−1	0.584***	0.584***	0.572***	0.567***
	(0.103)	(0.103)	(0.099)	(0.099)
*Price ratio−1*Above one*	−0.818***	−0.819***	−0.769***	−0.776***
	(0.165)	(0.165)	(0.160)	(0.160)
Log mktcap	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Leverage	0.126***	0.126***	0.127***	0.128***
	(0.015)	(0.015)	(0.015)	(0.016)
ROA	−0.096**	−0.096**	−0.082*	−0.086*
	(0.047)	(0.045)	(0.047)	(0.046)
Year-quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	18,063	18,063	18,857	18,857
Adj. R^2	0.045	0.046	0.045	0.045

Table 7
Cash holdings.
This table reports the analyses of cash holdings. *Cash* is defined as cash and short-term investments divided by total assets. We restrict the sample to observations with *Price ratio* between 0.9 and 1.1. In columns 1–3, we estimate 2SLS regressions in which the *SEO dummy* is instrumented by the indicator *Above one*. In columns 4–6, we estimate reduced form regressions in which the indicator *Above one* is used directly. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS regressions			Reduced form regressions		
Dependent variable	$Cash_t$	$Cash_{t+1}$	$Cash_{t,t+3}$	$Cash_t$	$Cash_{t+1}$	$Cash_{t,t+3}$
SEO dummy (instrumented)	0.092***	0.087***	0.074**			
	(0.032)	(0.028)	(0.036)			
Above one				0.056**	0.051**	0.044*
				(0.028)	(0.025)	(0.024)
Price ratio−1	−0.003	−0.034	−0.002	0.070*	0.033	0.046
	(0.035)	(0.035)	(0.030)	(0.041)	(0.041)	(0.034)
*Price ratio−1*Above one*	−0.001	0.002	−0.001	−0.089	−0.080	−0.058
	(0.003)	(0.003)	(0.002)	(0.060)	(0.057)	(0.049)
Log mktcap	0.005	0.002	−0.002	−0.007**	−0.009***	−0.009***
	(0.008)	(0.008)	(0.007)	(0.003)	(0.003)	(0.003)
Tobin Q	0.013***	0.011***	0.012***	0.017***	0.015***	0.015***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
ROA	0.075	0.074	0.022	0.054	0.056	0.008
	(0.047)	(0.048)	(0.043)	(0.050)	(0.052)	(0.046)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	16,987	16,508	16,508	16,987	16,508	16,508

Table 8
Acquisitions.
This table reports the analyses of acquisitions. We restrict the sample to observations with *Price ratio* between 0.9 and 1.1. *Acquisition dummy* is a dummy variable equal to one if the firm makes an acquisition and zero otherwise. *Acquisition amount* is the natural logarithm of one plus the acquisition value. Panel A reports the results from 2SLS regressions in which the *SEO dummy* is instrumented by the indicator *Above one*. Panel B reports the results from reduced form regressions in which the indicator *Above one* is used directly. Panel C reports the results from the regressions of acquisition announcement returns. The dependent variable is the three-day [−1, +1] CAR, using the Fama and French 5×5 size and book-to-market portfolio as the benchmark. *Relative deal size* is deal value as a percentage of the acquirer's market capitalization measured on the 11th day prior to the announcement. *Percent of cash payment* is the percentage of deal value that is paid in cash. *Public target* is a dummy variable equal to one if the target is a public firm and zero otherwise. *Private target* is a dummy variable equal to one if the target is a private firm and zero otherwise. *Diversifying deal* is a dummy variable equal to one if the acquirer and the target have different two-digit SIC codes and zero otherwise. *Tender offer* is a dummy variable equal to one for tender offer acquisitions and zero otherwise. We only include acquisitions announced in the quarters following SEOs for which the *Price ratio* is between 0.9 and 1.1. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: 2SLS regressions

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*Acquisition* $dummy_t$	*Acquisition* $dummy_{t+1}$	*Acquisition* $dummy_{t,t+3}$	*Acquisition* $amount_t$	*Acquisition* $amount_{t+1}$	*Acquisition* $amount_{t,t+3}$
SEO dummy (instrumented)	0.026**	0.021*	0.037**	0.101**	0.087*	0.113**
	(0.013)	(0.012)	(0.018)	(0.050)	(0.051)	(0.052)
Price ratio−1	−0.070	−0.047	−0.125	−0.254	−0.178	−0.376
	(0.049)	(0.051)	(0.089)	(0.197)	(0.206)	(0.261)
*Price ratio−1*Above one*	0.002	0.001	0.003	0.006	0.002	0.009
	(0.005)	(0.005)	(0.007)	(0.019)	(0.020)	(0.022)
Log mktcap	0.020*	0.023**	0.042**	0.086*	0.092*	0.125**
	(0.011)	(0.012)	(0.020)	(0.047)	(0.048)	(0.057)
Tobin Q	−0.004	−0.001	−0.005	−0.018	−0.008	−0.017
	(0.004)	(0.005)	(0.008)	(0.017)	(0.019)	(0.022)
ROA	0.070*	0.074**	0.241***	0.305*	0.296**	0.719***
	(0.039)	(0.036)	(0.075)	(0.164)	(0.149)	(0.219)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	17,219	16,720	16,720	17,219	16,720	16,720

Panel B: Reduced form regressions						
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*Acquisition* $dummy_{t}$	*Acquisition* $dummy_{t+1}$	*Acquisition* $dummy_{t,t+3}$	*Acquisition* $amount_{t}$	*Acquisition* $amount_{t+1}$	*Acquisition* $amount_{t,t+3}$
Above one	0.015**	0.012*	0.023*	0.070**	0.060*	0.086**
	(0.073)	(0.066)	(0.012)	(0.035)	(0.034)	(0.039)
Price ratio−1	0.054	0.056	0.100	0.220	0.231	0.305
	(0.058)	(0.063)	(0.091)	(0.232)	(0.264)	(0.260)
*Price ratio−1*Above one*	−0.142	−0.116	−0.267*	−0.562	−0.488	−0.805**
	(0.087)	(0.088)	(0.139)	(0.351)	(0.363)	(0.395)
Log mktcap	0.003	0.006*	0.006	0.009	0.024*	0.015
	(0.004)	(0.003)	(0.007)	(0.015)	(0.014)	(0.019)
Tobin Q	0.002	0.005*	0.008*	0.010	0.016	0.023*
	(0.002)	(0.003)	(0.004)	(0.007)	(0.010)	(0.012)
ROA	0.033	0.042	0.172**	0.160	0.185	0.509**
	(0.032)	(0.034)	(0.068)	(0.131)	(0.143)	(0.201)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	17,219	16,720	16,720	17,219	16,720	16,720

Panel C: Acquisition announcement returns			
	(1)	(2)	(3)
Acquisitions following SEOs	quarter [t, t+1]	quarter [t, t+2]	quarter [t, t+4]
Above one	−0.024***	−0.022***	−0.011**
	(0.008)	(0.007)	(0.005)
Relative deal size	0.014	0.015	0.004
	(0.027)	(0.012)	(0.013)
Percent of cash payment	0.018**	0.023***	0.030***
	(0.008)	(0.007)	(0.006)
Public target	0.008	0.021	0.008
	(0.024)	(0.017)	(0.013)
Private target	−0.025***	−0.020***	−0.019***
	(0.008)	(0.007)	(0.006)
Diversifying deal	−0.024**	−0.025***	−0.029***
	(0.010)	(0.008)	(0.007)
Tender offer	−0.013	−0.010	−0.014
	(0.036)	(0.025)	(0.024)
Log mktcap	−0.014***	−0.011***	−0.011***
	(0.003)	(0.003)	(0.003)
Tobin Q	0.032***	0.021***	0.010**
	(0.005)	(0.005)	(0.005)
ROA	0.153	0.111	0.245***
	(0.106)	(0.091)	(0.081)
Year-quarter FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Obs.	468	663	964
Adj. R^2	0.561	0.462	0.360

Table 9
Investment and employment.
This table reports analyses of investment and employment. We restrict the sample to observations with *Price ratio* between 0.9 and 1.1. *Capex* is capital expenditures divided by lagged assets. *Rnd* is the research and development expense divided by lagged assets. *Employment* is the number of employees divided by lagged assets. *Capex* and *Rnd* are measured quarterly, while *Employment* is measured annually. Panel A reports the results from 2SLS regressions in which the *SEO dummy* is instrumented by the indicator *Above one*. Panel B reports the results from reduced form regressions in which the indicator *Above one* is used directly. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: 2SLS regressions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	$Capex_t$	$Capex_{t+1}$	$Capex_{t,t+3}$	Rnd_t	Rnd_{t+1}	$Rnd_{t,t+3}$	*Employment*
SEO dummy (instrumented)	0.008	0.016	0.001	−0.011	−0.004	−0.010	0.001
	(0.017)	(0.017)	(0.009)	(0.067)	(0.009)	(0.007)	(0.002)
Price ratio−1	−0.001	0.014	0.012**	0.009	−0.004	0.004	0.003**
	(0.015)	(0.015)	(0.005)	(0.006)	(0.006)	(0.004)	(0.001)
*Price ratio−1*Above one*	−0.001	−0.002	−0.001	−0.001	0.001	0.001	−0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log mktcap	0.001	0.002	−0.001	−0.008***	−0.004***	−0.005***	−0.002***
	(0.003)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tobin Q	0.001	0.001	0.001***	0.005***	0.002***	0.002***	0.001***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ROA	0.015	0.039***	0.020***	−0.123***	−0.091***	−0.088***	0.010***
	(0.014)	(0.012)	(0.006)	(0.014)	(0.013)	(0.010)	(0.002)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	16,554	16,037	16,037	17,280	16,780	16,780	16,667

Panel B: Reduced form regressions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*$Capex_t$*	*$Capex_{t+1}$*	*$Capex_{t,t+3}$*	*Rnd_t*	*Rnd_{t+1}*	*$Rnd_{t,t+3}$*	*Employment*
Above one	0.008	0.015	0.001	−0.015	−0.004	−0.009	0.001
	(0.019)	(0.018)	(0.010)	(0.010)	(0.010)	(0.007)	(0.003)
Price ratio−1	0.008	0.032*	0.013*	−0.003	−0.007	−0.004	0.004**
	(0.018)	(0.019)	(0.007)	(0.007)	(0.007)	(0.005)	(0.002)
*Price ratio−1*Above one*	−0.012	−0.025	−0.002	0.015	0.005	0.009	−0.001
	(0.027)	(0.027)	(0.010)	(0.010)	(0.010)	(0.007)	(0.003)
Log mktcap	−0.001	−0.001*	−0.002***	−0.006***	−0.003***	−0.004***	−0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tobin Q	0.002***	0.001***	0.001***	0.004***	0.002***	0.002***	0.001***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ROA	0.013	0.035***	0.020***	−0.119***	−0.090***	−0.085***	0.010***
	(0.015)	(0.013)	(0.006)	(0.015)	(0.014)	(0.011)	(0.002)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	16,554	16,037	16,037	17,280	16,780	16,780	16,667

Table 10

Buy-side investors.

This table reports the comparison of institutional investors' shareholdings following SEOs between *Above one* issuers and *Below one* issuers. Quarterly data on institutional ownership are obtained from the Thomson-Reuters 13F database. We restrict the sample to SEOs for which the *Price ratio* is between 0.9 and 1.1. Panel A reports the mean and median change in aggregate institutional ownership from the quarter prior to the SEO to the quarter after the SEO. Panel B reports the mean and median percentage of prior SEO institutional buyers that buy shares in the current SEO and the change in aggregate ownership of prior SEO buyers from the quarter prior to the current SEO to the quarter after the current SEO. The *p*-values for testing the statistical significance of the differences are reported in parentheses. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Change in aggregate institutional ownership following the SEO			
	Above one	*Below one*	difference
Mean	9.047%	6.631%	2.416%***
p-value			(0.001)
Median	7.103%	4.375%	2.728%***
p-value			(0.001)

Panel B: Institutional investors that are prior SEO buyers						
	Percentage of prior SEO buyers that increase ownership following the SEO			Change in ownership of prior SEO buyers following the SEO		
	Above one	*Below one*	difference	*Above one*	*Below one*	difference
Mean	50.629%	47.402%	3.227%*	1.677%	1.168%	0.509%**
p-value			(0.079)			(0.019)
Median	49.296%	45.000%	4.296%**	0.502%	0.198%	0.304%**
p-value			(0.032)			(0.013)

Table 11

Announcement returns.

This table reports the CARs of SEO announcements. We restrict the sample to SEOs for which the *Price ratio* is between 0.9 and 1.1. In Panel A, the CARs are calculated using the Fama and French 5×5 size and book-to-market portfolio as the benchmark in columns 1–3, using the one-factor market model in columns 4–6, and using the Fama and French three-factor model in columns 7–9. The models are estimated using daily stock returns over the [−160, −11] period prior to SEO announcements. The event window of the CARs is described in the column's heading. In Panel B, the dependent variable is the characteristic-adjusted CAR over the [−1, +1] window. The indicator variable *Increase* is equal to one if the outcome variable described in the column's heading has increased after the SEO and zero otherwise. The indicator *No increase* is equal to one if the outcome variable has not increased and zero otherwise. The increase is identified by comparing the average from quarter *t* to quarter *t*+3 and the average from quarter *t*−4 to quarter *t*−1, except that for *Employment* the increase is identified by comparing the year following the SEO and the prior year. The baseline sample includes Compustat firms that have done an SEO in the past five years and are trading on the NYSE, Nasdaq, or Amex. We exclude regulated utilities (SIC 4900–4999) and financial firms (SIC 6000–6999). The sample period is from 1983 to 2015. The standard errors (in parentheses) are heteroskedasticity consistent and are clustered at the firm level. The asterisks ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Average announcement returns

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Characteristic-adjusted CAR			CAR from market model			CAR from three-factor model		
Event window	[0, +1]	[−1, +1]	[−2, +2]	[0, +1]	[−1, +1]	[−2, +2]	[0, +1]	[−1, +1]	[−2, +2]
Above one	0.005*	0.004	0.005	0.005**	0.005*	0.006	0.006**	0.006*	0.007*
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)
Log mktcap	0.002	0.002	0.001	0.002	0.003	0.002	0.003	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Tobin Q	0.001	0.001	0.001	0.002	0.003	0.002	0.002	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
ROA	−0.025	−0.017	−0.005	−0.015	−0.013	0.002	−0.019	−0.013	−0.001
	(0.046)	(0.048)	(0.061)	(0.047)	(0.053)	(0.070)	(0.047)	(0.052)	(0.067)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,036	1,036	1,036	1,036	1,036	1,036	1,036	1,036	1,036
Adj. R^2	0.059	0.030	0.025	0.051	0.031	0.026	0.046	0.028	0.023

Panel B: Cross-sectional variation in announcement returns						
	(1)	(2)	(3)	(4)	(5)	(6)
Increase variable	*Cash*	*Acquisition dummy*	*Acquisition amount*	*Capex*	*Rnd*	*Employment*
*Above one*Increase*	0.009*	0.002	0.002	0.011**	0.019**	0.013**
	(0.005)	(0.008)	(0.008)	(0.005)	(0.009)	(0.007)
*Above one*No increase*	0.004	0.007*	0.007*	0.004	0.004	0.004
	(0.006)	(0.004)	(0.004)	(0.006)	(0.005)	(0.005)
Log mktcap	0.003	0.002	0.002	0.003	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Tobin Q	0.001	0.001	0.001	0.001	0.001	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ROA	−0.021	−0.018	−0.017	−0.021	−0.010	−0.038
	(0.052)	(0.053)	(0.053)	(0.053)	(0.056)	(0.054)
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	952	972	972	895	916	833
Adj. R^2	0.017	0.018	0.018	0.014	0.024	0.039