Corporate Boards and SEOs: The Effect of Certification and Monitoring*

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Abstract

In a sample of underwritten seasoned equity offerings (SEOs) of U.S. public industrial issuers over 1990-2005, issuers with boards dominated by independent directors experience higher abnormal announcement returns than issuers with boards dominated by insiders. Firm size, transparency, and other governance characteristics do not explain the effect of board independence. The positive relation between board independence and SEO announcement returns is more pronounced for firms with lower monitoring costs and more severe financial constraints. Our findings show that independent directors have a positive valuation effect when firms access capital markets because of their role in controlling shareholder-manager conflicts (monitoring the use of funds) and current-future shareholder conflicts (certification of the issue's value).

JEL classification: G14, G32, G34

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1. Introduction

The conventional wisdom on corporate boards is that only directors who are independent from management can be effective monitors and improve firm performance (Fama and Jensen (1983)). The evaluation of top management and their replacement in case of poor performance is likely to be best performed by independent directors because they are less susceptible to top managers' influence. Additionally, independent directors have incentives to ensure that the company is well run; they thereby build reputations as expert monitors and signal competence in the labor market (Fama (1980)). This view has led to a dramatic shift toward independent directors on public corporations' boards (Bhagat and Black (2001)).

Yet board independence is not consistently found to be correlated with firm performance.[1] Among the reasons advanced to explain this fact is that board structure is chosen endogenously. Firm performance is both a result of the decisions of past directors and a factor that potentially influences the choice of subsequent directors (Hermalin and Weisbach (1998)). Directors moreover are chosen not only to optimize monitoring but also for other reasons such as to provide expert advice (Adams and Ferreira (2007), Harris and Raviv (2008)).

Our research presents new evidence on the relation of board structure and firm value, using seasoned equity offerings (SEOs) as an experimental ground. There are compelling reasons to study SEOs in the context of corporate governance. For one, boards are explicitly responsible to provide for the capital base of the firm, but it is well established that the stock price reaction to an underwritten SEO announcement is strongly negative (2% to 3%).[2] Although the standard explanation is adverse selection, the extent of the capital loss upon SEO announcements suggests that a corporate governance failure could be involved. Because board structures are largely exogenous to SEOs, and board structures are established prior to offerings in any case, we sidestep some of the empirical limitations of the board literature. Another reason SEO decisions provide a good laboratory is that, unlike some other

[1] See Hermalin and Weisbach (2003) for a survey.

[2] See Eckbo, Masulis, and Norli (2007) for a review and updated evidence.

fundamental decisions that have been the subject of studies of board structure effectiveness, information on SEOs comes to the market discretely as an announcement, allowing us to better measure the value effect.

In a sample of underwritten SEOs of U.S. public industrial companies over 1990-2005, we find that issuers whose boards have a majority of independent directors experience abnormal announcement returns much higher than issuers with boards dominated by insiders. The difference is statistically and economically significant. For an announcement window defined as the filing date and the next trading day, the mean market model abnormal return is -2.88% for firms with a minority of independent directors, but only -1.50% for firms with a majority of independent directors. For a sample-average firm with market capitalization of $2.2 billion, the value-added of an independent board would be about $30 million. This primary finding is robust to a variety of checks, including controlling for firm size, transparency, and other governance characteristics.

To understand the economic source of this finding, we investigate two hypotheses regarding of the relation of board independence and SEO valuation. The hypotheses focus on ways that independent directors could add to fundamental value by resolving conflicts of interest between groups with different interests, either shareholders versus managers or current versus new shareholders. The *monitoring hypothesis* proposes that independent directors are effective in preventing the waste of new funds. The *certification hypothesis* proposes that independent directors are effective in reassuring investors about the firm's fundamental value. We find support for these hypotheses in that the board independence SEO-price effect is significantly stronger in firms where monitoring is easier and certification is more credible.

Our findings add new insights to both the board and SEO literature. The conclusion that economic causality flows from board structure to value is stronger than conclusions in other studies, as board structure choices are not likely motivated by prospective SEO price effects. We also provide new insights on the ways that interests and information sets of the various parties involved in SEOs play out to determine the value of shares post-SEO. These include

not just management and boards, but also current and new shareholders. We thus extend the understanding of how adverse selection theories of security issuance work in practice.

The remainder of the paper is organized as follows. Section 2 develops our hypotheses on board monitoring and certification of SEOs. Section 3 describes the data. Section 4 examines the relation between board independence and SEO announcement returns. Section 5 presents evidence that substantiates the importance of both monitoring and certification in explaining our primary finding. Section 6 presents robustness checks. Section 7 concludes.

2. Hypothesis development

We first develop our two hypotheses for the importance of board independence to shareholders' valuation of SEOs. The hypotheses work from the assumptions that there are inherent conflicts of interest between shareholders and managers and between current and new shareholders.

2.1. The monitoring hypothesis

Public corporations separate decision making from risk bearing, necessitating mechanisms to resolve agency conflicts between managers and shareholders. Boards of directors play an important role, particularly in monitoring and ratifying top managers' decisions (Fama and Jensen (1983)). While managers who serve as directors are inherently conflicted, independent directors are expected to be better monitors because they are less conflicted and have legal duties of care, loyalty, and good faith. Importantly, independent directors benefit in the labor market from establishing reputations as good monitors (Fama (1980)).[3] On the other hand, Jensen (1986) argues that independent directors are themselves conflicted in that they are more likely to lose their board position if they replace the CEO, and Bebchuk (2005) argues that all directors are actually part of a "team" with managers. One recent response to

[3]Evidence of superior monitoring by independent directors has been found for specific board decisions, including CEO replacement (Weisbach (1988)), takeovers (Byrd and Hickman (1992)), adoption of poison pills (Brickley, Coles, and Terry (1994)), and executive compensation (Core, Holthausen, and Larcker (1999)).

these criticisms has been to increase the equity-sensitivity of director compensation (Linck, Netter, and Yang (2009)).

Monitoring is especially important at the time of new financing because new funds test the firm's propensity to accept suboptimal projects that offer managerial private benefits. If they are better monitors, independent directors should be more effective in controlling this loss of shareholder value. Because board composition is public and established well in advance of an SEO, the announcement stock price reaction should be conditional on board composition. Thus, we expect to find a positive relation between board independence and the announcement abnormal return. We call this the *monitoring hypothesis*.

We expect that the monitoring effect of board independence is strongest where monitoring costs are low and other reasons that drive board structure, such as the need for insiders' advice and firm-specific knowledge, are not central (Adams and Ferreira (2007), Harris and Raviv (2008)).[4] In such cases, independent directors can monitor more effectively and with more focus. Monitoring costs are higher for firms whose value derives more from growth opportunities than from assets-in-place (Jensen (1993)). Insiders' advice is also apt to be most important when it comes to unique opportunities, such as those in growth firms. These reasons work in the same direction. Growth firms should not exhibit as strong a linkage of SEO announcement reaction to board independence as less growth oriented firms. Following Boone, Field, Karpoff, and Raheja (2007) and Coles, Daniel, and Naveen (2008), we use several proxies for monitoring costs and the need for inside directors' advice and firm-specific knowledge: Tobin's Q, R&D expenditures, and property, plant and equipment.

2.2. The certification hypothesis

A prominent reason for conflicts of interest between current and new shareholders is information asymmetry. That is, shares that are fairly valued given an outside investor's information can be overvalued given an insider's information. Because they enable new projects but dilute

[4] Duchin, Matsusaka, and Ozbas (2009) provide evidence that information asymmetry influences the link between independent boards and firm value.

current shareholders' claims, SEOs occur only when projects are good enough and existing assets' values are low enough (Myers (1984), Myers and Majluf (1984)). One outcome is that share price falls on the SEO announcement. Market timing explanations of issuance patterns, studies of long-run returns, and surveys of managers all suggest the possibility that new investors do not fully price the bad news (Baker and Wurgler (2002), Loughran and Ritter (1995), Graham and Harvey (2001)). Another outcome is underinvestment in positive NPV projects over time, limiting firms' long-run value.

Bolton, Scheinkman, and Xiong (2006) show that a second reason for conflict is disagreement about fundamental value. Current investors may optimally choose projects subject to high levels of disagreement to increase the value of their option to sell to the most optimistic new investors, leading to overinvestment in speculative projects.

Boards could add to fundamental value by resolving this conflict. Dybvig and Zender (1991) show that underinvestment is avoided if the board sets a managerial compensation contract that offsets the adverse selection.[5] Bolton et al. (2006) show that a long-run oriented board helps to alleviate conflicts, as investors know the policies that such a board will follow. Moreover, some legal scholars argue that independent boards are a way current shareholders bind themselves from taking short-term advantage of new shareholders to the long-term detriment of the company (Blair and Stout (1999)). An essential point is that independent directors, as not beholden to the CEO and, importantly, not much beholden to shareholders either, are mostly free to do as they choose.[6] Independent directors' freedom is also certainly enhanced by facing only a tiny chance of being unseated in an election (Bebchuk (2005)). Team production theory is one of the foundations of the Blair and Stout (1999) argument;

[5]Lucas and McDonald (1990) suggest this specific contract might not be practical, but still conclude that contracting can reduce problems related to asymmetric information. We note that contracting with management is a central board function. They also argue that shareholders voting on share-issuance policies would tend to vote for a long-run orientation, as each one is a short-term shareholder only at the end of his holding period.

[6]Blair and Stout (1999) point out that, under the law, directors are fiduciaries, not shareholders' agents. They argue that case law suggests the fiduciary duty is to the corporation, not to its shareholders, and that the well-established business judgment rule gives directors extensive discretion. Bainbridge (2003) goes so far as to propose "director primacy" as the essence of the corporation.

relatively disinterested board members having power to allocate firm value among claimant groups can encourage investment by those who fear they might be disadvantaged (Alchian and Demsetz (1972), Coates (1999)).

Why might independent directors choose for long-run value, given they are free to choose? We suggest that one important reason is that directors' labor market opportunities are related to firm's operating performance and long-run stability.[7] Thus, what is good for the firm's long run appears to be good for directors' opportunities too. Additionally, even though independent directors, like inside directors, may have equity incentives to profit from market overvaluation, such incentives are certainly much weaker when they typically have less of their wealth invested in the firm.

A firm's focus on long-term fundamental value versus the chance for short-term gains is especially challenged at the time of equity issues. If independent boards are in fact long-term oriented, they should be effective in controlling this conflict. An independent board could thereby serve as a credible signal or certification of the value of assets in place as maintaining an independent board is costly. We call this the *certification hypothesis*.[8]

We expect this effect of board independence to be strongest when certification is most compelling. Since adverse selection implies a "pecking order" theory of financing (Myers (1984)), certification will be less compelling when firms act differently from what is predicted by the pecking order. Under this theory, firms with considerable internal resources or good access to credit—financially unconstrained firms—are unlikely to issue equity for reasons other than overvaluation. Thus, independent directors are more credible in a certification role when an issuer is financially constrained. Just as monitoring is easier when monitoring

[7] There is extensive evidence that directors' reputations are related to good corporate outcomes, including avoiding financial distress (Gilson (1990)), avoiding dividend cuts (Farrell and Whidbee (2000)), enhancing operating profits (Ferris, Jagannathan, and Pritchard (2003)), avoiding restatements (Srinivasan (2005)), and avoiding financial fraud lawsuits (Fich and Shivdasani (2007)). All these outcomes relate more to long-run business health than to any short-run market advantage.

[8] The term certification is intended in the same sense as the proposal of Hertzel and Smith (1993) that certification by well-informed outside investors can resolve the Myers and Majluf (1984) adverse selection problem, in that the board is well-informed relative to new investors and it represents outsiders rather than management.

costs are low, certification is easier when an issuer's decision is consistent with pecking order predictions. Following Kaplan and Zingales (1997) and Almeida, Campello, and Weisbach (2004), we use several proxies to capture the degree of financial constraints an issuer faces: cash holdings, leverage, payout, and whether the firm has a credit rating.

2.3. Discussion

There are reasons to believe that boards dominated by independent directors are more effective monitors, helping to resolve manager-shareholder conflicts in a way that increases firm value. Independent boards may also be more long-term-oriented, helping to resolve current shareholder-future shareholder conflicts. Moreover, there are reasons to believe that boards have considerable influence at the time of an SEO.

There are other ways of controlling conflicts of interest at the time of an SEO, but other mechanisms also come with their own costs, explaining why none of them are used in all situations. With respect to the manager-shareholder conflict, private placements of equity, for example, can bring extra monitoring (Wruck (1989)), as well as certification. But private placements can also entrench management by bringing in friendly investors (Barclay, Holderness, and Sheehan (2007)). With respect to the current versus new shareholder conflict, financial slack and rights issues are often mentioned as solutions. But financial slack enables managerial private benefits (Jensen (1986)) and rights issues run the risk of low shareholder subscription, leading in the end to underinvestment (Eckbo and Masulis (1992)).

There are other ways independent boards might influence value at the time of SEOs. For example, suppose that independent boards are associated with higher expectations for future cash flows, perhaps as a result of reputations for good monitoring. As an indication of low-valued assets in place, an SEO would then represent a more negative surprise. Our tests allow for this possibility.

Additionally, monitoring and certification effects could either operate together as complements or offset each other. For example, if equity-based compensation for directors is

a strong influence, it would alleviate manager-shareholder conflicts but aggravate current-future shareholder conflicts (Datta, Iskandar-Datta, and Raman (2005)). More fundamentally, there can be trade-offs between the board setup that optimizes monitoring and the one that optimizes investment efficiency (Kumar and Sivaramakrishnan (2008)). We empirically consider director pay incentives, and test whether monitoring and certification effects compound or offset each other.

3. Data and descriptive statistics

Our initial sample includes SEOs by U.S. companies over 1990-2005 in the Thomson Financial Securities Data Corporation (SDC) New Issue database. We require that SEOs be of common stock by U.S. issuers, listed on the NYSE, Nasdaq, and Amex. Following Lee and Masulis (2009) we exclude completed SEOs with offer prices lower than $5; withdrawn SEOs with filing range midpoints lower than $5; spin-offs; reverse LBOs; offers by closed-end funds, unit investment trusts, REITs, and limited partnerships; rights and standby issues; simultaneous or combined offers of several classes of securities such as unit offers of stock and warrants; and non-domestic and simultaneous domestic-international offers.

We require that issuers have daily stock returns, prices, and volume for the SEO announcement period and the prior 200 trading days on CRSP. We also require that issuers have annual financial data for the year prior to the SEO announcement period on Compustat. These requirements reduce the sample to 4,025 SEOs. We require that board and governance data be available in the year prior to the SEO announcement period, which reduces the sample to 540 SEOs.

In our main tests, we also exclude financial firms (SIC codes 6000-6999) and utilities (SIC codes 4910-4940) to conform with many earlier studies. For example, Eckbo and Masulis (1992) find market reactions to equity offers by regulated firms to be less negative than offers by industrial firms. This reaction to regulated firm SEOs is consistent with adverse selection arguments, as regulated firms have less discretion than industrial companies in timing an

issue. Regulated firms also tend to have a higher proportion of independent directors and to be more transparent, which could bias results in favor of a positive relation between the reaction to an SEO and board independence. The final sample consists of 410 completed SEOs made by 329 companies over the 1990-2005 period.

Table 1 shows the distribution of the SEO final sample by year. Numbers of SEOs are not uniformly distributed across the sample years. There are a number of "hot" equity offering periods: 1991-1992, 1995, and especially 2002-2004. In the latter period there are 117 SEOs, representing 29% of our sample. There are also "cold" periods: 1990, 1994, 1997, 1999-2001. The mean firm in our sample has a market capitalization of $2.2 billion before the SEO, and mean proceeds amount to $184 million. Average relative offer size, defined as net proceeds divided by market capitalization prior to the offer, is 24%. We also note that the sample exhibits some industry clustering, in that about 13% of the SEOs are in the electronic equipment industry, 10% are in the industrial equipment industry, and 8% are in each of the chemical and measuring instruments industry.

3.1. SEO announcement returns

We estimate arithmetic cumulative abnormal returns (CARs) around the initial announcement, taking the original filing date from the SDC New Issues database as the announcement date.[9] We estimate CARs over event window days (t_1, t_2), benchmarking against a market model with the CRSP value-weighted index as the measure of market return and with an estimation period over trading days -160 to -11 before the SEO announcement date (event day 0). We use three alternative event windows: $(0, 1)$, $(-1, 1)$, and $(-2, 2)$ days. Our conclusions are not affected by the particular event window, so we report only the two-day event window $(0, 1)$ results.

Table 2 presents descriptive statistics for the CARs and other variables. Consistent with

[9] A search of the Factiva database indicates that in the majority of cases the announcement day is the filing day (usually after market close) or the day following the filing day. We take this timing into account in defining our announcement windows.

results elsewhere, the average two-day CAR is negative, at −1.8% (Panel A). This average CAR is, however, slightly less negative than the −2% to −3% often reported for U.S. SEOs. This can be explained by the fact that we require board structure data that are available only for large firms, which tend to exhibit reduced information asymmetry between issuers and outside investors.

3.2. Board characteristics

Our central tests are regressions of the SEO announcement return on board independence. Board independence is measured by the fraction of independent directors on the board of directors. For a director to qualify as independent, she or he must not be an employee, a former executive, or a relative of a current executive of the company. Nor may the director have any other business relations with the company. We also use board size as an additional explanatory variable, defined by the number of directors on the board. We obtain board data from IRRC for the 1996-2001 period. We supplement the IRRC board data with Compact Disclosure for the 1990-1995 period, but only in the case of firms included in the IRRC governance database in the year prior to the SEO.[10]

Panel B of Table 2 presents descriptive statistics for board characteristics. The mean fraction of independent directors is 0.64. Board size ranges from 4 to 18 directors, with a median of 9. The board size is in line with corporate board studies, but the fraction of independent directors is below the average value found in more-recent periods. We show later that no particular period is driving our results.

3.3. Firm and issue characteristics

Following the SEO literature, we include both firm characteristics (Panel C of Table 2) and issue characteristics (Panel D of Table 2) as control variables. Detailed variable definitions

[10] While IRRC provides detailed information on affiliation of directors, Compact Disclosure identifies only whether the director is an officer of the firm. Thus, board composition is only described in terms of the percentage of executive directors (insiders or officers) and non-executive directors in the Compact Disclosure period. In the robustness section, we show that our results are unchanged if we use only IRRC data.

and data sources are provided in the Appendix. We next discuss the motivations for the most important control variables in our tests.

Larger firms are more likely to be followed by analysts and the financial press, and attract more institutional investors. Thus, we expect that firm size reduces the information asymmetry between issuers and outside investors, leading to a positive relation between firm size and announcement returns. The size of a firm's operations also affects its board structure. Empirical evidence supports that board composition shifts towards a higher fraction of independent directors as the firm grows (Boone et al. (2007), Linck, Netter, and Yang (2008)). We use total assets as our main proxy for size, but we also consider a variety of alternative proxies to make sure we control for the effect of firm size. Our additional proxies include sales, equity market capitalization, firm age (number of years that the firm's stock has been exchange-listed), and number of business segments. The median firm in our sample has $880 million in total assets and $1.1 billion in sales, is 16.5 years old, and operates in a single business segment.

The quality of firms' accounting information affects investors' evaluations of SEOs (Lee and Masulis (2009)). Poor-quality accounting information prevents investors from evaluating a firm's true financial health, allows room for private benefits, and increases information asymmetry between issuers and outside investors (Jo and Kim (2007)). Additionally, board independence has been found to be positively associated with the quality of accounting information (Klein (2002)). Therefore, it is important that we control for accounting quality. We proxy for accounting quality with an accruals-based measure of (inverse) earnings quality. Accruals quality is defined as the tendency for a firm's accruals to diverge from *a priori* expected levels, given the observed time series of the firm's business activities and its industry. We benchmark primarily against the Dechow and Dichev (2002) (DD) model of accruals, which is based on the idea that accruals naturally map into cash flow realizations in contemporaneous and adjacent periods. High variance in residual accruals indicates that managers

are using their discretion to reduce transparency.[11]

Other control variables are suggested by prior research on SEOs and corporate financing. Managers of more levered firms (proxied by the ratio of total debt to assets) have greater incentives to take riskier projects at the expense of debtholders due to the overinvestment problem (Myers (1977)). Leverage is also related to the likelihood of financial distress. Therefore, we expect a negative relation between leverage and announcement returns.

Investors face lower adverse selection costs when equity issuers have more profitable investment opportunities (Choe, Masulis, and Nanda (1993)). Growth firms (as proxied by Tobin's Q) tend to have more profitable investment opportunities that benefit new equity investors. This leads us to expect a positive relation between Tobin's Q and announcement returns. Capital expenditures intensity (CAPEX, the ratio of capital expenditures to assets) is also a proxy for growth opportunities. Firms with credit ratings, and, of those, firms with higher ratings, tend to have higher announcement returns (Liu and Malatesta (2005)), because credit ratings reduce information asymmetry between managers and outside shareholders.

A few additional control variables are drawn from stock market data. Firms with more volatile stocks face more uncertainty about the issue value. Thus, we expect a negative relation between stock return volatility and announcement returns. Liquidity (proxied by share turnover prior to the issue) should make an SEO more attractive to investors, so we expect to find a positive relation between liquidity and announcement returns. Because of the difference in announcement returns across stock exchanges, we include a dummy variable (NYSE) that equals one if the issuer's shares are listed on the NYSE and zero otherwise.

Some of our regressions involve governance characteristics in addition to board independence. Because we want to know if board independence is special, we consider measures of takeover defenses, institutional ownership, CEO and board ownership and compensation, industry competitiveness, analyst following, and CEO dominance.

[11] As an alternative, we use a modification of the DD model proposed by McNichols (2002) (MDD). Following Lee and Masulis (2009), we extend the MDD model to incorporate a firm fixed effect (FDD).

Our issue characteristic control variables include offer size (net proceeds), secondary shares as a proportion of total SEO shares, and underwriter ranking (using the Carter-Manaster reputation measure). Offer size proxies for an economy of scale effect (Smith (1977)), which implies a positive relation between offer size and announcement returns.[12] Insiders making secondary offers in SEOs may be selling on private information, and any Myers and Majluf (1984) adverse selection effect may be exaggerated (Brav, Gezcy, and Gompers (2000)). Other authors, such as Kim and Purnanandam (2009), reason that secondary offerings are indicative of agency costs. Underwriters may provide monitoring and certification, and underwriter and issuer quality are complementary (Smith (1986), Puri (1996)).

Correlations among explanatory variables (not tabulated) are mostly small. Board independence presents the highest correlations with board size and firm age at 0.20 and 0.27, consistent with the notion that as a firm matures it requires more independent directors. Even so, these correlations are moderate in absolute terms. Interestingly, other proxies of firm size are insignificantly correlated with board independence. Additionally, there is no evidence of a significant correlation between board independence and accruals quality. The correlations between the various firm size proxies and accruals quality are usually negative and between -0.1 and -0.25, which indicates that larger firms tend to be more transparent. Overall, the correlation matrix does not suggest that board independence is merely a proxy for firm size and transparency in our sample.

4. The empirical relation of board independence and SEO price reaction

In univariate tests, we investigate whether CARs are different across firms with different levels of board independence (measured in the year prior to the SEO announcement) using two alternative sample splits: (1) whether the board has a majority or minority of independent directors; and (2) whether the fraction of independent directors prior to the SEO is in the

[12] We obtain similar results using issue size or relative issue size (defined as net proceeds over market capitalization) as control variables.

top quartile (Q4) or bottom quartile (Q1) of the sample distribution of board independence. Table 3 reports mean and median two-day cumulative abnormal returns (CARs) around SEO announcements for these subsamples according to board independence.

The results in Table 3 show that announcement abnormal returns are significantly more negative for issuers in low board independence subsamples than high board independence subsamples. The difference in abnormal returns between the majority and minority independent directors groups is 1.38 percentage points. This difference is statistically significant, with a $t-$statistic of 3.22. Similarly, there is a positive difference in abnormal returns between the top and bottom quartile on board independence of 1.61 percentage points, with a $t-$statistic of 2.95. Differences in median abnormal returns between high and low board independence subsamples are more moderate, at about one percentage point, but still economically and statistically significant. These univariate results support the hypothesis that SEO announcement abnormal returns of issuers with less independent boards are more negative than returns of issuers with more independent boards.

4.1. Main regression results

We next evaluate the relation between the SEO announcement stock price reaction and board independence in a regression framework. Table 4 presents OLS regression estimates, where the dependent variable is the two-day CAR. Regressions include the control variables discussed above, and also year dummies to account for any trends in SEO stock price reactions. To allow for heteroskedasticity and within-industry effects, we use robust standard errors corrected for clustering at the industry level.

Column (1) uses the logarithm of board independence as the central explanatory variable. The coefficient estimate for board independence is positive and significant at the 1% level. The effect is also economically significant; a one-standard deviation increase in board independence increases the announcement return by roughly 0.6 percentage points (one-third of the average CAR). Column (2) uses a dummy variable that takes a value of one when

there are a majority of independent directors and of zero otherwise. The dummy majority coefficient is positive and significant, indicating that announcement returns average 1.5 percentage points higher in firms with boards controlled by independent directors than in firms where independent directors are a minority, controlling for other factors. Finally, in column (3) we use a dummy variable that takes a value of one for the top quartile (Q4) of board independence and of zero for the bottom quartile (Q1). Intermediate quartile observations (Q2 and Q3) are not included in this specification. The estimated coefficient is positive and significant. A change from the bottom to the top quartile of board independence is associated with an increase in the stock market reaction to a SEO announcement of 1.35 percentage points. Among the control variables, the only consistently significant effect is for firm size; larger firms display less negative SEO announcement returns. This finding is consistent with reduced information asymmetry between insiders and outside investors in larger firms.

In columns (4)-(6) of Table 4, we add accruals quality to the models, considering that poor-quality accounting information may be associated with insider boards and promote both moral hazard and adverse selection. The regressions in these columns are analogous to those in columns (1)-(3) but include accruals quality (DD) as a regressor. The accruals quality (DD) measure coefficient is negative but not consistently significant.[13] A positive and significant relation between the reaction to the SEO announcement and board independence persists. These results demonstrate that board independence proxying for transparency does not drive our primary findings. We again conclude that board independence leads to significantly higher abnormal returns.

[13]Lee and Masulis (2009) report statistically stronger effects by focusing on the extreme quintile breakpoints in their regressions. Because our purpose is different from theirs − focusing on corporate governance − we choose to retain the simpler specification, which still guards against any omitted variable bias.

4.2. Effects of firm size and transparency

A reasonable concern is that board independence may be proxying for some aspect of firm size and transparency that is not captured by the linear model or by the particular empirical proxies in Table 4.

We first check how the relation between SEO announcement returns and board independence varies for different levels of firm size and transparency. If board independence simply captures non-linear effects of firm size and transparency, we would expect to find a weaker relation (or no relation at all) between SEO returns and board independence for smaller and less transparent firms.

We take the specification in column (4) of Table 4 as our starting point. In column (1) of Table 5, we add to that specification an interaction between the fraction of independent directors and a dummy variable that takes a value of one if a firm is above the median firm size. We find that the effect of board independence is positive and significant in smaller firms, as shown by the coefficient on the fraction of independent directors. The interaction coefficient, significant only at the 10% level, is negative. Thus, there is no indication that the effect of board independence is present only in larger firms, and there is even some evidence that the effect is weaker among larger firms. We conclude that is unlikely that firm size drives our primary finding.

In column (2) of Table 5 we add an interaction between the fraction of independent directors and a dummy variable that takes a value of one if a firm is below the median accruals quality variable. The coefficient on board independence, which registers the effect in firms with poorer accruals quality, remains positive and significant. The interaction variable is positive and significant, which indicates that the effect of board independence is stronger in firms with better transparency.

In column (3), we include both interactions. The board independence coefficient, which now measures the effect in smaller and less transparent firms, is still statistically and economically significant. The interaction variables are both significant at the 5% level, evidence

that board independence has a weaker effect for larger firms (negative interaction coefficient) and a stronger effect for more transparent firms (positive interaction coefficient). We conclude that the board independence effect goes beyond the effects of firm size (which actually works in the opposite direction) and transparency.

To address the concern that our particular proxies for firm size and transparency are imperfect, we use alternative proxies in the regressions reported in Table 6. As before, we take the specification in column (4) of Table 4 as our starting point. Columns (1)-(4) use alternative proxies for firm size. These are sales, equity market capitalization, firm age, and firm diversification (as measured by number of business segments). All these variables have been shown to be positively associated with board size and independence. We find that using these proxies for firm size in place of total assets does not affect the statistical or economic significance of the relation between board independence and SEO announcement returns. Some of these variables have a positive relation to SEO returns (sales and market capitalization), but others have no effect (age and number of segments).[14]

In columns (5) and (6), we use the alternative accruals quality MDD and FDD measures, rather than the DD measure. These alternative proxies for accruals quality do not affect the significance of the relation between SEO announcement returns and board independence.

Accruals quality measures may not be sufficient to measure the quality of information provided by the firm. We therefore also investigate whether board independence might proxy for non-accruals-related aspects of corporate disclosure. Our reasoning is that more forthcoming managers might both provide more information via disclosures and be more comfortable with independent directors.[15] For 288 of the SEOs in our sample, we are able to find SEC Form S, the regulatory filing that registers the issue and provides disclosures about the issue and the issuer. We focus on two standard disclosures in the form.

First, recognizing that informing investors of the extent of their risk is a key reason for

[14] We have also jointly included the proxies that capture different aspects of firms' size and development, without affecting our primary result.

[15] We thank a referee for suggesting this line of thought.

regulatory filing requirements for SEOs, we measure the extent of issuers' risk disclosures. Some disclosure is required, but the extent of it depends on issuers' situations and judgments. For a simple and objective measurement, we count the number of pages devoted to the "Risk Factors" section. Because the discussion of risk factors likely increases with the complexity of the issuer's business, we divide the number of pages by the firm's market capitalization to arrive at a measure of disclosure that we refer to as *risk factor disclosure*.[16]

Second, following Walker and Yost (2008), we examine the Form S section on "Use of Proceeds" to see what firms say about their plans for using SEO proceeds. Some issuers state only that the funds will be used for general corporate purposes or other language to that effect. Walker and Yost (2008) find that firms making more specific statements, especially about using funds for corporate investments, are likely to experience a higher SEO announcement effect. We define a dummy variable that takes a value of one if an issuer states that its intended use of funds is corporate investment, paying down debt, or acquisitions. We refer to this dummy variable as the *specific use of funds*.

We enter these variables into our core regression model and report the results in columns (7) and (8) of Table 6. Risk factor disclosure and specific use of funds are positively and significantly related to SEO abnormal return. The results substantiate that these variables are effective measures of information flow. The most important point is that the positive and statistically significant effect of board independence on SEO abnormal returns remains. Consistent with the idea that the presence of independent directors does some of the same job as regulatory disclosures, the coefficient on board independence is slightly smaller than it is in other regressions.

[16] We choose market capitalization because size roughly reflects a company's complexity as well as reflecting the extent of the investing public's interest in the stock, which might, in turn, lead to regulatory pressures to provide more detail.

5. Importance of monitoring and certification

5.1. Testing for the influence of monitoring costs

We investigate whether evidence consistent with the monitoring hypothesis is present in the relation between board independence and the market reaction to SEOs. The monitoring hypothesis predicts that the positive effect of independence on SEO announcement returns is stronger for firms with lower monitoring costs and less in need of insiders' advice. We use three proxies for monitoring costs and need for insiders' advice: Tobin's Q, the research and development expenditures-to-assets ratio (R&D), and the property, plant, and equipment-to-assets ratio (PPE). We include terms in our regressions for the interactions between board independence and indicator variables to pick out the half of the sample in which monitoring costs ought to be higher and inside advice more valuable. We expect to find that the interaction variables coefficients are negative. The effect of board independence should be positive and significant in the other half of the sample.

We present the evidence in columns (1)-(4) of Table 7. We use regressions with the same set of control variables as in column (4) of Table 4, although we omit reporting some of the coefficients. Column (1) of Table 7 includes an interaction between board independence and a dummy variable that takes a value of one for firms with a Tobin's Q ratio above the median. The significantly positive coefficient on board independence indicates a relation between board independence and SEO announcement returns for firms with low Tobin's Q ratios. The effect is weaker for firms with high Tobin's Q ratios as indicated by the significant negative interaction term coefficient. This finding is consistent with the idea that investors view outsiders as more effective monitors in firms with fewer growth opportunities.

Column (2) uses an interaction between board independence and a dummy variable that takes a value of one for firms with R&D above the median. Once again, we observe a positive and significant board independence coefficient, indicating a strong effect of independence for less R&D-intensive firms. However, the effect of independence is also strong in firms in more

R&D-intensive firms, as the interaction variable coefficient is insignificant.[17]

Column (3) uses an interaction between board independence and a dummy variable that takes a value of one for firms with PPE below the median. We find the effect of board independence to be positive and significant in firms with high PPE, and that the effect is significantly reduced in firms with low PPE as indicated by the significant negative interaction term coefficient.

Column (4) uses a summary index of monitoring costs as a regressor. We extract a first principal component factor from our three monitoring cost proxies (Tobin's Q, R&D expenses, and the negative of PPE), and interact board independence with a dummy variable that takes a value of one for firms with this monitoring cost factor above the median. The interaction term coefficient is negative and significant, while the estimated board independence is positive and significant. The evidence is uniformly consistent with the monitoring hypothesis in that board independence is more important where monitoring costs are low. We conclude that independent boards are effective in resolving shareholder-manager conflicts of interest involving SEOs.

5.2. Testing for the influence of certification effects

To provide evidence on the certification hypothesis, we investigate whether the relation between board independence and the market reaction to SEOs can be understood according to the predictions of pecking order theory of Myers (1984). The certification hypothesis predicts that independent directors can be more credible in a certification role when an issuer is financially constrained at the time of the SEO. We use several proxies to capture the degree of financial constraints that firms face: cash holdings, leverage, payout, and whether the firm has a credit rating. We augment our base regressions with interaction terms between board independence and indicator variables to pick out the half of the sample in which financial

[17] In untabulated regressions, we find that R&D works better as an indicator of monitoring costs if we exclude firms in high-tech industries (see Loughran and Ritter (2004)). High-tech firms may already be sufficiently non-transparent that monitoring difficulty does not vary according to R&D intensity.

constraints ought to be lower. Under the certification hypothesis, we expect to find that the interaction variables' coefficients are negative. The coefficient on board independence, which is driven by the other half of the sample (i.e., more financially constrained firms), should be positive and significant.

Columns (5)-(9) of Table 7 present the results of the regressions using alternative indicators of financial constraints. Column (5) uses an interaction between board independence and a dummy variable that takes a value of one for firms with cash above the median. There is evidence of a statistically significant positive relation between board independence and SEO announcement reactions in firms with less cash. Board independence also has an effect on SEO outcomes for firms with more cash, as evidenced by the insignificant interaction term coefficient.

Column (6) uses an interaction between board independence and a dummy variable that takes a value of one for firms with leverage below the median. We estimate a positive and significant board independence coefficient for firms with high leverage, while the effect is significantly weaker in firms with low leverage, judging from the negative and significant coefficient on the interaction term. The effect of board independence is stronger for high leverage issuers.

Column (7) uses an interaction between board independence and a dummy variable that takes a value of one for firms with payouts above the median. The idea is that firms choosing high payouts do not face financial constraints. The interaction has a negative and significant coefficient. We see a positive and significant board independence coefficient for firms with low payout. Thus, higher distributions to shareholders reduce the effect of board independence on SEO returns.

Column (8) uses an interaction between board independence and a dummy variable that takes a value of one if a firm has a credit rating. A credit rating indicates access to public debt markets and consequently mitigates financial constraints. We find that the relation between board independence and SEO announcement returns is significantly stronger for

firms with no credit rating and therefore without access to public debt markets.

Column (9) uses a summary index of financial constraints as a regressor. We extract a first principal component factor from our four financial constraints proxies (the negative of cash, leverage, the negative of payout, and no credit rating), and interact board independence with a dummy variable that takes a value of one for firms with this financial constraint factor below the median.[18] We find the effect of board independence is more important where financial constraints are stronger, while the outsiders certification effect is partially offset when a firm does not stick with the pecking order. A firm that issues equity when it is not financially constrained is more likely to be taking advantage of stock overvaluation, making certification less credible. Overall, the evidence is supportive of the certification hypothesis.[19]

To explain the relation between board independence and SEO price reactions, we have so far focused either on whether monitoring costs are low or on whether financial constraints are tight. We have shown that both monitoring and certification explanations are economically important when considered one at a time. To further establish whether they work together, as opposed to substituting for one another, we need a test that considers both explanations simultaneously. In column (10) of Table 7 we include interaction variables for board independence with the principal components indicators of high monitoring costs and low financial constraints. We find that the board independence coefficient is positive and significant, and both interaction variable coefficients are negative and significant. These results suggest that the effect of board independence is significantly stronger both for firms with low monitoring costs and low certification difficulty. We conclude that both monitoring and certification effects are operant in the sample, and they reinforce each other.

[18] We obtain consistent results using the Kaplan and Zingales (1997) (KZ) index of financial constraints as a summary indicator.

[19] Because reputation with investors may be more important for firms that raise funds repeatedly, we have checked on the effect of board independence for the repeat issuers in our sample. Strikingly, for repeat issuers in the top quartile on board independence, there is no negative SEO reaction on average. Though the sample of repeat issuers is too small to allow for more extensive tests, this univariate result is also supportive of the certification hypothesis.

6. Additional Evidence and Robustness

6.1. Unique explanatory power of board independence

The endogenous nature of board independence to companies' nature and state of development means it is challenging to fully isolate the effect of board independence. We thus report the results of two additional analyses that further separate the singular effects of board independence.

The first analysis is based on a partitioned regression. Computing OLS regression estimates via partitioning identifies the separable and total explanatory power of specific regressor groups via targeted R^2 statistics. For our application, we designate the log fraction of independent directors alone as one regressor group, and all control variables in the base model as the other group. We know the total R^2 for the base regression model is 0.134 (column (4), Table 4). Partitioned regressions show that the total effect of the control group of regressors is represented by an R^2 of 0.114, while the total effect of board independence is 0.027. Thus, the part of total R^2 that cannot be apportioned is only 0.007 (= 0.114 + 0.027 – 0.134).

The fact that only a small part of the overall R^2 is not separable is consistent with our earlier finding that most control variables are little correlated with board independence. Note particularly that the minimum separable explanatory effect of board independence on the SEO announcement abnormal return is 0.020 (= 0.134 – 0.114). Whether measured by total effect or minimum effect, the variation in the SEO announcement effect explained by the board independence regressor is about 0.02, which is about 15% of the overall explanatory power of the regression including board independence and control variables.

In a separate strategy to understand the statistically unique effect of board independence, we apply a two-step regression method (see Almeida and Wolfenzon (2005)). A first-step regression breaks board independence into a component linearly related to the other regressors in the base model (column (4), Table 4) and a residual component not related to the

other regressors. We refer to these as the fitted and the residual components of board independence, respectively. In a second-step regression, we re-estimate the base model but include as regressors the board independence measure split into these two parts. There is no omitted variable or generated regressor bias, given that both parts are included, and OLS standard error estimates remain appropriate. The estimates (not tabulated) show that the fitted value component of independence has a small and statistically insignificant influence on the SEO announcement effect. The residual component, however, has a coefficient of 0.0204 with a robust $t-$statistic of 3.01, similar to the effect of independence overall in the base model. Thus, essentially the full effect of board independence in the regression is due to the component that is independent of other regressors.

6.2. Controlling for other governance mechanisms

It is possible that other corporate governance mechanisms are drivers of SEO price effects and that they might supplant the board independence effect we have documented. We examine now whether the difference in average SEO announcement returns between high and low board independence firms can be explained by differences in takeover defenses, institutional ownership, or the way executives and directors receive incentives.

Takeover defenses. Gompers, Ishii, and Metrick (2003) (GIM) document a negative relation between takeover defenses and both firm value and performance, which supports the importance of the market for corporate control as a governance mechanism (Jensen (1993)). In Table 8, column (1), we include the GIM index as an additional control variable. The statistical and economic significance of the board independence effect on SEO announcement returns is barely affected by controlling for takeover defenses. The GIM coefficient is insignificant.[20]

Institutional ownership. Hartzell and Starks (2003) and Chen, Harford, and Li (2007)

[20] In untabulated results, we obtain similar findings if we alternatively control for staggered boards, poison pills, cumulative voting, and supermajority provisions, which have been identified as the most important takeover impediments (Gillan, Hartzell, and Starks (2006) and Larcker, Richardson, and Tuna (2007)).

find that institutional investors constitute an important governance influence, especially in firms with a high concentration of institutional ownership. In column (2) of Table 8, we report results when we include total institutional ownership and concentration of institutional ownership (as proxied by a Herfindahl index) as additional controls. The estimated board independence coefficient remains significantly positive, while the institutional ownership variables are insignificant.[21]

Compensation and equity incentives. Kim and Purnanandam (2009) emphasize incentives as a substitute for direct monitoring. If independent boards play a monitoring role, strong incentives in compensation and ownership could be a substitute, exerting a similar effect on management actions. Alternatively, managers' and directors' freedom to consider long-term interests could be compromised by tying their interests closely to those of the current shareholders. Datta et al. (2005) argue that the more aligned managerial incentives are with current shareholder value, the more likely managers are to issue overvalued equity to benefit current shareholders, exacerbating the adverse selection problem in SEOs.

To investigate these considerations, we add CEO and director equity-based pay and the delta of CEO holdings of stocks and stock options as regressors. Columns (3)-(5) of Table 8 report the results. CEO equity-based pay is added to the specification in column (3). Delta of the CEO holdings of stock and stock options is added in column (4). Outside directors' equity-based pay is added in column (5). The regression results show that only the delta of CEO holdings has significant explanatory power for SEO announcement returns. The coefficient is negative, in line with the certification reasoning and the results of Datta et al. (2005). All board independence variables continue to have significantly positive effects on SEO announcement returns.[22]

[21] In untabulated results we consider several other variables to account for the governance role of institutional investors. We use the ownership by the top five institutional shareholders as an alternative measure of ownership concentration. We also consider the type of institutional ownership: dedicated versus transient institutional ownership (Bushee (1998)) and independent versus grey institutions (Chen et al. (2007)). We continue to find a positive relation between SEO announcement returns and board independence controlling for these alternatives.

[22] In untabulated results, we also find that using either CEO or director equity ownership does not affect our primary finding.

Additional governance characteristics. Column (6) controls for whether the CEO is also the chairman. Column (7) controls for the number of analysts covering a firm, which can be seen as an additional monitoring influence. Column (8) includes a control for product market competition as proxied by the two-digit SIC Herfindahl index based on sales, a disciplining influence on firms (Shleifer and Vishny (1997)). In all these models, the board independence coefficient remains positive and significant.

Directors' characteristics. We include as control variables several characteristics of independent directors that have been shown to be important for their effectiveness: a "busy board" dummy, indicating whether a majority of independent directors hold three or more directorships (Fich and Shivdasani (2006)); the fraction of outside directors with attendance problems, defined as attending fewer than 75% of the board and committee meetings; the average age of independent directors; a dummy variable for the presence of female outside directors (Adams and Ferreira (2009)); and a dummy variable for the presence of foreign outside directors (Masulis and Wang (2007)). The addition of these regressors (not tabulated) has no effect on our conclusions.

We conclude that board independence is the crucial internal governance mechanism that influences the way investors perceive an SEO.

6.3. Other robustness checks

We additionally check that our findings are robust to the sample period, outliers, industry effects, and several other concerns. Results of some these checks appear in Table 8. Our basic result is confirmed: A more independent board is associated with less negative reactions to SEO announcements.

Sample period. Column (9) uses the 1996-2005 sample period, rather than 1990-2005. The 1996-2005 period corresponds to the period for which IRRC director data are available. Therefore, column (9) uses only IRRC data, rather than both Compact Disclosure (1990-1995) and IRRC data (1996-2005). This issue might be a concern because Compact

Disclosure characterizes boards only in terms of executive and non-executive directors. As a check on the stability of the board effect, we also estimate (untabulated results) regressions for separate subsample periods in the 1990s (1990-1999) and the 2000s (2000-2005).

Outliers. Column (10) checks the sensitivity of our results to extreme observations. We estimate a median regression using the least absolute deviation method, which is less subject to the influence of outliers than OLS. As an alternative (untabulated results), we exclude observations in the extreme deciles according to board independence, total assets, and accruals quality DD (i.e., with deciles computed separately on each count).[23] We find that outliers are not driving our primary finding.

Industry effects. The regression in column (11) includes industry dummies to account for unobserved heterogeneity across industries, with no meaningful change in the results.[24] We have so far excluded financial and utility firms from our tests. Regulated firms, like banks and utilities, may exhibit both more board independence and more transparency because of the regulatory process, which might otherwise bias us in favor of finding a correlation between SEO announcement returns and board independence. In untabulated results, we add back regulated firms to the sample, finding no effect on our conclusions.

Sample selection. We address the concern that data on board composition are available only for large firms (roughly the S&P 1500 index), which influences the sampling distribution of SEO abnormal returns. First, we expand the SEO sample by not imposing the restriction that a firm must be in the IRRC governance database in the year prior to the SEO. In this case, we are using board data from Compact Disclosure in 1990-1995 if a firm is in the IRRC governance database at any given time. This different criteria gives us a sample

[23] Standard outlier analysis of high leverage observations indicates very few influential observations in our sample. Excluding them has negligible effects on our primary findings. We have also investigated the characteristics of outlier deciles for board independence and SEO price reaction, to ascertain if they are unusual in terms of other characteristics. This would suggest a back-door route for those other characteristics to drive our results. We do not find any evidence that this is the case.

[24] Given that the sample exhibits some clustering in electronic, computer and other equipment industries, we study whether there is any effect on our results. If we drop all high-tech industry firms from the sample (eliminating 79 observations) the board independence coefficient is still positive and significant (see Loughran and Ritter (2004)).

of 537 issues. Second, to check for possible sample selection bias, we estimate a Heckman correction model. We posit that selection for our sample depends on the firm's market capitalization, analyst following, and institutional holdings as these factors correlate with S&P 1500 membership. Using the extended sample or applying the Heckman correction, we continue to find a positive and significant coefficient for the fraction of independent directors (untabulated results). There is thus no evidence that our results are biased by sample selection requirements.

Long-run returns. Our results so far focus on announcement returns. Monitoring should also influence the use of proceeds over time, and certification should enhance future financing opportunities. If the stock market is not fully efficient at all times, these value effects may not be fully incorporated in stock prices during the announcement period. To add confidence to our results, we estimate the relation of board independence to long-run abnormal returns following SEOs. In untabulated results, we find a positive and significant relation between long-run buy-and-hold abnormal returns and board independence. Overall, the long-term returns evidence substantiates the interpretation of our primary finding that independent directors have a strong positive value effect.[25]

7. Conclusion

We have established an empirical relation between board independence and stock market reaction to SEOs. U.S. public issuers whose boards are dominated by independents experience higher stock price reactions to an SEO announcement than issuers with boards dominated by insiders. This result is robust to controlling for firm size and transparency, as well as a wide variety of other controls.

We hypothesize that independent directors play both a monitoring role (preventing the waste of new capital) and a certification role (assuring prospective investors that shares are

[25]Following Lyon, Barber, and Tsai (1999), we compute five-year buy-and-hold abnormal returns (BHARs) where the benchmark is an event-specific portfolio of stocks matched according to their quintile of market capitalization, book-to-market, and one-year momentum, with no new issues allowed to enter the portfolio after the event.

not overvalued). Independent directors are more likely to monitor the use of new funds, as they are less conflicted than insiders. Independent directors are more likely to consider the long-term health of the firm as they have a long-run reputation to maintain. Consistent with this interpretation, we find that the positive relation between board independence and SEO announcement returns is more pronounced for firms with lower monitoring costs and less certification difficulty.

Our study contributes to both the corporate governance and equity issue literatures. First, our evidence is compelling in the corporate governance literature in that even though boards consisting of independents are generally thought to be superior monitors, there has so far been little evidence that these boards are associated with stronger performance. This may be a result of our empirical design focus on SEOs, which is less subject to endogeneity concerns and equilibrium interpretations, and when governance arrangements come into play in a crucial way. Second, our findings imply that empirical research into SEOs must take into account corporate governance. Board structure, in particular, is a key. Finally, we show that the distinction between the interests of (non-insider) current shareholders and new shareholders can affect market outcomes such as the price reaction to SEOs. Much of the reasoning in the corporate governance literature focuses on current shareholders alone.

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Table 1

SEO sample distribution by announcement year

The sample consists of SEOs over the 1990-2005 period by U.S. industrial issuers of common stock listed on the NYSE, Amex, and Nasdaq. Excluded are: (1) firms without board structure data on IRRC (1996-2005) or Compact Disclosure (1990-1995) in the year prior to the SEO announcement period; (2) SEOs without CRSP daily stock returns and prices for the SEO announcement period and the prior 200 trading days; (3) firms lacking Compustat annual financial data for the fiscal year prior to the SEO announcement period; (4) SEOs with offer prices lower than $5 and withdrawn SEOs with filing range midpoints lower than $5; (5) spin-offs, reverse LBOs, closed-end funds, unit investment trusts, REITs and limited partnerships; (6) rights and standby issues; (7) simultaneous or combined offers of several classes of securities such as unit offers of stock and warrants; (8) non-domestic and simultaneous domestic-international offers; and (9) financial firms (SIC codes 6000-6999) and utilities (SIC codes 4910-4940). SEO relative size is the ratio of gross proceeds to market capitalization in the year prior to the SEO filing.

Year	Number of SEOs	Percentage of sample	Mean market capitalization ($ millions)	Mean SEO proceeds ($ millions)	Mean SEO relative size
1990	15	3.7	1,176	105	0.169
1991	33	8.0	1,127	135	0.224
1992	32	7.8	1,725	109	0.155
1993	24	5.9	964	99	0.342
1994	18	4.4	1,429	108	0.127
1995	32	7.8	1,074	110	0.185
1996	23	5.6	1,050	102	0.197
1997	17	4.1	1,251	70	0.200
1998	25	6.1	2,111	179	0.148
1999	17	4.1	4,870	275	0.219
2000	19	4.6	3,495	421	0.189
2001	18	4.4	5,704	238	0.177
2002	41	10.0	4,632	291	0.157
2003	40	9.8	1,288	206	0.622
2004	36	8.8	1,564	247	0.269
2005	20	4.9	3,308	199	0.165
Total	410	100.0	2,213	184	0.238

Table 2

Summary statistics

This table reports the mean, median, standard deviation, minimum, maximum, and number of observations for each variable. The sample consists of SEOs over the 1990-2005 period by U.S. industrial issuers of common stock listed on the NYSE, Amex, and Nasdaq that are included in the IRRC database and meet additional requirements as detailed in Table 1. See Table A.1 for variable definitions.

	Mean	Median	Std Dev	Min	Max	Obs.
Panel A: SEO Returns						
Cumulative abnormal return (CAR)	-0.018	-0.018	0.060	-0.225	0.251	410
Panel B: Board Characteristics						
Fraction of independent directors	0.642	0.667	0.175	0.111	0.933	410
Fraction of independent directors (majority)	0.741	1.000	0.438	0.000	1.000	410
Board size	8.961	9.000	2.637	4.000	18.000	410
Number of independent directors	5.854	5.000	2.588	1.000	15.000	410
CEO-chairman duality	0.752	1.000	0.433	0.000	1.000	250
Panel C: Firm Characteristics						
Total assets (millions)	2,853	880	9,284	50	165,282	410
Sales (millions)	2,696	1,057	4,709	2	37,969	378
Market capitalization (millions)	2,213	787	5,613	9	64,259	410
Age (years)	18.751	16.500	11.655	1.000	80.000	410
Number of segments	2.314	1.000	1.839	1.000	12.000	392
Accruals quality (DD)	0.054	0.041	0.062	0.004	0.929	336
Accruals quality (MDD)	0.055	0.039	0.067	0.001	0.940	336
Accruals quality (FDD)	0.055	0.039	0.067	0.001	0.940	336
Leverage	0.319	0.312	0.198	0.000	1.538	410
Tobin's Q	1.802	1.459	1.348	0.258	19.780	410
CAPEX	0.072	0.051	0.069	0.000	0.439	410
Credit rating	0.541	1.000	0.499	0.000	1.000	410
Return volatility	0.029	0.026	0.013	0.008	0.109	410
Share turnover	0.009	0.006	0.011	0.000	0.150	410
NYSE	0.678	1.000	0.468	0.000	1.000	410
R&D	0.034	0.000	0.066	0.000	0.444	410
PPE	0.356	0.301	0.231	0.003	0.936	409
Cash	0.105	0.045	0.143	0.000	0.885	410
Payout	0.007	0.000	0.012	0.000	0.087	409
Governance index (GIM)	8.976	9.000	2.895	2.000	17.000	410
Total institutional ownership	0.291	0.000	0.329	0.000	1.000	410
Institutional ownership Herfindahl	0.013	0.000	0.025	0.000	0.278	410
CEO equity-based pay	0.308	0.238	0.315	0.000	1.000	330
Delta of CEO holdings	0.308	0.068	1.128	0.000	12.142	330
Directors equity-based pay	0.145	0.000	0.279	0.000	1.000	330
Industry Herfindahl	0.127	0.092	0.116	0.028	1.000	410
Number of analysts	1.966	0.000	5.073	0.000	31.000	410
Panel D: Issue Characteristics						
Net proceeds (millions)	183	109	262	2	2,781	410
Secondary shares	0.006	0.000	0.030	0.000	0.557	410
Underwriter ranking	8.543	9.100	1.134	2.100	9.100	410
Risk factor disclosure	0.014	0.000	0.090	0.000	1.487	288
Specific use of funds	0.323	0.000	0.468	0.000	1.000	288

Table 3

Announcement abnormal returns and board independence

This table shows mean and median cumulative abnormal returns (CARs) around SEO announcement dates using a two-day event window (0, 1). The sample consists of SEOs over the 1990-2005 period by U.S. industrial issuers of common stock listed on the NYSE, Amex, and Nasdaq that are included in the IRRC database and meet additional requirements as detailed in Table 1. Abnormal returns are estimated using a market model with CRSP value-weighted index as the benchmark, and with coefficients estimated over a window of 160 days to 11 days prior to the announcement. Issuers are classified according to high (low) board independence based on presence of a majority (minority) of independent directors on the board in the year prior to the issue, and, alternatively, on top (Q4) or bottom (Q1) quartile based on the fraction of independent directors in the year prior to the issue. Standard t-statistics and Wilcoxon signed-rank test statistics are in parentheses.

	Mean	Median	Obs.
Board classification:			
Majority of independent directors (1)	-0.0150	-0.0138	304
	(-6.88)	(-6.77)	
Minority of independent directors (2)	-0.0288	-0.0228	106
	(-7.75)	(-6.29)	
Difference (1)-(2)	0.0138	0.0090	
	(3.22)	(2.68)	
Board classification:			
High board independence (Q4)	-0.0127	-0.0148	95
	(-3.18)	(-4.23)	
Low board independence (Q1)	-0.0288	-0.0228	106
	(-7.75)	(-6.29)	
Difference (Q4)-(Q1)	0.0161	0.0080	
	(2.95)	(2.11)	

Table 4

Regression of announcement abnormal returns and board independence

This table reports regression estimates of cumulative abnormal returns (CARs) around SEO announcement dates using a two-day event window (0, 1). The sample consists of SEOs over the 1990-2005 period by U.S. industrial issuers of common stock listed on the NYSE, Amex, and Nasdaq that are included in the IRRC database and meet additional requirements as detailed in Table 1. Board independence is measured in three ways: by the logarithm of the fraction of independent directors in the year prior to issue; by a dummy that takes the value of one (zero) if there is (is not) a majority of independents directors on the board; and by a dummy that takes the value of one (zero) if the fraction of independent directors is in the top (Q4) (bottom (Q1)) quartile (observations in the intermediate quartiles are excluded in this case). See Table A.1 for other variable definitions. Robust t-statistics, adjusted for industry-level clustering, are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of independent directors (log)	0.0181			0.0204		
	(3.25)			(3.01)		
Fraction of independent directors (majority)		0.0152			0.0156	
		(3.75)			(2.83)	
Fraction of independent directors (Q4-Q1)			0.0135			0.0152
			(2.09)			(1.94)
Board size (log)	-0.0066	-0.0082	0.0023	-0.0068	-0.0085	0.0059
	(-0.81)	(-0.99)	(0.19)	(-0.78)	(-0.96)	(0.46)
Total assets (log)	0.0069	0.0070	0.0063	0.0055	0.0057	0.0073
	(2.98)	(3.03)	(1.77)	(1.80)	(1.83)	(1.70)
Accruals quality (DD)				-0.0224	-0.0206	-0.0573
				(-1.25)	(-1.18)	(-2.05)
Net proceeds (log)	-0.0034	-0.0034	-0.0036	0.0000	-0.0001	-0.0054
	(-0.98)	(-0.98)	(-0.88)	(0.00)	(-0.03)	(-0.95)
Secondary shares	-0.0341	-0.0372	0.1632	0.0007	-0.0031	0.2701
	(-1.06)	(-1.17)	(0.72)	(0.02)	(-0.09)	(1.11)
Underwriter ranking	-0.0019	-0.0020	-0.0059	-0.0014	-0.0016	-0.0054
	(-0.76)	(-0.82)	(-2.01)	(-0.54)	(-0.62)	(-1.46)
Leverage	-0.0031	-0.0021	-0.0064	0.0037	0.0046	0.0037
	(-0.42)	(-0.30)	(-0.45)	(0.53)	(0.73)	(0.23)
Tobin's Q	0.0023	0.0024	0.0017	0.0018	0.0020	0.0005
	(1.07)	(1.18)	(0.71)	(0.83)	(0.92)	(0.20)
CAPEX	-0.0090	-0.0066	-0.0180	-0.0153	-0.0128	-0.0382
	(-0.37)	(-0.27)	(-0.43)	(-0.47)	(-0.40)	(-0.73)
Credit rating	0.0033	0.0030	0.0044	-0.0033	-0.0034	-0.0026
	(0.81)	(0.74)	(0.69)	(-0.83)	(-0.81)	(-0.31)
Return volatility	0.0218	-0.0096	0.0442	-0.2548	-0.2988	0.0130
	(0.10)	(-0.04)	(0.12)	(-1.40)	(-1.68)	(0.03)
Share turnover	-0.0385	-0.0323	1.0886	0.0685	0.0827	1.4750
	(-0.15)	(-0.12)	(1.38)	(0.29)	(0.34)	(1.56)
NYSE	0.0026	0.0029	0.0126	0.0012	0.0009	0.0147
	(0.41)	(0.49)	(1.68)	(0.20)	(0.16)	(1.45)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.120	0.124	0.214	0.134	0.135	0.229
Observations	410	410	201	336	336	165

Table 5

Regression of announcement abnormal returns and board independence: The effect of size and transparency

This table reports regression estimates of cumulative abnormal returns (CARs) around SEO announcement dates using a two-day event window (0, 1). The sample consists of SEOs over the 1990-2005 period by U.S. industrial issuers of common stock listed on the NYSE, Amex, and Nasdaq that are included in the IRRC database and meet additional requirements as detailed in Table 1. Board independence is measured using the logarithm of the fraction of independent directors in the year prior to issue. Total assets (high) is a dummy that takes the value of one if a firm has assets above the median. Accruals quality (DD) (low) is a dummy that takes the value of one if a firm has accruals quality (DD) below the median. See Table A.1 for other variable definitions. Robust t-statistics, adjusted for industry-level clustering, are in parentheses.

	(1)	(2)	(3)
Fraction of independent directors (log)	0.0277	0.0147	0.0223
	(3.92)	(2.00)	(3.09)
Board size (log)	-0.0060	-0.0067	-0.0058
	(-0.69)	(-0.78)	(-0.67)
Total assets (log)	0.0038	0.0059	0.0040
	(1.30)	(1.89)	(1.35)
Fraction of independent directors × Total assets (high)	-0.0124		-0.0139
	(-1.79)		(-2.15)
Accruals quality (DD)	-0.0216	-0.0400	-0.0410
	(-1.16)	(-2.61)	(-2.61)
Fraction of independent directors × Accruals quality (DD) (low)		0.0106	0.0117
		(2.10)	(2.19)
Net proceeds (log)	0.0005	0.0000	0.0005
	(0.12)	(-0.01)	(0.13)
Secondary shares	0.0015	-0.0106	-0.0108
	(0.04)	(-0.29)	(-0.29)
Underwriter ranking	-0.0017	-0.0014	-0.0017
	(-0.64)	(-0.52)	(-0.64)
Leverage	0.0014	0.0044	0.0019
	(0.19)	(0.63)	(0.26)
Tobin's Q	0.0016	0.0020	0.0018
	(0.73)	(0.90)	(0.79)
CAPEX	-0.0088	-0.0133	-0.0058
	(-0.26)	(-0.42)	(-0.18)
Credit rating	-0.0041	-0.0032	-0.0041
	(-1.03)	(-0.81)	(-1.04)
Return volatility	-0.2618	-0.2656	-0.2746
	(-1.45)	(-1.47)	(-1.52)
Share turnover	0.0442	0.0723	0.0455
	(0.19)	(0.31)	(0.20)
NYSE	0.0010	0.0009	0.0006
	(0.17)	(0.15)	(0.10)
Year dummies	Yes	Yes	Yes
R^2	0.138	0.139	0.144
N	336	336	336

Table 6

Regression of announcement abnormal returns and board independence: Alternative proxies for size and transparency

This table reports regression estimates of cumulative abnormal returns (CARs) around SEO announcement dates using a two-day event window (0, 1). The sample consists of SEOs over the 1990-2005 period by U.S. industrial issuers of common stock listed on the NYSE, Amex, and Nasdaq that are included in the IRRC database and meet additional requirements as detailed in Table 1. Board independence is measured using the logarithm of the fraction of independent directors in the year prior to issue. Risk factor disclosure is the number of pages in the "Risk Factor" section in SEC Form S, scaled by market capitalization. Specific use of funds is a dummy variable that takes the value of one if the issuer states a specific use of funds (real investment, debt repayment or acquisition) in the "Use of Funds" section in SEC Form S. Regressions include control variables as in column (4) of Table 4 (coefficients not shown). See Table A.1 for other variable definitions. Robust t-statistics, adjusted for industry-level clustering, are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction of independent directors (log)	0.0186	0.0183	0.0185	0.0208	0.0203	0.0206	0.0170	0.0165
	(3.21)	(3.26)	(3.31)	(3.54)	(3.04)	(3.12)	(2.82)	(2.67)
Board size (log)	-0.0038	-0.0060	0.0012	-0.0006	-0.0069	-0.0048	-0.0025	-0.0045
	(-0.44)	(-0.70)	(0.18)	(-0.07)	(-0.79)	(-0.57)	(-0.27)	(-0.48)
Total assets (log)					0.0056	0.0053	0.0074	0.0076
					(1.81)	(1.78)	(2.75)	(2.77)
Sales (log)	0.0060							
	(1.83)							
Market capitalization (log)		0.0077						
		(3.27)						
Age (log)			0.0011					
			(0.39)					
Number of segments (log)				-0.0002				
				(-0.04)				
Accruals quality (MDD)					-0.0130			
					(-0.56)			
Accruals quality (FDD)						0.0191		
						(0.39)		
Risk factor disclosure							0.0287	
							(2.42)	
Specific use of funds								0.0069
								(2.06)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.116	0.126	0.103	0.110	0.133	0.150	0.119	0.122
Observations	378	410	410	392	336	335	288	288

Table 7

Regression of announcement abnormal returns and board independence: The effect of monitoring costs and financial constraints

This table reports regression estimates of cumulative abnormal returns (CARs) around SEO announcement dates using a two-day event window (0, 1). The sample consists of SEOs over the 1990-2005 period by U.S. industrial issuers of common stock listed on the NYSE, Amex, and Nasdaq that are included in the IRRC database and meet additional requirements as detailed in Table 1. Board independence is measured using the logarithm of the fraction of independent directors in the year prior to issue. Tobin's Q (high) is a dummy that takes the value of one if a firm has a Tobin's Q above the median. R&D (high) is a dummy takes that the value of one if a firm has a R&D-to-assets ratio above the median. PPE (high) is a dummy that takes the value of one if a firm has a property, plant and equipment-to-assets ratio below the median. Monitoring costs factor (high) is a dummy that takes the value of one if a firm has a first principal component extracted from Tobin's Q, R&D, and the negative of PPE above the median. Cash (high) is a dummy that takes the value of one if a firm has a cash-to-asssets ratio above the median. Leverage (low) is a dummy that takes the value of one if a firm has a leverage ratio below the median. Payout (high) is a dummy that takes the value of one if a firm has a common dividends-to-assets ratio above the median. Credit rating is a dummy that takes the value of one if a firm has a bond rating. Financial constraints factor (low) is a dummy that takes the value of one if a firm has a first principal component extracted from the negative of cash, leverage, the negative of payout and no credit rating below the median. Regressions include control variables as in column (4) of Table 4 and the level effect of variable underlying the interaction term (coefficients not shown). See Table A.1 for other variable definitions. Robust t-statistics, adjusted for industry-level clustering, are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fraction of independent directors (log)	0.0266	0.0220	0.0385	0.0317	0.0195	0.0258	0.0235	0.0312	0.0307	0.0461
	(3.44)	(3.06)	(2.91)	(3.14)	(2.38)	(3.56)	(3.43)	(4.04)	(4.39)	(4.30)
Board size (log)	-0.0075	-0.0071	-0.0077	-0.0065	-0.0065	-0.0075	-0.0115	-0.0070	-0.0072	-0.0071
	(-0.86)	(-0.79)	(-0.96)	(-0.77)	(-0.75)	(-0.84)	(-1.34)	(-0.82)	(-0.88)	(-0.90)
Total assets (log)	0.0063	0.0057	0.0061	0.0055	0.0054	0.0060	0.0055	0.0054	0.0046	0.0044
	(2.07)	(1.82)	(1.96)	(1.82)	(1.72)	(1.92)	(1.81)	(1.78)	(1.57)	(1.55)
Accruals quality (DD)	-0.0218	-0.0199	-0.0273	-0.0218	-0.0225	-0.0192	-0.0162	-0.0244	-0.0218	-0.0216
	(-1.15)	(-1.06)	(-1.48)	(-1.10)	(-1.25)	(-1.01)	(-0.85)	(-1.35)	(-1.25)	(-1.09)
Fraction of independent directors × Tobin's Q (high)	-0.0120									
	(-1.98)									
Fraction of independent directors × R&D (high)		-0.0046								
		(-0.53)								
Fraction of independent directors × PPE (low)			-0.0222							
			(-2.03)							
Fraction of independent directors × Monitoring costs factor (high)				-0.0168						-0.0214
				(-2.05)						(-2.68)
Fraction of independent directors × Cash (high)					0.0023					
					(0.27)					
Fraction of independent directors × Leverage (low)						-0.0161				
						(-2.22)				
Fraction of independent directors × Payout (high)							-0.0132			
							(-2.02)			
Fraction of independent directors × Credit rating								-0.0171		
								(-2.11)		
Fraction of independent directors × Financial constraints factor (low)									-0.0173	-0.0187
									(-2.13)	(-2.14)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.140	0.136	0.150	0.138	0.136	0.141	0.145	0.139	0.139	0.143
Observations	336	336	336	336	336	336	336	336	336	336

Table 8

Regression of announcement abnormal returns and board independence: Robustness

This table reports regression estimates of cumulative abnormal returns (CARs) around SEO announcement dates using a two-day event window (0, 1). The sample consists of SEOs over the 1990-2005 period by U.S. industrial issuers of common stock listed on the NYSE, Amex, and Nasdaq that are included in the IRRC database and meet additional requirements as detailed in Table 1. Board independence is measured using the logarithm of the fraction of independent directors in the year prior to issue. Column (1) includes the GIM governance index as a regressor. Column (2) includes institutional ownership and concentration of institutional ownership as regressors. Column (3) includes CEO equity pay as a regressor. Column (4) includes the delta of the CEO's equity holdings as a regressor. Column (5) includes directors' equity pay level as a regressor. Column (6) includes a dummy for CEO-chairman duality as a regressor. Column (7) includes analyst coverage as a regressor. Column (8) includes industry Herfindahl as a regressor. Column (9) uses only data from 1996-2005. Column (10) reports a median regression. Column (11) includes industry dummies. Regressions include control variables as in column (4) of Table 4 (coefficients not shown). See Table A.1 for other variable definitions. Robust t-statistics, adjusted for industry-level clustering, are in parentheses.

	(1) GIM	(2) Inst. ownership	(3) CEO equity pay	(4) CEO Delta holdings	(5) Directors equity pay	(6) CEO-chairman	(7) Analyst coverage	(8) Indust. Herfind.	(9) 1996 -2005	(10) Median regression	(11) Indust. dummies
Fraction of indep. dir. (log)	0.0228	0.0198	0.0181	0.0154	0.0173	0.0209	0.0207	0.0207	0.0206	0.0161	0.0206
	(3.03)	(2.67)	(3.04)	(2.76)	(2.62)	(3.70)	(3.02)	(3.00)	(3.46)	(2.16)	(2.27)
Board size (log)	-0.0032	-0.0062	0.0002	-0.0022	-0.0018	0.0037	-0.0072	-0.0067	0.0015	-0.0116	-0.0096
	(-0.37)	(-0.72)	(0.02)	(-0.22)	(-0.18)	(0.28)	(-0.82)	(-0.77)	(0.11)	(-1.27)	(-0.92)
Total assets (log)	0.0057	0.0054	0.0054	0.0062	0.0054	0.0041	0.0059	0.0055	0.0039	0.0078	0.0042
	(1.86)	(1.79)	(1.73)	(1.94)	(1.72)	(1.25)	(1.97)	(1.78)	(1.19)	(2.57)	(1.03)
Accruals quality (DD)	-0.0287	-0.0214	-0.0218	-0.0243	-0.0193	0.0033	-0.0220	-0.0225	-0.0001	-0.0478	-0.0270
	(-1.53)	(-1.15)	(-0.61)	(-0.73)	(-0.55)	(0.10)	(-1.26)	(-1.24)	(-0.00)	(-1.87)	(-1.42)
Governance index (GIM)	-0.0014										
	(-1.42)										
Total institutional ownership		-0.0017									
		(-0.19)									
Institutional ownership Herfindahl		-0.0609									
		(-0.79)									
CEO equity-based pay			0.0010								
			(0.18)								
Delta of CEO holdings				-0.0039							
				(-1.99)							
Directors equity-based pay					0.0074						
					(0.95)						
CEO-chairman duality						-0.0067					
						(-1.43)					
Number of analysts							-0.0003				
							(-0.83)				
Industry Herfindahl								0.0054			
								(0.44)			
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.142	0.136	0.161	0.172	0.163	0.163	0.135	0.134	0.155		0.196
Observations	336	336	270	270	270	197	336	336	203	336	336

Table A.1
Definitions of Variables

Variable	Definition
	Panel A: SEO Returns
Cumulative abnormal return (CAR)	Cumulative abnormal return over a two-day trading period around the SEO announcement date from the market model with parameters estimated using daily returns over the trading days -160 to -11 (CRSP).
	Panel B: Board Characteristics
Fraction of independent directors	Ratio of number of independent directors to board size in the year prior to the SEO filing (IRRC and Compact Disclosure).
Fraction of independent directors (dummy majority)	Dummy variable that takes the value of one if a firm-year has a majority of independent directors, and zero otherwise. (IRRC and Compact Disclosure).
Fraction of independent directors (dummy Q4-Q1)	Dummy variable that takes the value of one if a firm-year is in the top quartile of the fraction of independent directors, zero if a firm-year is in the bottom quartile, and a missing value otherwise (IRRC and Compact Disclosure).
Board size	Number of board members in the year prior to the SEO filing (IRRC).
Number of independent directors	Number of independent directors in the year prior to the SEO filing (IRRC).
CEO-chairman duality	Dummy variable that takes the value of one if CEO is also chairman of the board in the year prior to the SEO filling, and zero otherwise (IRRC).
	Panel C: Firm Characteristics
Total assets	Book value of total assets in millions in the year prior to the SEO filing (Compustat item 6).
Sales	Net sales in millions in the year prior to the SEO filing (Compustat item 12).
Market capitalization	Equity market capitalization in millions, defined as common shares outstanding times fiscal year-end stock price in the year prior to the SEO filing (Compustat item 25 $\times$ item 199).
Age	Firm's age in the year prior to the SEO filing as given by the number of years since the firm's stock appears in CRSP for the first time (CRSP).
Number of segments	Number of business segments in the year prior to the SEO filing (Compustat).
Accruals quality (DD)	The standard deviation of the five most recent firm-specific residuals prior to the SEO filing from the regression of total current accruals on lagged, contemporaneous, and leading cash flow from operations; total current accruals = Δ current assets (Compustat item 4) - Δ current liabilities (item 5) + Δ debt in current liabilities - Δ cash (item 2) where Δ denotes annual changes; cash flow from operations = earnings before extraordinary items (item 18) - total accruals and total accruals = total current accruals - depreciation and amortization (item 14); all variables are scaled by total assets; the regression is estimated annually for each of the Fama-French 48 industry groups having at least 20 firms with data available for each of the five years prior to the SEO filing.
Accruals quality (MDD)	Accruals quality (MDD) is equivalent to accruals quality (DD) with sales (Compustat item 12) and property, plant, and equipment (item 7) added as explanatory variables to the total current accruals regression.
Accruals quality (FDD)	Accruals quality (FDD) is equivalent to accruals quality (MDD) with firm fixed effects added to the regression, which is estimated using a total current accruals panel regression.
Leverage	Ratio of total debt to book value of total assets in the year prior to the SEO filing (Compustat item 9 + item 34) / item 6).
Tobin's Q	Ratio of market value of assets to book value of assets in the year prior to the SEO filling, with market value of assets equal to book value of assets minus book value of equity plus common shares outstanding times year-end stock price (Compustat item 6 - item 60 + item 25 $\times$ item 199) / item 60).

Table A.1: continued

Variable	Definition
CAPEX	Ratio of capital expenditures to total assets in the year prior to the SEO filing (Compustat item 128 / item 6).
Credit rating	Dummy variable that takes the value of one if the issuer has any rated bonds in the year prior to the SEO filing, and zero otherwise (Compustat).
Return volatility	Standard deviation of daily stock returns during the trading days -90 to -11 prior to the SEO filing date (CRSP).
Share turnover	Ratio of average daily share trading volume by number of shares outstanding during the trading days -90 to -11 prior to the SEO filing date (CRSP).
NYSE	Dummy variable that takes the value of one if the issuer's stock is listed on the NYSE, and zero otherwise (CRSP).
R&D	Ratio of research and development expenditures by total assets in the year prior to the SEO filing (Compustat: item 46 / item 6).
PPE	Ratio of property, plant and equipment to total assets in in the year prior to the SEO filing (Compustat: item 8 / item 6).
Cash	Ratio of cash and short-term investments to total assets in the year prior to the SEO filing (Compustat: item 1 / item 6).
Payout	Ratio of common dividends to total assets in the year prior to the SEO filing (Compustat: item 21 / item 6).
Governance index (GIM)	Governance index of Gompers, Ishii, and Metrick (2003), which is based on 24 antitakeover provisions in the year prior to the SEO filing (IRRC).
Total institutional ownership	Number of shares held by institutions divided by the number of shares outstanding in the year prior to the SEO filing (Thomson CDA/Spectrum 13f).
Institutional ownership Herfindahl	Institutional Herfindahl index calculated using institutional ownership in the year prior to the SEO filing (Thomson CDA/Spectrum13f).
CEO equity-based pay	Value of stock options and restricted stock grants received by the CEO divided by the CEO total compensation in the year prior to the SEO filing (Execucomp).
Delta of CEO holdings	The dollar change in the value of a CEO's stock and option portfolio per 1% change in stock price, estimated using the algorithm developed by Core and Guay (2002) for the year prior to the SEO filing (Execucomp).
Directors equity-based pay	Value of stock options and restricted stock grants received by outside directors divided by outside directors' total compensation in the year prior to the SEO filing (Execucomp).
Industry Herfindahl	Sum of squared market shares of firms' sales (Compustat: item 12) in each two-digit SIC industry.
Number of analysts	Number of analysts covering a firm (IBES).
Panel D: Issue Characteristics	
Net proceeds	SEO gross proceeds or shares offered times offer price minus gross spread (Thomson SDC).
Secondary shares	Proportion of shares being sold by current shareholders relative to total SEO shares (Thomson SDC).
Underwriter ranking	Carter-Manaster underwriter reputation measure in the year prior to SEO filing (Jay Ritter's website).
Risk factor disclosure	Number of pages in the "Risk Factor" section in the SEC Form S, scaled by market capitalization.
Specific use of funds	Dummy variable that takes the value of one if the issuer states a specific use of funds (real investment, debt repayment or acquisition) in the "Use of Funds" section in the SEC Form S.