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Corporate Boards and SEOs: The Effect of Certification and Monitoring

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Abstract

In a sample of underwritten seasoned equity offerings (SEOs), 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 returns is more pronounced for firms with lower monitoring costs and more severe financial constraints. The evidence suggests that independent directors have a positive effect because of their role in controlling both shareholder–manager conflicts (monitoring the use of funds) and current–new shareholder conflicts (certification of the issue's value).

I. Introduction

Providing for the capital base of the firm is a fundamental duty of firms' boards of directors. Boards therefore oversee financing choices, including seasoned equity offerings (SEOs), the announcement of which tends to occasion strong negative announcement returns of 2% to 3%.[1] Myers and Majluf (1984) famously argue that the source of the negative reaction lies in the informational advantage held by preexisting shareholders' agents over incoming investors who buy into the offering. Harris and Raviv (2008) show how information advantages of inside versus independent board members are operative in determining who

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[1] Asquith and Mullins (1986) are the first to find a strong negative announcement effect. The drop is greater where information asymmetry is large (Dierkins (1991)), where there are few analysts and forecast dispersion is large (D'Mello and Ferris (2000)), and for growth firms (Denis (1994), Jung, Kim, and Stulz (1996)). See Eckbo, Masulis, and Norli (2007) for a review and updated evidence.

has the authority for key decisions. Therefore, it should be expected that board structure conditions investors' beliefs and valuations at SEO time. This article establishes that board structure is important for SEO announcement returns and investigates two conditioning linkages, which we refer to as the monitoring and the certification channels.

The degree of board independence from management is thought to relate to corporate boards' performance via two well-known channels that are at the heart of our reasoning. First, independent directors' greater objectivity and unbiasedness as monitors of management (à la Fama and Jensen (1983) and a large subsequent literature) imply that their presence is helpful in mitigating conflicts of interest between management and pre-SEO shareholders.[2] Both current and incoming investors are harmed if boards are not diligent in monitoring the good use of new funds. We therefore hypothesize a monitoring channel that links board independence to pricing at SEO time. If independent boards were imposed exogenously and had this natural monitoring advantage, a positive pricing effect in the cross section at the time of important choices would be expected. In that case, the SEO announcement is an information innovation, and board independence positively conditions investors' interpretation of it.

Second, as Fama (1980) emphasizes, the labor market for independent directors rewards for successfully "refereeing" top managers and representatives of other factors of production in a system that has good "survival properties" for the long haul. This suggests that independent directors could help mitigate conflicts between previously existing shareholders and informationally disadvantaged shareholders who come in via the SEO. Independent directors may be a credible commitment to the long run to the extent that chasing short-term benefits hurts directors' reputation in the labor market. We therefore hypothesize a certification channel, in which the presence of independent directors helps reassure new shareholders. The idea is that new shareholders at issue time can be less suspicious that managers with loyalty to current shareholders decide to issue when assets in place are overvalued (Myers and Majluf (1984), Baker, Stein, and Wurgler (2003)) or to sell temporarily overvalued securities (Lucas and McDonald (1990), Stein (1996)).

Adding force to the certification channel is that, unlike independents, inside directors (managers) are more subject to incentive arrangements that induce them to trade off the future for the present. Dybvig and Zender (1991) demonstrate that standard managerial compensation arrangements act as short-term incentives. Bolton, Scheinkman, and Xiong (2005), (2006) show it is optimal for current shareholders to reward managers (and therefore, by definition, inside directors) for taking risk when overvaluation is a possibility. More generally, Stein (1989) illustrates that even with an efficient market and no agency problem, a focus on stock price maximization induces insiders to emphasize the short term if they cannot convincingly communicate their commitment to the long run.

The idea of independent boards as certifiers in this sense has been raised by legal scholars. Blair and Stout (1999), (2001), and Bainbridge (2005),

[2]Jung et al. (1996) are among the first to suggest that monitoring is the source of a pricing effect at SEO time.

for example, emphasize independent directors as having broader concerns for the long-run health of the firm. Their line of argument is that independent boards are less tightly bound to a stock price focus and are therefore a way existing shareholders convincingly communicate a long-run orientation. Thus, whereas the monitoring channel is rooted in agency theory, the certification channel adds the idea that independent directors might mediate informational discrepancies between investors.[3] In summary, the monitoring and certification channels both imply a positive association between board independence and SEO announcement returns.

Hypothesis. A higher proportion of independent directors on the board is associated with more positive SEO announcement returns.

In a sample of underwritten SEOs of large U.S. public industrial companies over 1990–2005, we find that issuers whose boards have a majority of independent directors experience abnormal announcement returns statistically and economically higher than issuers with boards dominated by insiders. 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 is about $30 million.

We investigate the importance of the monitoring and certification channels in explaining our primary finding. We use the implication of board theories that independent directors are not only appointed less often, but are also less effective in situations where they are disadvantaged (i.e., extra monitoring or information-collection effort is not sufficient to fully offset their disadvantages). For some firms, monitoring is inherently more difficult. This includes firms with high levels of information asymmetry (Raheja (2005), Adams and Ferreira (2007), and Harris and Raviv (2008)), such as growth firms, where minority investors cannot cost effectively become informed enough to discipline managers by selling the stock. Duchin, Matsusaka, and Ozbas (2010) provide evidence that information asymmetry influences the link between independent boards and firm value. Growth firms are also a class of firms where advice from outsiders is apt to be less valuable, as growth opportunities are idiosyncratic in nature. Coles, Daniel, and Naveen (2008) provide evidence that research and development (R&D)-intensive firms have a higher fraction of insiders on the board and that firm values increases with the fraction of insiders on the board.

Similarly, firms vary in the extent to which certification (i.e., the effect of outside directors on alleviating investors' fears about adverse selection) is believable or compelling. Because adverse selection in SEOs implies a "pecking order" of financing (Myers (1977)), certification is less compelling when firms act differently from what is predicted by the pecking order, such as when they have substantial debt capacity or access to public debt markets yet still issue shares.

[3]Our ideas could also be stated in terms of competing overinvestment and underinvestment problems, similar to what is proposed by Wu and Wang (2005) in their extension of Myers and Majluf (1984) to include managerial goal seeking.

Consistent with this reasoning, we find that board independence SEO-price effect is significantly stronger in firms with lower monitoring costs and more severe financial constraints. Additionally, monitoring and certification channels are complementary, with stronger effects for firms where both channels are expected to operate. We compare equity to debt issues to further study the effects. We show that the positive relation between board independence and announcement returns also pertains for debt issues, but the effect is about half as large as for SEOs. Unlike SEOs, debt issues do not present a strong adverse-selection risk for new investors and therefore its effect is mainly driven by monitoring; indeed, debt is less "information laden" than equity. By comparison to the results for SEOs, this finding suggests that about half of the SEO price effect is related to a certification effect (operative only for equity issues) and about half is related to a monitoring effect (operative for both debt and equity issues).

An important issue in interpreting our findings is that, as emphasized by Adams, Hermalin, and Weisbach (2010) and others, board structure is endogenously determined along with board actions. Therefore, our finding of a positive association of board independence and SEO announcement returns could indicate merely that unobservables correlated with board independence are also correlated with SEO returns. Without a natural experiment, we cannot fully rule out other explanations.

We note reasons and evidence that reduce (but cannot eliminate) the endogeneity concern. First, independent directors tend to be added after poor performance (Hermalin and Weisbach (1988) and others). SEOs, in contrast, tend to occur after periods of strong performance and stock price run-ups. Consistent with this, the SEO model of Dittmar and Thakor (2007) emphasizes that issues are most likely when existing shareholders and managers are in a state of agreement, that is, not likely after a crisis or period of discontent that would bring independents to the fore. In other words, there is reason to suspect that value-related omitted variables that bear positively on independent boards would bear negatively on valuation at SEO time. Second, board structure may be established long before an SEO is considered, and impediments to rapid board structure adjustments may be high. Such predetermined variables are less apt to be endogenous with the SEO. Supportive of the idea of exogenous effects, we find that lagged measures of board independence (up to 4 years) are predictive of less negative SEO returns in our sample.[4]

We also provide evidence that board structure is important for valuation at SEO time even when the firm should not have expected to do an SEO and therefore has probably not structured the board around it. Indeed, we do not find a difference in the effect for firms that are a priori more likely to do an SEO. Similarly, we find a positive board structure effect on SEO returns for firms that do only one SEO during our sample period, as well as for more frequent issuers.

We consider alternative interpretations of our findings. We investigate whether our findings might be the result of self-selection in equilibrium, in that firms with independent boards are firms that are predisposed to SEOs for other

[4]This also tends toward ruling out reverse causality in our results.

reasons. In contrast to such reasoning, we find that firms with independent boards tend to shy away from SEOs in their financing flow. This suggests that independent boards might offer a benefit at the time of the SEO that is too expensive for the kinds of firms that do SEOs to accept. What could lead such firms to pass on the benefit? Consistent with our earlier reasoning, a strong possibility is unobserved growth options, in that firms that need funds to grow cannot afford the informational, communications, advising, and decision-making disadvantages of an independent board of directors. These firms have a strong need for the benefits offered by inside directors and pay a price for them when funds are raised.[5]

Another possible interpretation is that board structure reflects other more exogenous, slow-changing characteristics that militate toward independent boards and predispose firms to less monitoring difficulty and less adverse selection. To check this, we investigate whether our findings are distinctive in the periods before or after the Sarbanes–Oxley Act (SOX) of 2002. If SEO announcement effects are larger in post-SOX years, a spurious positive correlation would result, as board independence is mandated in that period. We find that the board–SEO return relation is economically similar in both periods.[6]

Additionally, we conduct extensive robustness checks, focusing on measures that relate to information flow because theory suggests that information asymmetries are at the heart of stock price effects around financing announcements. We check the sensitivity of our results to information explicitly released at the time of the financing, such as the use of the funds procured. We show that board independence has a unique effect among governance variables, even though it seems likely that all governance variables share some common unobservable determinants.

Overall, our study shows empirically that independent boards do in fact link closely to value at the time of new financing. A variety of tests suggests that the link has a causal element. Yet it is also clear that board independence is chosen as part of some broader equilibrium in which firms that should have strong benefits of insider directors on other counts do not take advantage of the opportunity to issue new financing instruments more advantageously.

II. Data and Descriptive Statistics

Our sample starts with SEOs by U.S. companies over 1990–2005 in the Thomson Financial Securities Data Corporation (SDC) New Issues database. We require that SEOs be of common stock by U.S. issuers, listed on the New York Stock Exchange (NYSE), NASDAQ Stock Market (NASDAQ), or American Stock Exchange (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 leveraged buyouts; offers by

[5]Harris and Raviv (2008) point out that board structure is generally optimized considering that the controlling group can delegate decisions to maximize value. However, in an SEO situation with adverse selection, if the board is under insider control, such delegation would not be credible to new investors. Thus, an insider-dominated board structure suffers a flexibility deficit when it comes to SEOs that increases the importance of board structure per se.

[6]We do not have enough post-SOX observations for an effective difference-in-differences analysis.

closed-end funds, unit investment trusts, real estate investment trusts, 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 nondomestic 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 the Center for Research in Security Prices (CRSP) and annual financial data for the year before the SEO announcement period on Compustat. We also require that board and governance data on the Investor Responsibility Research Center (IRRC) be available in the year before the SEO announcement period. The resulting sample consists of 540 SEOs.

In our main tests, we also exclude financial firms (Standard Industrial Classification (SIC) codes 6000–6999) and utilities (SIC codes 4910–4940) to conform to many earlier studies. These requirements reduce the sample to 410 completed SEOs made by 329 companies over 1990–2005.

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 last period there are 117 SEOs, representing 29% of our sample. There are also "cold" periods: 1990, 1994, 1997, and 1999–2001. The mean firm in our sample has market capitalization of $2.2 billion before the SEO, and mean proceeds amount to $184 million. Average relative offer size, defined as gross proceeds divided by market capitalization before the offer, is 24%.

TABLE 1

SEO Sample Distribution by Announcement Year

The sample consists of seasoned equity offerings (SEOs) over the 1990–2005 period by U.S. industrial issuers of common stock listed on the NYSE, AMEX, and NASDAQ. Excluded are: i) firms without board structure data on the Investor Responsibility Research Center (1996–2005) or Compact Disclosure (1990–1995) database in the year before the SEO announcement period; ii) SEOs without Center for Research in Security Prices daily stock returns and prices for the SEO announcement period and the prior 200 trading days; iii) firms lacking Compustat annual financial data for the fiscal year before the SEO announcement period; iv) SEOs with offer prices lower than $5 and withdrawn SEOs with filing range midpoints lower than $5; v) spin-offs, reverse leveraged buyouts, closed-end funds, unit investment trusts, real estate investment trusts, and limited partnerships; vi) rights and standby issues; vii) simultaneous or combined offers of several classes of securities such as unit offers of stock and warrants; viii) nondomestic and simultaneous domestic–international offers; and ix) financial firms (Standard Industrial Classification (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 before the SEO filing.

Year	No. of SEOs	Percentage of Sample	Mean Market Capitalization ($millions)	Mean SEO Proceeds ($millions)	Relative Size	Cumulative Abnormal Return	Fraction of Independent Directors
1990	15	3.7	1,176	105	0.169	−0.017	0.719
1991	33	8.0	1,127	135	0.224	−0.023	0.643
1992	32	7.8	1,725	109	0.155	−0.035	0.731
1993	24	5.9	964	99	0.342	−0.032	0.688
1994	18	4.4	1,429	108	0.127	−0.014	0.710
1995	32	7.8	1,074	110	0.185	−0.007	0.733
1996	23	5.6	1,050	102	0.197	−0.014	0.708
1997	17	4.1	1,251	70	0.200	−0.024	0.516
1998	25	6.1	2,111	179	0.148	−0.013	0.548
1999	17	4.1	4,870	275	0.219	−0.011	0.556
2000	19	4.6	3,495	421	0.189	−0.033	0.527
2001	18	4.4	5,704	238	0.177	−0.022	0.594
2002	41	10.0	4,632	291	0.157	−0.024	0.621
2003	40	9.8	1,288	206	0.622	−0.006	0.596
2004	36	8.8	1,564	247	0.269	−0.008	0.643
2005	20	4.9	3,308	199	0.165	−0.021	0.679
Total	410	100.0	2,213	184	0.238	−0.019	0.642

A. SEO Announcement Returns

We estimate cumulative abnormal returns (CARs) around the initial announcement, taking the original filing date from the SDC New Issues database as the announcement date.[7] We estimate CARs over the event window, days $(0, 1)$, using 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. We have also measured abnormal returns in a variety of other ways (Fama–French (1996) 3-factor model, Carhart (1997) 4-factor model, size-adjusted portfolios, and Fama–French (1997) 48-industry adjusted) and with alternative announcement-period windows, with little effect on our results.

Table 2 presents descriptive statistics for the CARs and other variables. Consistent with results elsewhere, the average 2-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

TABLE 2

Summary Statistics

Table 2 reports the mean, median, standard deviation, minimum, maximum, and number of observations for each variable. The sample consists of seasoned equity offerings (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 Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. See the Appendix for variable definitions.

Variable	Mean	Median	Std. Dev.	Minimum	Maximum	No. of Obs.
Panel A. SEO Returns						
CAR, for SEOs	−0.018	−0.018	0.060	−0.225	0.251	410
CAR, for debt issues	−0.002	−0.007	0.028	−0.160	0.180	1,876
Panel B. Board Characteristics						
BOARD_ INDEP	0.642	0.667	0.175	0.111	0.933	410
MAJORITY_ INDEP	0.741	1.000	0.438	0.000	1.000	410
BOARD_SIZE	8.961	9.000	2.637	4.000	18.000	410
Panel C. Firm Characteristics						
ASSETS ($millions)	2,853	880	9,284	50.000	165,282	410
SALES ($millions)	2,696	1,057	4,709	2.000	37,969	378
AQ_DD	0.054	0.041	0.062	0.004	0.929	336
LEVERAGE	0.319	0.312	0.198	0.000	1.538	410
TOBIN_Q	1.802	1.459	1.348	0.258	19.780	410
CAPEX	0.072	0.051	0.069	0.000	0.439	410
RATING	0.541	1.000	0.499	0.000	1.000	410
VOLATILITY	0.029	0.026	0.013	0.008	0.109	410
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
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_RANK	8.543	9.100	1.134	2.100	9.100	410

[7] 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.

require board structure data that are available only for large firms, which tend to exhibit reduced information asymmetry between issuers and outside investors.

B. Board Independence

Board independence is measured by the fraction of independent directors on the board of directors (BOARD_INDEP). For a director to qualify as independent, she or he must not be an employee, former executive, or relative of a current executive of the company. The director may not have any other business relations with the company. In regression analyses, we use board size as a control variable, defined as the number of directors on the board. We obtain board data from IRRC for 1996–2001. We supplement the IRRC board data with Compact Disclosure for 1990–1995, but only in the case of firms included in the IRRC governance database in the year before the SEO.[8]

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.

C. Firm and Issue Characteristics

Many of our tests are regressions of SEO returns on board independence. We include both firm characteristics (Panel C of Table 2) and issue characteristics (Panel D) as control variables. Detailed variable definitions and data sources are provided in the Appendix. We next discuss the motivations for the most important control variables in our tests. Because the theoretical motivations for our study focus on the distribution of information, we pay special attention to control variables related to information asymmetries.

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, Field, Karpoff, and Raheja (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. 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

[8]Although 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 described in terms of the percentage of executive directors (insiders or officers) and nonexecutive directors in the Compact Disclosure period. In the robustness section, we show that our results are unchanged if we use only IRRC data.

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 to control for accounting quality. We proxy for accounting quality with an accruals-based measure of 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 (DD) (2002) model of accruals, which is based on the idea that accruals naturally map into cash-flow realizations in contemporaneous and adjacent periods, specifically following Lee and Masulis (2009) in computing accruals quality as the standard deviation of DD-model residual accruals over the 5 years before issue. High variance in residual accruals indicates that managers are using their discretion to reduce transparency (i.e., the accruals quality measures are larger when earnings are less transparent). As an alternative, we also use a modification of the DD model proposed by McNichols (2002) with similar results.

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 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 before 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 1 if the issuer's shares are listed on the NYSE, and 0 otherwise.

Some 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 (1990) reputation measure). Offer size proxies for an economy of scale effect (Smith (1977)), which implies a positive relation between offer size and announcement returns.[9] Insiders making secondary offers in SEOs

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

may be selling on private information, and any adverse-selection effect may be exaggerated (Brav, Geczy, 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)).

III. The Empirical Relation of Board Independence and SEO Price Reaction

A. Univariate Results

In univariate tests, we investigate whether CARs are different across firms with different levels of board independence measured in the year before the SEO announcement using two alternative sample splits: i) whether the board has a majority or minority of independent directors and ii) whether the fraction of independent directors before the SEO is in the top quartile (Q4) or bottom quartile (Q1) of the sample distribution of board independence. Table 3 reports mean and median 2-day CARs around SEO announcements for these subsamples according to board independence.

TABLE 3

SEO Announcement Abnormal Returns and Board Independence

Table 3 shows mean and median cumulative abnormal returns around seasoned equity offering (SEO) announcement dates using a 2-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 Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. Abnormal returns are estimated using a market model with Center for Research in Security Prices value-weighted index as the benchmark, and with coefficients estimated over a window of 160 days to 11 days before the announcement. Issuers are classified according to high (or low) board independence based on presence of a majority (minority) of independent directors on the board in the year before the issue and, alternatively, on top quartile (HIGH_BOARD_INDEP = 1) or bottom quartile (HIGH_BOARD_INDEP = 0) based on the fraction of independent directors in the year before the issue. Standard *t*-statistics and Wilcoxon signed-rank test statistics are shown below in parentheses.

Subsample	Mean	Median	No. of Obs.
Panel A. Board Classification			
MAJORITY_INDEP = 1	−0.0150 (−6.88)	−0.0138 (−6.77)	304
MAJORITY_INDEP = 0	−0.0288 (−7.75)	−0.0228 (−6.29)	106
Difference	0.0138 (3.22)	0.0090 (2.68)	
Panel B. Board Classification			
HIGH_BOARD_INDEP = 1	−0.0127 (−3.18)	−0.0148 (−4.23)	95
HIGH_BOARD_INDEP = 0	−0.0288 (−7.75)	−0.0228 (−6.29)	106
Difference	0.0161 (2.95)	0.0080 (2.11)	

Table 3 shows that announcement abnormal returns are significantly more negative for issuers in low-board-independence subsamples than in 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 quartiles 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 1 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.

B. Regression Results

We next evaluate the relation between the SEO announcement return and board independence in a regression framework. Table 4 presents ordinary least squares (OLS) regression estimates, where the dependent variable is the 2-day CAR. Regressions include firm and issue characteristics as control variables, and year dummies to account for any trends in SEO returns. To allow for heteroskedasticity and within-industry effects, we use robust standard errors corrected for clustering at the industry level (2-digit SIC).

Column 1 of Table 4 uses the natural logarithm of the board independence ratio BOARD_INDEP as the central explanatory variable. The coefficient estimate is positive and significant at the 1% level. The effect is also economically significant; a 1-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 equals 1 when there is a majority of independent directors, and 0 otherwise. The dummy majority coefficient is positive and significant, indicating that announcement returns are 1.5 percentage points higher in firms with boards controlled by independent directors than in firms where independent directors are a minority. Finally, in column 3 we use a dummy variable that equals 1 for the top quartile (Q4) of board independence and 0 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 SEO announcement return of 1.35 percentage points.

In columns 4–6 of Table 4, we add accruals quality (AQ_DD) to see whether board independence is merely a stand-in for more general informational conditions. The regressions in these columns are analogous to those in columns 1–3 but include accruals quality as a regressor. The accruals quality measure coefficient is negative but not consistently significant. The strong positive and significant relation between the reaction to the SEO announcement and board independence persists.

In columns 7 and 8 of Table 4, we investigate whether our findings are robust to the inclusion of industry (2-digit SIC) fixed effects. Specifically, the regression in column 7 repeats the same specification as in column 4 with industry fixed effects, and similarly the regression in column 8 repeats that of column 5 with

TABLE 4

Regression of SEO Announcement Abnormal Returns and Board Independence

Table 4 reports regression estimates of cumulative abnormal returns around seasoned equity offering (SEO) announcement dates using a 2-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 Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. Board independence is measured in three ways: the natural logarithm of the fraction of independent directors in the year before the issue; a dummy that equals 1 (0) if there is (is not) a majority of independents directors on the board; and a dummy that equals 1 (0) if the fraction of independent directors is in the top (Q4) (bottom (Q1)) quartile (observations in the intermediate quartiles are excluded in this case). Regressions include year dummies. See the Appendix for other variable definitions. Robust *t*-statistics (shown below in parentheses) are adjusted for industry-level clustering.

Regressor	1	2	3	4	5	6	7	8
ln(BOARD_INDEP)	0.0181			0.0204			0.0206	
	(3.25)			(3.01)			(2.27)	
MAJORITY_INDEP		0.0152			0.0156			0.0156
		(3.75)			(2.83)			(2.29)
HIGH_BOARD_INDEP			0.0135			0.0152		
			(2.09)			(1.94)		
ln(BOARD_SIZE)	−0.0066	−0.0082	0.0023	−0.0068	−0.0085	0.0059	−0.0096	−0.0108
	(−0.81)	(−0.99)	(0.19)	(−0.78)	(−0.96)	(0.46)	(−0.92)	(−1.04)
ln(ASSETS)	0.0069	0.0070	0.0063	0.0055	0.0057	0.0073	0.0042	0.0042
	(2.98)	(3.03)	(1.77)	(1.80)	(1.83)	(1.70)	(1.03)	(1.02)
AQ_DD				−0.0224	−0.0206	−0.0573	−0.0270	−0.0263
				(−1.25)	(−1.18)	(−2.05)	(−1.42)	(−1.41)
ln(NET_PROCEEDS)	−0.0034	−0.0034	−0.0036	0.0000	−0.0001	−0.0054	0.0021	0.0020
	(−0.98)	(−0.98)	(−0.88)	(0.00)	(−0.03)	(−0.95)	(0.40)	(0.40)
SECONDARY_SHARES	−0.0341	−0.0372	0.1632	0.0007	−0.0031	0.2701	0.0246	0.0189
	(−1.06)	(−1.17)	(0.72)	(0.02)	(−0.09)	(1.11)	(0.56)	(0.43)
UNDERWRITER_RANK	−0.0019	−0.0020	−0.0059	−0.0014	−0.0016	−0.0054	−0.0016	−0.0017
	(−0.76)	(−0.82)	(−2.01)	(−0.54)	(−0.62)	(−1.46)	(−0.46)	(−0.50)
LEVERAGE	−0.0031	−0.0021	−0.0064	0.0037	0.0046	0.0037	0.0021	0.0030
	(−0.42)	(−0.30)	(−0.45)	(0.53)	(0.73)	(0.23)	(0.25)	(0.36)
TOBIN_Q	0.0023	0.0024	0.0017	0.0018	0.0020	0.0005	0.0015	0.0016
	(1.07)	(1.18)	(0.71)	(0.83)	(0.92)	(0.20)	(0.52)	(0.57)
CAPEX	−0.0090	−0.0066	−0.0180	−0.0153	−0.0128	−0.0382	−0.0035	−0.0050
	(−0.37)	(−0.27)	(−0.43)	(−0.47)	(−0.40)	(−0.73)	(−0.08)	(−0.11)
RATING	0.0033	0.0030	0.0044	−0.0033	−0.0034	−0.0026	−0.0038	−0.0041
	(0.81)	(0.74)	(0.69)	(−0.83)	(−0.81)	(−0.31)	(−0.65)	(−0.65)
VOLATILITY	0.0218	−0.0096	0.0442	−0.2548	−0.2988	0.0130	−0.2181	−0.2643
	(0.10)	(−0.04)	(0.12)	(−1.40)	(−1.68)	(0.03)	(−0.97)	(−1.21)
TURNOVER	−0.0385	−0.0323	1.0886	0.0685	0.0827	1.4750	0.0525	0.0626
	(−0.15)	(−0.12)	(1.38)	(0.29)	(0.34)	(1.56)	(0.20)	(0.23)
NYSE	0.0026	0.0029	0.0126	0.0012	0.0009	0.0147	0.0015	0.0014
	(0.41)	(0.49)	(1.68)	(0.20)	(0.16)	(1.45)	(0.16)	(0.15)
Industry dummies	No	No	No	No	No	No	Yes	Yes
R^2	0.120	0.124	0.214	0.134	0.135	0.229	0.196	0.198
No. of obs.	410	410	201	336	336	165	336	336

industry fixed effects. The findings for the board independence effect are the same: a strong positive effect. Given the similarity of findings across these models, we use the specification of column 4 as a base-case model in later tests.[10]

We check whether our core result is robust to the use of alternative abnormal return measures. Table 5 presents descriptive statistics on abnormal returns measured using four alternative benchmarks (Fama–French (1996) 3-factor model,

[10]We obtain similar estimates when we include industry dummies in subsequent regressions of abnormal returns.

TABLE 5

Cumulative Abnormal Returns: Alternative Measures

Table 5 reports cumulative abnormal returns around seasoned equity offering (SEO) announcement dates using a 2-day event window (0, 1) and alternative benchmarks. 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 Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. 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 before the issue. See the Appendix for variable definitions. Standard *t*-statistics are shown below in parentheses.

Subsample	Mean	No. of Obs.
Panel A. Fama–French (1996) 3-Factor Model Benchmark		
Board classification:		
MAJORITY_INDEP = 1	−0.0151	304
	(−5.81)	
MAJORITY_INDEP = 0	−0.0276	106
	(−6.37)	
Difference	0.0125	
	(2.55)	
Panel B. Carhart (1997) 4-Factor Model Benchmark		
Board classification:		
MAJORITY_INDEP = 1	−0.0151	304
	(−5.89)	
MAJORITY_INDEP = 0	−0.0271	106
	(−6.34)	
Difference	0.0120	
	(2.37)	
Panel C. Size-Adjusted Portfolio Returns Benchmark		
Board classification:		
MAJORITY_INDEP = 1	−0.0160	304
	(−7.95)	
MAJORITY_INDEP = 0	−0.0286	106
	(−7.30)	
Difference	0.0126	
	(2.85)	
Panel D. Industry-Adjusted Portfolio Returns Benchmark		
Board classification:		
MAJORITY_INDEP = 1	−0.0154	304
	(−7.08)	
MAJORITY_INDEP = 0	−0.0279	106
	(−7.48)	
Difference	0.0125	
	(2.49)	

Carhart (1997) 4-factor model, size-adjusted portfolios, and Fama–French (1997) 48-industry adjusted). The table also reports tests regarding the difference of mean abnormal returns for the majority-independent versus minority-independent subsamples. In every case, the difference is positive and statistically significant. Table 6 presents estimates of the same core regressions as in column 4 of Table 4, but for each alternative abnormal returns measure. In every case, we find that the board independence coefficient is positive and significant. Therefore, our core result is robust to various alternative ways of measuring abnormal returns.

IV. Importance of Monitoring and Certification Channels

Board theories imply that board structure will be optimally chosen to match the natural needs of the firm in terms of monitoring, advising, communication,

TABLE 6

Regression of SEO Announcement Abnormal Returns and Board Independence: Alternative Abnormal Returns Measures

Table 6 reports regression estimates of cumulative abnormal returns around seasoned equity offering (SEO) announcement dates using a 2-day event window (0, 1) and alternative benchmarks (Fama–French (1996) 3-factor model, Carhart (1997) 4-factor model, size-adjusted portfolio returns, industry-adjusted portfolio returns). 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 Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. Board independence is measured using the natural logarithm of the fraction of independent directors in the year before the issue. Regressions include year dummies. See the Appendix for other variable definitions. Robust *t*-statistics (shown below in parentheses) are adjusted for industry-level clustering.

	ANALYST_FCAST_ERR Benchmark Model			
	3 Factor	4 Factor	Size Adjusted	Industry Adjusted
Regressor	1	2	3	4
ln(BOARD_INDEP)	0.0198	0.0205	0.0204	0.0208
	(3.44)	(3.27)	(3.55)	(2.81)
ln(BOARD_SIZE)	−0.0065	−0.0053	−0.0071	−0.0070
	(−0.74)	(−0.60)	(−0.81)	(−0.78)
ln(ASSETS)	0.0064	0.0067	0.0060	0.0039
	(2.14)	(2.38)	(1.87)	(1.27)
AQ_DD	−0.0319	−0.0219	−0.0393	−0.0292
	(−2.05)	(−1.24)	(−2.13)	(−1.71)
ln(NET_PROCEEDS)	−0.0003	−0.0008	−0.0002	−0.0005
	(−0.07)	(−0.23)	(−0.06)	(−0.13)
SECONDARY_SHARES	−0.0023	−0.0139	−0.0084	0.0137
	(−0.06)	(−0.34)	(−0.23)	(0.37)
UNDERWRITER_RANK	−0.0013	−0.0013	−0.0014	−0.0018
	(−0.43)	(−0.42)	(−0.47)	(−0.67)
LEVERAGE	0.0047	0.0082	0.0063	0.0103
	(0.50)	(0.83)	(0.84)	(1.46)
TOBIN_Q	0.0031	0.0031	0.0027	0.0021
	(1.50)	(1.39)	(1.28)	(0.95)
CAPEX	−0.0212	0.0005	−0.0200	−0.0030
	(−0.73)	(0.02)	(−0.70)	(−0.10)
RATING	−0.0070	−0.0069	−0.0061	−0.0047
	(−1.51)	(−1.33)	(−1.41)	(−1.01)
VOLATILITY	−0.2925	−0.3413	−0.2223	−0.3085
	(−1.44)	(−1.42)	(−1.07)	(−1.36)
TURNOVER	0.0860	0.0658	0.0561	0.1538
	(0.31)	(0.27)	(0.19)	(0.55)
NYSE	0.0021	0.0015	0.0030	0.0006
	(0.40)	(0.26)	(0.51)	(0.10)
R^2	0.144	0.144	0.133	0.112
No. of obs.	333	333	333	333

and decision making. With respect to monitoring, the theories suggest that the presence of independent directors should be expected to translate into stronger returns at the SEO announcement because of investors' added confidence that the new funds are well applied. This is the essence of a *monitoring channel* by which board independence can affect stock pricing at the SEO announcement.

Conversely, board theories suggest that insider directors will dominate and be most effective in settings where advice, communication, and expert information for decisions are most important. This insider advantage, however, turns into a concern for new investors at SEO time. Independent directors' concern for long-run reputation means that the SEO is not a strong indication of overvalued assets in place or securities. For this reason also, independent directors are expected to translate into stronger returns at SEO time. This is the essence of a *certification*

channel for the effect of board independence on stock pricing at the SEO announcement.

Independent directors could, by extra investment and extra effort, add more to value in settings that are not their comparative advantage, though board theories suggest this is less likely in equilibrium. In the end, this is an empirical issue. We therefore investigate how the empirical relation of board independence to SEO announcement returns differs across firms with different levels of monitoring costs and certification difficulty.

Note that an association in our regressions is not necessarily causal. Whether independents would monitor and certify more effectively in situations to which they were not appointed, we cannot tell. We can provide some evidence that is suggestive of causality, and we do so later, but panel regressions cannot be conclusive on this point.

A. Tests Based on Sample Splits

We start by analyzing the monitoring and certification hypotheses based on splits of the full sample according to monitoring costs and financial constraints. The first analysis is based on the idea that the effects of board independence via the monitoring channel should be most evident where monitoring costs are low and where 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)). 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 will not exhibit as strong a linkage of SEO announcement reaction to board independence as less growth-oriented firms. Following Boone et al. (2007) and Coles et al. (2008), we use three proxies for monitoring costs and the need for inside directors' advice: Tobin's Q, R&D expenditures, and tangibility of assets (the ratio of property, plant, and equipment to assets (PPE)).

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 now omit reporting control variable coefficients. Column 1 of Table 7 includes an interaction between board independence and a dummy variable that equals 1 for firms with a Tobin's Q ratio above the median. The positive and significant 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 negative and significant 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 of Table 7 uses an interaction between board independence and a dummy variable that equals 1 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. The effect of board

TABLE 7

Regression of SEO Announcement Abnormal Returns and Board Independence: The Effect of Monitoring Costs and Financial Constraints

Table 7 reports regression estimates of cumulative abnormal returns around seasoned equity offering (SEO) announcement dates using a 2-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 Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. Board independence is measured using the natural logarithm of the fraction of independent directors in the year before the issue. TOBIN_Q (high) is a dummy that equals 1 if a firm has a Tobin's Q above the median. R&D (high) is a dummy that equals 1 if a firm has an R&D-to-assets ratio above the median. PPE (low) is a dummy that equals 1 if a firm has a ratio of property, plant, and equipment to assets below the median. Monitoring costs (MC) factor (high) is a dummy that equals 1 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 equals 1 if a firm has a cash-to-assets ratio above the median. LEVERAGE (low) is a dummy that equals 1 if a firm has a leverage ratio below the median. PAYOUT (high) is a dummy that equals 1 if a firm has a common dividends-to-assets ratio above the median. RATING (high) is a dummy that equals 1 if a firm has a bond rating. Financial constraints (FC) factor (low) is a dummy that equals 1 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 (coefficients not shown) and year dummies. See the Appendix for other variable definitions. Robust *t*-statistics (shown below in parentheses) are adjusted for industry-level clustering.

	Monitoring Costs Measures				Financial Constraints Measures					Both
Regressor	1	2	3	4	5	6	7	8	9	10
ln(BOARD_INDEP)	0.0266 (3.44)	0.0220 (3.06)	0.0385 (2.91)	0.0317 (3.14)	0.0195 (2.38)	0.0258 (3.56)	0.0235 (3.43)	0.0312 (4.04)	0.0307 (4.39)	0.0461 (4.30)
ln(BOARD_INDEP) × MC	−0.0120 (−1.98)	−0.0046 (−0.53)	−0.0222 (−2.03)	−0.0168 (−2.05)						−0.0214 (−2.68)
ln(BOARD_INDEP) × FC					0.0023 (0.27)	−0.0161 (−2.22)	−0.0132 (−2.02)	−0.0171 (−2.11)	−0.0173 (−2.13)	−0.0187 (−2.14)
R^2	0.140	0.136	0.150	0.138	0.136	0.141	0.145	0.139	0.139	0.143
No. of obs.	336	336	336	336	336	336	336	336	336	336
MC or FC regressor	TOBIN_Q (high)	R&D (high)	PPE (low)	MC (high)	CASH (high)	LEVERAGE (low)	PAYOUT (high)	RATING (high)	FC (low)	MC (high) & FC (low) factors

independence is similar in more R&D-intensive firms, as the interaction variable coefficient is insignificant.[11]

Column 3 of Table 7 uses an interaction between board independence and a dummy variable that equals 1 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 the effect is significantly reduced in firms with low PPE as indicated by the negative and significant interaction term coefficient. This finding is consistent with the idea that outsiders as more effective monitors in firms with more tangible assets.

Column 4 of Table 7 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 equals 1 for firms with this monitoring cost factor above the median. The interaction term coefficient is negative and significant, whereas the estimated board independence is positive and significant. The evidence is 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.

The second analysis is based on the idea that the effect of board independence is apt to be strongest when certification is most compelling. Because adverse selection implies a "pecking order" theory of financing (Myers (1984)), certification may be less compelling when firms act differently from what is predicted by the pecking order. Under this hypothesis, firms with considerable internal resources or good access to credit (i.e., 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 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 four proxies to capture the degree of financial constraints an issuer faces: cash holdings, leverage, payout, and whether the firm has a credit rating.

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 equals 1 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 has a similar effect on SEO outcomes for firms with more cash, as evidenced by the insignificant interaction term coefficient.

Column 6 of Table 7 uses an interaction between board independence and a dummy variable that equals 1 for firms with leverage below the median. We estimate a positive and significant board independence coefficient for firms with

[11] 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 nontransparent that monitoring difficulty does not vary according to R&D intensity.

high leverage, whereas the effect is significantly weaker in firms with low leverage, judging from the negative and significant coefficient on the interaction term. This finding is consistent with the idea that certification by independent directors is more credible in financially constrained firms.

Column 7 of Table 7 uses an interaction between board independence and a dummy variable that equals 1 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 of Table 7 uses an interaction between board independence and a dummy variable that equals 1 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.

Column 9 of Table 7 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 equals 1 for firms with this financial constraint factor below the median.[12] We find the effect of board independence is more important where financial constraints are stronger, whereas the outside directors 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 supports the certification hypothesis.[13]

We show that both monitoring and certification explanations are economically important when considered one at a time. To 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 for firms with low certification difficulty. This suggests that both monitoring and certification effects operate in the sample, and they reinforce each other. We do not suggest that our tests are capable of cleanly separating monitoring and certification effects, but only that the tests establish both are present in some mix.

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

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

B. Additional Tests for Monitoring and Certification Effects

We present additional analyses of the monitoring and certification channels. Monitoring should influence the use of proceeds over time. If the stock market is not fully efficient at all times, these value effects may not be fully incorporated into stock prices during the announcement period. By measuring long-run returns beginning after the announcement period, we try to exclude the effects of selling overpriced securities. Following Lyon, Barber, and Tsai (1999), we compute 5-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 1-year momentum, with no new issues allowed to enter the portfolio after the event. In untabulated results, we find a positive and significant relation between long-run BHARs and board independence. In summary, the long-term returns evidence substantiates the interpretation of our primary finding that independent directors have a strong positive value effect consistent with the monitoring hypothesis.

Next, we present a test to establish the relative importance of the certification channel relative to the monitoring channel. By comparing the price effects of SEO announcements to debt issue announcements, we can to some extent disentangle the monitoring and certification channels in explaining the effects of board independence on shareholder value at the time of SEOs. The key is that, unlike SEOs, debt issues do not present a strong adverse-selection risk for new investors. Because debt is senior to equity, debtholders are less exposed to errors in the value of the firm. Thus, debt announcement price effects are mainly driven by monitoring-channel effects.

We first collect data on debt issues between 1990 and 2005 and compute market model abnormal stock returns in a 2-day event window $(0, 1)$. Consistent with previous studies such as Eckbo (1986), Shyam-Sunder (1991), and Eckbo et al. (2007), we find a slightly negative announcement effect for debt issues. The mean abnormal return for the debt issues in our period is 0.155% with a t-statistic of -2.41.

Column 1 of Table 8 reports the results of the regression of debt issue announcement returns on board independence, including the same set of control variables (coefficients not reported) as used in our SEO regression in column 4 of Table 4. The regressions include year fixed effects and inference is based on industry-cluster robust standard errors. We find that the positive relation between board independence and announcement returns also pertains for debt issues. The board independence coefficient is positive and significant at the 1% level. This estimate implies that a 1-standard-deviation increase in board independence increases the debt issue announcement return by roughly 0.24 percentage points, which is substantially less than the effect implied by estimates for SEOs.

We next pool debt and equity issues in the same regression to directly compare the effects of board independence on announcement returns. The explanatory variables of interest are two interaction terms: board independence with a dummy for debt issues and a dummy for equity issues (SEOs). We also include debt and equity issue dummies. Columns 2–4 of Table 8 show the results. The regression in column 2 provides a benchmark result, showing that debt-issue reactions are less

TABLE 8

Regression of SEO and Debt Issues' Announcement Abnormal Returns and Board Independence

Table 8 reports regression estimates of cumulative abnormal returns around seasoned equity offering (SEO) and debt issue announcement dates using a 2-day event window (0, 1). The sample consists of SEOs and debt issues over the 1990–2005 period by U.S. industrial issuers listed on the NYSE, AMEX, and NASDAQ that are included in the Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. Board independence is measured using the natural logarithm of the fraction of independent directors in the year before issue. Regressions include the same control variables (not shown) as in column 4 of Table 4 and year dummies. Debt issues and SEOs are entered as dummy variables (DEBT_ISSUE_DUMMY and SEO_DUMMY, respectively). See the Appendix for other variable definitions. Robust *t*-statistics (shown below in parentheses) are adjusted for industry-level clustering.

	Debt Issues	Debt Issues and SEOs		
Regressor	1	2	3	4
ln(BOARD_INDEP)	0.0071 (4.69)			0.0163 (2.17)
DEBT_ISSUE_DUMMY		−0.0179 (−3.25)	−0.0157 (−2.72)	−0.0006 (−0.13)
SEO_DUMMY		−0.0215 (−2.41)	−0.0151 (−1.53)	
ln(BOARD_INDEP) × DEBT_ISSUE_DUMMY			0.0065 (4.48)	−0.0077 (−2.59)
ln(BOARD_INDEP) × SEO_DUMMY			0.0142 (4.84)	
R^2	0.050	0.051	0.059	0.051
No. of obs.	1,876	2,195	2,195	2,195

negative than equity-issue reactions. Column 3 adds the two interaction terms. As expected, the presence of more independent directors on the board is associated with a positive and significant effect for both debt- and equity-issue announcement returns. The coefficient is much larger for equity issues than for debt issues. The relevant coefficient for equity issues is 0.0142, whereas for debt issues it is less than half as large at 0.0065. In column 4 we reconfigure the specification, including an independence levels regressor and removing the SEO–independence interaction term, to check whether the effect of board independence on the stock market reaction for debt issues is statistically significantly lower than that for SEOs. The difference in the coefficient of board independence is −0.0077 with a *t*-statistic of −2.59.

Considering that board independence effects for SEOs can be via both monitoring and certification channels, whereas effects for debt are via mostly the monitoring channel, these estimates imply that more than half the SEO price effect is related to a certification effect (operative only for equity issues) and about half is related to a monitoring effect (operative for both debt and equity issues). This estimate of the importance of certification effects may be overstated to the extent that the implicit certification by independent directors is also important for debt issues.[14]

[14] We attempt additional tests for certification effects of directors using more extensive data on the nature of the directors. We mention several examples. First, we consider the affiliation of directors with institutional investors or strategic investors, using employment data from BoardEx. It seems plausible that a director's affiliation with an outside long-term investor would enhance the certification effect. Second, we consider directors' age and tenure, with the idea that directors near retirement may place less emphasis on long-run reputation and therefore be less effective certifiers. Though these

V. Endogeneity and Equilibrium

In this section, we develop evidence about the equilibrium within which our results are generated. We address some endogeneity concerns. To begin, we consider whether board independence has an economic effect of its own, as opposed to merely reflecting a pattern of self-selection within the equilibrium. We also consider whether our results could be due to reverse causality or to time patterns connected with SOX. Finally, we consider whether they are due to boards and financing choices both being driven by the same exogenous factors.

A. Self-Selection

From the evidence presented so far, it is possible that the observed effect of board independence is the expression of self-selection, in which firms that choose independent directors are also predisposed to SEOs. We address this concern as a first step to understanding the equilibrium that generates our observed effects, using a panel of issuing and nonissuing firms between 1996 and 2005.

We first estimate a logit model of the decision to do an SEO versus not do an SEO. The explanatory variable of interest is board independence, but we also control for other firm characteristics that may influence this decision. Column 1 of Table 9 presents the results. We find that the coefficient on board independence is negative and significant. This indicates that firms with more independent boards actually tend to shy away from SEOs in their financing flow, inconsistent with the self-selection hypothesis.

Column 2 of Table 9 presents estimates of a similar logit model but where the dependent variable is a dummy that equals 1 if a firm announces a capital issue, regardless whether it is an equity or debt issue. We find that the board independence coefficient is statistically insignificant. Thus, independent boards make equity issues less likely but this effect cannot be found for financing events in general.

We also estimate a nested logit model to corroborate the binomial logit model estimates and to obtain separate results for SEO effects and debt issue in the same model. The nested logit model proposes that a firm first decides whether to raise funds, then decides on the method as debt only, a mix of debt and equity, or equity only. The main variable of interest is again board independence. We obtain similar results using a multinomial logit (i.e., four separate choices), but we present the nested logit estimates because statistical tests favor its 2-step interpretation. For identification of the nested model, we need to set some regressors as determinants of the first-stage decision only. We choose return on assets, cash holdings, and stock price, variables that bear on a firm's need for funds.

The results, reported in columns 3–6 of Table 9, confirm those of the binomial logit models. Only in the case of the equity finance decision do we find a negative and significant coefficient on board independence. The evidence is that independent directors make it less likely that a firm decides to do an SEO, given

effects make sense, we were unable to find significant cross-sectional influences in either case. We also investigate whether independents' membership on governance, nominating, and audit committees is statistically influential.

TABLE 9

Logit Model of SEO and Debt Issue Choice and Board Independence

Table 9 reports coefficient estimates of binomial and nested logit models of security issuance. In column 1 the dependent variable is a dummy that equals 1 if a firm issues equity by seasoned equity offering (SEO) in a year. In column 2 the dependent variable is a dummy that equals 1 if a firm issues equity or debt in a year. In column 3 the dependent variable includes three types of security issuance for each year: only debt, debt and equity, and only equity; the base outcome is not issuing equity and debt. The sample consists of SEOs and debt issues over the 1990–2005 period by U.S. industrial issuers listed on the NYSE, AMEX, and NASDAQ that are included in the Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. Board independence is measured using the natural logarithm of the fraction of independent directors in the year before the issue. See the Appendix for other variable definitions. Robust *t*-statistics (shown below in parentheses) are adjusted for industry-level clustering.

	Binomial Logit		Nested Logit			
	SEO vs. No SEO	Issue vs. No Issue	No Issue	Debt	Debt and SEO	SEO
Regressor	1	2	3	4	5	6
ln(BOARD_INDEP)	−0.2709	0.1136		−0.0145	−0.0405	−0.2037
	(−2.81)	(1.37)		(−0.15)	(−0.41)	(−2.17)
ANALYST_FCAST_ERR	0.0186	−0.0164		0.0127	0.0136	0.0174
	(2.73)	(−2.40)		(0.89)	(1.04)	(1.76)
TOBIN_Q	0.0016	−0.0015		0.0013	0.0011	0.0015
	(2.14)	(−1.86)		(1.20)	(0.95)	(1.53)
ln(SALES)	−0.0396	−0.2143		0.3162	0.2133	0.1096
	(−1.44)	(−9.63)		(5.60)	(8.81)	(1.90)
R&D	0.0268	−0.0845		−0.0805	0.0872	0.0626
	(0.93)	(−2.34)		(−0.35)	(2.60)	(1.82)
PPE	0.5256	−1.2966		1.7032	1.3586	0.9613
	(2.35)	(−6.78)		(5.91)	(6.42)	(3.73)
LEVERAGE	0.8313	−0.7784		0.7032	1.0924	0.7241
	(4.14)	(−4.56)		(3.72)	(4.51)	(4.09)
ROA	−1.8633	1.9824	1.8220			
	(−5.18)	(6.27)	(6.31)			
CASH	1.0515	−1.3314	−1.1651			
	(2.74)	(−3.64)	(−3.17)			
STOCK_PRICE		−0.0032	−0.0031			
		(−2.70)	(−3.43)			
Constant	−2.6560	4.3585		−5.6027	−4.9650	−3.6871
	(−11.27)	(20.82)		(−8.32)	(−12.80)	(−9.20)
No. of obs.	10,189	10,189	10,189	10,189	10,189	10,189

that it has decided to raise funds, which is again inconsistent with a self-selection explanation for the positive relation between SEO returns and board independence. Our result that firms with independent boards tend to shy away from SEOs in their financing flow suggests that the benefits of independent boards in terms of monitoring may be too expensive for the kinds of firms that tend to do SEOs.

We next investigate whether our findings are consistent with an equilibrium in which board independence has an economic effect of its own, even though shareholders try set board structure optimally. This might be indicated by the fact that board structure is often established long before an SEO is considered, and impediments to rapid board structure adjustments are high. We perform additional tests (untabulated) to confirm that board structure is important for valuation at the SEO announcement even when the firm did not expect to do an SEO and board composition is therefore more likely to be exogenous with respect to the SEO. We estimate a logit model (similar to the one in column 1 of Table 9) to calculate the probability that a firm will do an SEO. We then use the predicted probabilities to classify firms as those that are likely to do an SEO and those that are unlikely

to do an SEO based on the median probability. We then estimate the SEO returns–board independence regression separately for both groups. We find no difference between the effect for firms that would be likely to do an SEO and those that would not. Finally, we estimate the SEO returns–board independence regression separately for firms that do only one SEO during our sample period and firms that do more than one SEO. For firms that do only one SEO it is harder to anticipate that they will issue new equity. We find that the board structure effect on SEO returns is evident for firms that do only one SEO during our sample period, as well as for more frequent issuers.

B. Reverse Causality

We consider the possibility that our results might be generated by reverse causality, where boards are established in light of upcoming SEOs. As a first check, we look at the evolution of board independence around the time of an SEO. Average board independence is stable in the range of 59% to 60% over the 5 years before an SEO. Furthermore, there is no significant change in average board independence in the 2 years following an SEO.

To consider the reverse-causality possibility more extensively, we estimate the SEO return regressions using board independence measured 2, 3, 4, and 5 years before the SEO announcement (rather than board independence in the year before the announcement). Columns 1–4 of Table 10 show the results. We find that the board independence coefficient is positive and significant in all specifications. Board structure up to 5 years before financing announcements has a positive and significant effect on SEO announcement returns.

TABLE 10

Regression of SEO and Debt Issue Announcement Abnormal Returns and Lagged Board Independence

Table 10 reports regression estimates of cumulative abnormal returns around seasoned equity offering (SEO) announcement dates using a 2-day event window (0, 1). The sample consists of SEOs over the 1990–2005 period by U.S. industrial issuers listed on the NYSE, AMEX, and NASDAQ that are included in the Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. Board independence is measured using the natural logarithm of the fraction of independent directors. In columns 1–4 board independence is measured 2, 3, 4, and 5 years before the issue. In column 5 board independence is measured using ordinary least squares (OLS) in 2002. Column 6 presents 2-stage least squares (2SLS) estimates where board independence in 2002 is used as an instrument for board independence in the first-stage regression. In columns 5 and 6 the sample period is 2002–2005. Regressions include the same control variables (not shown) as in column 4 of Table 4 and year dummies. See the Appendix for other variable definitions. Robust *t*-statistics (show below in parentheses) are adjusted for industry-level clustering.

Regressor	1	2	3	4	5	6
ln(BOARD_INDEP)	0.0206	0.0164	0.0350	0.0241	0.0137	0.0163
	(3.46)	(2.76)	(3.69)	(2.63)	(1.96)	(2.17)
R^2	0.155	0.143	0.289	0.317	0.198	0.207
No. of obs.	203	201	105	86	131	131
Lags	2	3	4	5	2002 (OLS)	2002 (2SLS)

We also measure board independence in 2002 and use it to explain SEO announcement returns for years after 2002. We focus on 2002 because it precedes the implementation of the SOX, which mandated more independent boards. The sample period for this test is 2002–2005. Column 5 of Table 10 presents the results

of an OLS regression and column 6 presents the results of a 2-stage least squares regression where we use board independence in 2002 as an instrument for board independence in later years. We find that the board independence coefficient is positive and significant in both specifications. These findings add confidence to the interpretation that the board independence–SEO returns relation is not likely the result of reverse causality.

C. Sarbanes–Oxley Act

The implementation of SOX mandated more independent boards. Prior studies (e.g., Linck et al. (2008)) find that board independence increased substantially from the pre- to post-SOX periods. Thus, there is a concern that SOX may be driving our results if at the same time SEO returns are coincidentally higher in the post-SOX period. To address this concern we estimate the relation between SEO announcement returns and board independence in the pre-SOX (1990–2002) and post-SOX (2003–2005) periods. Table 11 presents the results.

TABLE 11

SEO Announcement Abnormal Returns and Board Independence: The Effect of SOX

Table 11 reports on the associations of board independence and seasoned equity offering (SEO) announcement abnormal returns in pre- and post-Sarbanes–Oxley Act (SOX) periods. Panel A shows mean and median cumulative abnormal returns (CARs) around SEO announcement dates using a 2-day event window (0, 1). Issuers are classified according to high (low) board independence based on the presence of a majority (minority) of independent directors on the board in the year before the issue and, alternatively, on top (Q4) or bottom (Q1) quartile based on the fraction of independent directors in the year before the issue. Panel B reports regression estimates of CARs around SEO announcement dates. Board independence is measured using the natural logarithm of the fraction of independent directors in the year before the issue. 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 Investor Responsibility Research Center database and meet additional requirements as detailed in Table 1. Regressions include the same control variables (not shown) as in column 4 of Table 4 and year dummies. See the Appendix for other variable definitions. Robust *t*-statistics (shown below in parentheses) are adjusted for industry-level clustering.

Panel A. Mean and Median SEO Announcement Abnormal Returns

	Pre-SOX Period (1990–2002)			Post-SOX Period (2003–2005)		
Subsample	Mean	Median	No. of Obs.	Mean	Median	No. of Obs.
Board classification:						
MAJORITY_INDEP = 1	−0.0173	−0.0164	237	−0.0066	−0.0071	67
	(−6.85)	(−6.39)		(−1.65)	(−2.32)	
HIGH_BOARD_INDEP = 1	−0.0331	−0.0260	77	−0.0174	−0.0126	29
	(−7.38)	(−5.76)		(−2.82)	(−2.61)	
Difference	0.0157	0.0096		0.0108	0.0055	
	(3.07)	(2.59)		(1.47)	(1.12)	

Panel B. Regression of SEO Announcement Abnormal Returns

Subsample	Pre-Sox Period		Post-SOX Period
ln(BOARD_INDEP)	0.0193		0.0139
	(2.45)		(1.94)
F-test of Pre-SOX vs. Post-SOX		0.320	
p-value		0.58	
R^2	0.126		0.134
No. of obs.	314		96

Panel A of Table 11 presents the results of the univariate analysis that compares the SEO return for groups of SEOs based on board independence. In the pre-SOX period, we find that SEO mean and median returns are significantly

higher in groups with high board independence versus groups with low board independence. The difference in average returns is more than 1.5% in the pre-SOX period, which is slightly higher than the difference in Table 4 for the whole period. In the post-SOX period, the difference in SEO returns between the high- and low-board-independence groups is slightly lower but is still economically significant at more than 1%. The statistical precision of the estimates is lower because of the smaller sample in the post-SOX period.

Panel B of Table 11 presents the results of the multivariate analysis where we use the natural logarithm of board independence as the central explanatory variable. Column 1 reports the results using the pre-SOX period and column 2 reports the results using the post-SOX period. We find that the board independence coefficient is positive and significant at the 5% level in the pre-SOX period. In the post-SOX period, the board independence coefficient is also positive but significant only at the 10% level. The effect of board independence is economically significant in both the pre- and post-SOX periods; a 1-standard-deviation increase in board independence increases the announcement return by roughly 0.6 and 0.5 percentage points, respectively.

D. Additional Evidence Relating to Endogeneity and Robustness

We conduct additional robustness checks that focus on extended specifications of our core regression equation to include alternative measures of firm size (sales, equity market capitalization, firm age, and number of business segments) and transparency, the influence of information release by the firm with the SEO announcement, the influence of other director and firm characteristics, and the influence of other governance characteristics (takeover defenses, institutional ownership, industry competitiveness, chief executive officer (CEO) dominance, CEO and board ownership and compensation, and analyst coverage). We also conduct robustness checks involving sample selection and measurement methods. The results of these tests are reported in a separate Internet Appendix (available at www.jfqa.org). The Internet Appendix also lays out the reasoning from the previous literature that suggests our specific checks. The results of the checks support the interpretations reported here.

VI. Conclusion

We establish 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 are able to address some, but by no means all, endogeneity concerns about the result.

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 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. Furthermore, we find that the effect of board independence on equity issues is twice as high as the effect on debt issues. This corroborates the idea that monitoring (operative only for equity and debt issues) and certification (operative only for equity issues) are both important in explaining our primary finding.

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 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 of governance arrangements that 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 key. Finally, we show that the distinction between the interests of (noninsider) 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.

Appendix. Definitions of Variables

SEO Returns

CAR: Cumulative abnormal return over a 2-day trading period around the SEO or debt-announcement date from the market model with parameters estimated using daily returns over trading days −160 to −11. *Source*: CRSP.

Board Characteristics

BOARD_INDEP: Ratio of number of independent directors to board size in the year before the SEO filing. *Source*: IRRC and Compact Disclosure.

MAJORITY_INDEP: Dummy variable that equals 1 if a firm-year has a majority of independent directors, and 0 otherwise. *Source*: IRRC and Compact Disclosure.

HIGH_BOARD_INDEP: Dummy variable that equals 1 if a firm-year is in the top quartile of the fraction of independent directors, and 0 if a firm-year is in the bottom quartile, and a missing value otherwise. *Source*: IRRC and Compact Disclosure.

BOARD_SIZE: Number of board members in the year before the SEO filing. *Source*: IRRC.

Firm Characteristics

ASSETS: Book value of total assets in $millions in the year before the SEO filing. *Source*: Compustat item 6.

SALES: Net sales in $millions in the year before the SEO filing. *Source*: Compustat item 12.

AQ_DD: Standard deviation of the five most recent firm-specific residuals before 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 (1997)

48 industry groups having at least 20 firms with data available for each of the 5 years before the SEO filing.

LEVERAGE: Ratio of total debt to total assets in the year before the SEO filing. *Source*: Compustat (item 9 + item 34)/item 6.

TOBIN_Q: Ratio of market value of assets to book value of assets in the year before the SEO filling, with market value of assets = book value of assets − book value of equity + common shares outstanding × year-end stock price. *Source*: Compustat (item 6 − item 60 + item 25 × item 199)/item 60.

CAPEX: Ratio of capital expenditures to total assets in the year before the SEO filing. *Source*: Compustat item 128/item 6.

RATING: Dummy variable that equals 1 if the issuer has any rated bonds in the year before the SEO filing, and 0 otherwise. *Source*: Compustat.

VOLATILITY: Standard deviation of daily stock returns during the trading days −90 to −11 before the SEO filing date. *Source*: CRSP.

TURNOVER: Ratio of average daily share trading volume to number of shares outstanding during the trading days −90 to −11 before the SEO filing date. *Source*: CRSP.

NYSE: Dummy variable that equals 1 if the issuer's stock is listed on the NYSE, and 0 otherwise. *Source*: CRSP.

R&D: Ratio of research and development expenditures to total assets in the year before the SEO filing. *Source*: Compustat item 46/item 6.

PPE: Ratio of property, plant, and equipment to total assets in the year before the SEO filing. *Source*: Compustat item 8/item 6.

CASH: Ratio of cash and short-term investments to total assets in the year before the SEO filing. *Source*: Compustat item 1/item 6.

PAYOUT: Ratio of common dividends to total assets in the year before the SEO filing. *Source*: Compustat item 21/item 6.

ROA: Ratio of net income to total assets. *Source*: Compustat item 18/item 6.

STOCK_PRICE: End-of-year stock price. *Source*: Compustat item 24.

ANALYST_FCAST_ERR: Proportional difference between annual earnings and mean analyst forecast. *Source*: Institutional Brokers' Estimate System.

Issue Characteristics

NET_PROCEEDS: SEO gross proceeds or shares offered × offer price − gross spread. *Source*: Thomson SDC.

SECONDARY_SHARES: Proportion of shares being sold by current shareholders relative to total SEO shares. *Source*: Thomson SDC.

UNDERWRITER_RANK: Carter–Manaster (1990) underwriter reputation measure in the year before the SEO filing. *Source*: Jay Ritter's Web site (https://site.warrington.ufl.edu/ritter/).

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