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## Executive Compensation Structure and Corporate Equity Financing Decisions\*

### I. Introduction

Raising outside equity capital is a major financial decision at the discretion of top managers. Received theory suggests that managerial discretion in the timing and pricing of equity offerings affects shareholder value (e.g., Akerlof 1970 and Myers and Majluf 1984). Myers and Majluf's model rests critically on the assumption that managers act in the interest of existing, or "old," shareholders, which invites the question of how managerial incentives affect corporate equity financing policies. To date, empirical tests of the theory have given little consideration to this important issue.<sup>1</sup> We reason that the incentive for

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1. Consistent with Myers and Majluf's (1984) prediction, a substantial body of past research documents a significant negative stock price reaction to seasoned-equity-offering announcements of about -3% (see, e.g., Asquith and Mullins 1986 and Masulis and Korwar 1986, among others). Cornett and Tehranian (1994) document that involuntary (not within managerial discretion)

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Extending Myers and Majluf's (1984) model, we propose the market response to seasoned equity offering (SEO) announcements depends on the alignment of goals of managers and existing shareholders. We document a negative relation between the stock-market response to SEO announcements and issuing firm managers' equity-based compensation (EC). Relative to low-EC managers, the market perceives high-EC managers as issuing more-overvalued equity, benefiting existing shareholders and exacerbating the adverse selection problem for potential shareholders. We find EC and the market reaction to SEOs varies cross-sectionally with information asymmetry, investment opportunities, preissue stock-price run-up, and managerial ownership.

managers to maximize the benefit accruing to “old” shareholders from the new equity offer depends on the degree of alignment between the goals of managers and those of existing shareholders. This study examines the link between managerial incentives and the equity issue decision and develops implications for cross-sectional variation in the market response to seasoned equity offerings (SEOs).

The recent surge in interest in the link between executive compensation (EC) and major discretionary managerial decisions, such as corporate investments and disinvestments (see, e.g., Datta, Iskandar-Datta, and Raman 2001 and Mehran, Nogler, and Schwartz 1998), accentuates the importance of internal control mechanisms in determining the information content of equity offerings. Given these recent evidence linking executive compensation and corporate investment decisions, managerial compensation is expected to have important implications for corporate financing decisions as well.

We study a sample of 444 SEOs made by U.S. firms during the period January 1, 1992, to December 31, 1999. The sample period is characterized by an explosive growth in stock-option-based executive pay and a relatively active market for corporate equity offerings. Consistent with previous research, we find that, for the full sample, the stock price response around the SEO announcement is significantly negative. Notably, when we partition the sample into high- and low-EC firms, we find that the adverse stock price effect for high-EC firms is more than three times that experienced by low-EC firms. This statistically, and economically, significant result provides compelling evidence that the structure of executive compensation at issuing firms is an important determinant of shareholder wealth effects associated with SEOs.

After controlling for information asymmetry, investment opportunities, and several other issuer characteristics in a multivariate regression framework as well as a univariate framework, we show that the inverse relation between equity-based compensation and the stock-price reaction at the SEO filing date remains statistically and economically significant in virtually every case. Consistent with the intuition in our hypotheses, we find that the negative relation between EC and the market reaction to equity offerings varies cross-sectionally with issuing firms’ level of preissue information asymmetry, investment opportunity set, preissue stock-price run-up, and managerial ownership stakes. This study is the first to document a significant link between executive

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stock offerings by commercial banks resulted in a much smaller decline in stock prices than voluntary (discretionary) stock offerings. Recent research focused on the influence of agency costs of managerial discretion on the choice of financing decisions and the resulting wealth effects (Jung, Kim, and Stulz 1996). In a recent paper, Myers (2000) expressed a similar sentiment by stating that “[A]ppplied corporate finance accepts outside equity as a fact of life but does not really explain how managers’ and stockholders’ interests become sufficiently aligned.”

compensation and the market's response to equity offerings, underscoring the importance of firms' internal control mechanisms in corporate financing policies.

The paper proceeds as follows. Section II extends the Myers and Majluf framework and develops the testable hypotheses, Section III describes the sample formation process, data sources, and empirical methodology. Section IV presents the sample characteristics and the empirical findings. Conclusions are drawn in Section V.

## II. The Extended Myers and Majluf Model and Testable Hypotheses

According to Myers and Majluf's (1984) model, existing shareholders are better off if the firm issues stock only when the market value of "old" shares is greater than the intrinsic value of existing stockholders' assets. This condition is presented in their equation (1) (p. 199) as follows:

$$\left(\frac{E}{P'}\right)(S + a) \leq E + b, \quad (1)$$

where new equity issued,  $E$ , equals  $I - S$ ,  $I$  = required investment in new project, and  $S$  (financial slack) is the sum of cash on hand and marketable securities;  $P'$  is the market value of "old" shares if stock is issued;  $a$  is the intrinsic value of the firm's assets-in-place, known only to the managers; and  $b$  is the realized net present value (NPV) of the firm's investment opportunity being financed by the new equity issue. It must be noted that, in the Myers and Majluf framework, financing decisions matter even when  $b$  is nonpositive, as long as the preceding condition is satisfied (for the proof see their Section 3.1.3).<sup>2</sup> Given that we examine a sample of firms that undertake new stock offerings, condition (1) holds for all our sample firms. Therefore, our hypotheses evolve from this condition. To keep our discussion focused on the financing implications and without loss of generality we assume  $b = 0$ . This reduces condition (1) to

$$P' - (S + a) \geq 0. \quad (2)$$

We refer to the left-hand side of this inequality as the *value gap* (which is the offer [market] price minus the intrinsic value of the stock). Thus, an equity issue signals that the value gap must be positive.

2. Brealey and Myers (2000, p. 422) aptly summarize the issue by stating that if managers know that the company's stock is overvalued and "the firm sells new shares at the high price, it will help *existing* shareholders at the expense of the *new* ones. Managers might be prepared to issue stock even if the new cash was put in the bank."

Based on adverse selection theory and the asymmetric information model of Myers and Majluf (1984), the incentive to issue equity is highest when managers believe that the value gap is maximum. A positive value gap at the offering enables the firm's existing shareholders to extract the benefit of relatively inexpensive financing (i.e., low expected return on equity) from the new shareholders, thereby increasing the intrinsic value of the existing shares.

It follows from condition (2) that maximizing the value gap is equivalent to maximizing  $P'$ . In formulating their model, Myers and Majluf make a critical assumption that the goals of managers are completely aligned with those of "old" shareholders (see their Section 2.1., assumption [5], p. 191). We relax this assumption by reasoning that the incentive for managers to maximize the market price of the shares, and thereby maximize the value gap, depends on the degree of alignment between the goals of managers and those of existing shareholders. Financial economists recognize that executive-compensation contracts with convex payoffs strengthen the alignment of managerial interests with those of existing shareholders (see, e.g., Jensen and Murphy 1990; Murphy 1998; Guay 1999; Datta et al. 2001; among others). Accordingly, managers with higher proportions of stock option grants, and therefore smaller agency costs of managerial discretion, are more likely to undertake equity offerings when the value gap is larger. Based on this reasoning, it follows that

$$\frac{\partial(\text{Valuegap})}{\partial(\text{EC})} > 0, \quad (3)$$

where EC represents the equity-based compensation received by managers.

However, Brealey and Myers (2000, p. 422) state, "[I]nvestors are not stupid. They can predict managers are more likely to issue stock when they think it is overvalued and that optimistic managers may cancel or defer issues. Therefore, when an equity issue is announced, they mark down the price of the stock accordingly." It follows from (3) that the value gap, and hence the magnitude of the adverse price response to the offering, is larger, the greater is the degree of alignment (captured by EC) between the goals of the managers and those of the existing shareholders:

$$\frac{\partial(\text{CAR})}{\partial(\text{EC})} < 0 \quad (4)$$

where CAR is stock-price response to new equity issue announcement. Given that our sample firms have publicly available executive-compensation data, it is likely that investors' perceptions of EC were

highly, positively, correlated with the actual equity-based compensation awarded managers.

If, however, investors are not perfectly informed about equity-based compensation of managers or they have biased perceptions about EC,<sup>3</sup> then

$$\frac{\partial(\text{CAR})}{\partial(\text{EC}^{\text{perceived}})} < 0.$$

Given the possibility that  $\text{EC}^{\text{perceived}} - \text{EC} \neq 0$ , due to biased perceptions or imperfect investor knowledge about EC, we incorporate the following assumption and proposition into our model.

**ASSUMPTION.**  $\text{EC}^{\text{perceived}} = \rho\text{EC} + \varepsilon$ , where  $\rho$  is a scalar indicating the correlation between the actual EC of managers and the one perceived by investors and  $\varepsilon$  is white noise.

**PROPOSITION.** If  $\rho \geq 0$ , then  $\partial(\text{CAR})/\partial(\text{EC}) \leq 0$ , respectively. The higher is the correlation between the perceived and actual degrees of managers' equity-based compensation, the more pronounced is the decline in the stock-price following a seasoned equity offering.

*Proof.*  $\partial(\text{CAR})/\partial(\text{EC}) = \rho[\partial(\text{CAR})/\partial(\text{EC}^{\text{perceived}})] \leq 0$ , and as argued earlier,  $\partial(\text{CAR})/\partial(\text{EC}^{\text{perceived}}) < 0$ .

The preceding arguments presented in this section lead to the following hypotheses.

**HYPOTHESIS 1.** Announcements of equity offerings by managers with high (low) equity-based compensation (EC) are expected to engender a more (less) adverse stock price response.

This would suggest that the market perceives shares offered by high-EC managers to be more overpriced than those offered by low-EC managers.

Baker and Wurgler (2002) argue that the total gains due to market timing are bigger than the adverse announcement effects suffered by equity issuers, providing strong support for the notion that overvaluation (i.e., a positive value gap) is an important motivating factor for managers to issue equity. As argued in Stein (2001), to the extent that managers favor current shareholders at the expense of potential investors, they wish to sell new shares when their private information suggests that the new shares are most overvalued. In a recent survey of CFOs, Graham and Harvey (2001) report that a vast majority (67%) admit that "the amount by which our stock is undervalued or overvalued by the market" was an important factor in their decision to issue common stock. Taken together, these studies provide ample support for

3. We thank the referee for pointing out this possibility that investors may not be perfectly informed or may have biased perceptions about EC and contributing the assumption, proposition, and proof related to this specific issue.

the premise that optimal managerial timing of SEOs is directly linked with what we call the value gap.

Based on Myers and Majluf (1984), it is well documented that issuing equity is more expensive for firms with larger information asymmetry between firm insiders and outsiders. In particular, among firms associated with greater information asymmetry, the adverse selection problem faced by new shareholders is exacerbated for firms in which managers' interests are more closely aligned with those of existing shareholders. In contrast, as Myers and Majluf (1984) show, when there is no information asymmetry, financing decisions do not matter. Hence, we propose the following hypothesis.

**HYPOTHESIS 2a.** The effect of management-incentive compensation on the market's response to equity offerings is likely to be more pronounced for firms with greater information asymmetry.

Smith and Watts (1992) argue that firms with growth options are likely to be associated with a high degree of information asymmetry between shareholders and management. Recently, Aboody and Lev (2000) and Chan, Lakonishok, and Sougiannis (2001) show that research and development (R&D)-intensive firms are associated with greater information asymmetry than firms with no R&D. Aboody and Lev also document significant gains from insider trades in R&D-intensive firms, indicating that managers take advantage of the information asymmetry in R&D-intensive firms. We similarly argue that managers with stock-option-based compensation packages have greater incentives to take advantage of high information asymmetry and issue overvalued equity to maximize their personal wealth. These arguments, in combination with Hypothesis 2a, lead us to propose the following.

**HYPOTHESIS 2b.** The negative relation between the market response to equity offerings and managers' incentive compensation is expected to be more pronounced for firms with greater investment (growth) opportunities.

Loughran and Ritter (1995) and Baker and Wurgler (2000), among others, argue that managers time the issuance of shares following a period of abnormal run-up in stock price. To maximize the value gap, firms with smaller preissue stock-price run-up require greater managerial discretion in terms of timing and pricing the issue. Given that managers with equity-based compensation personally benefit from greater discretion in pricing the equity issue, one would expect a more pronounced negative relation between incentive compensation and the market reaction to SEOs for firms experiencing a smaller preissue stock-price run-up. In contrast, a pooling equilibrium exists for offering firms with abnormally large stock-price run-up prior to the offering, effectively creating a rising-tide-lifts-all-boats scenario. For this group of issuers, it would be relatively difficult for the market to directly ascribe the value gap to managerial incentives, given the high preissue run-up. In

this context, we note that Aggarwal, Krigman, and Womack (2002) show that the stock-price run-up in the days following initial public offerings (IPOs) enables managers to maximize the selling price of their shares (at the lockup expiration date) with relatively little effort. We therefore expect a weaker relation between EC and the stock-price response to the SEO for firms experiencing a high stock-price run-up prior to the issue. Hence, we hypothesize the following.

**HYPOTHESIS 3.** The negative relation between the market reaction to seasoned equity offerings and managers' incentive compensation is expected to be more pronounced for firms experiencing a smaller pre-issue stock-price run-up.

Recently, Ofek and Yermack (2000) showed that executives with large equity ownership tend to counterbalance the incentive effects of new stock option grants by selling previously owned shares. Zhou (2001) presents evidence consistent with this argument. Moreover, firms with low managerial ownership have potentially greater agency costs of managerial discretion. As such, one would expect EC to be more effective in aligning the interests of managers with those of existing shareholders at firms in which managers' ownership stakes are low. Therefore, we propose the following hypothesis.

**HYPOTHESIS 4.** The negative relation between the market reaction to equity offerings and equity-based compensation is likely to be more pronounced for firms with low managerial ownership.

### III. Sample Formation Process, Data Sources, and Research Method

Using the Securities Data Company's (SDC's) New Issues database, 3,899 U.S. public SEOs are identified during the period January 1, 1992, to December 31, 1999. We exclude 135 American depositary receipts, 147 unit offerings, and 36 limited partnerships. We require that issuers have available stock prices around the filing date and during the pre-SEO market model estimation period on the University of Chicago's CRSP (Center for Research on Security Prices) tapes. These criteria result in 2,398 SEOs over an 8-year period, which translates into roughly 300 offers per year, indicating a substantial increase in the number of SEOs from the 1970s to the 1990s.<sup>4</sup> Finally, an SEO is included in our sample if executive-compensation data are available in Standard and Poor's ExecuComp database for the fiscal year prior to the filing date. The final sample consists of 444 SEOs made by 353 firms.

Because the *Wall Street Journal* and the Dow Jones News Retrieval Service do not report the announcement dates for our sample firms between 1992 and 1999, we use the filing dates provided by SDC.

4. For instance, Bayless and Chaplinsky (1996) examine 1,881 SEOs between 1974 and 1990. Lee's (1997) study examines 2,176 SEOs from 1976 to 1990.



Studies such as Jegadeesh, Weinstein, and Welch (1993), Denis (1994), and Clarke, Dunbar, and Kahle (2001) also followed the practice of using filing dates in place of announcement dates for SEOs occurring after 1984. Because equity offerings are more likely to be anticipated around filing dates relative to announcement dates (as actual announcements typically are made prior to the filing date), our tests are inherently biased against finding significant negative abnormal returns.

Three-day ( $-1, 0, +1$ ) abnormal stock returns around the filing date are computed using the market model and Scholes-Williams (1977) betas. The estimation period is from 200 days to 60 days prior to the filing date (day 0). Because equity offers typically are announced after unusual run-ups in share price, our use of the estimation window of  $-200$  to  $-60$  days may result in the model's alpha capturing the favorable performance. To address the concern that the CARs may be biased due to the strong pre-SEO share price performance, we redid our analyses using two alternative approaches to estimate abnormal returns around the filing date. Specifically, we measured 3-day abnormal returns by computing market-adjusted returns and using the 140-day period starting 41 days following the filing date to estimate the market model parameters. In both scenarios, we obtained results very similar to those reported in this study.

#### IV. Empirical Findings

##### A. Sample Characteristics

Table 1 presents the descriptive statistics for our sample of 444 completed SEOs during the period 1992–99. The frequency distribution of the sample (by year) at each stage of the sample selection process is shown in panel A. We find that the average issue size (in constant 1999 dollars using the consumer price index, CPI) increased steadily from a low of \$56.17 million in 1992 to a maximum of \$316.83 million in 1998. The number of SEOs in our final sample, 444, is similar to that of Denis (1994), who examines 435 SEOs during the 1977–90 period. In comparison, Dierkens' (1991) study is based on a sample of 197 SEOs; Jung et al. (1996) use a sample of 192 equity issues; and Pilotte (1992) studies a sample of 68 equity offerings.

Panel B presents statistics that describe the characteristics of the issuing firms in our sample. Market capitalization is measured as the stock price times the number of shares outstanding on the day prior to the filing date, obtained from CRSP. The data show that the issuing firms in our sample are typically large, with an average market capitalization of \$2,358.74 million, which is much larger than the mean of \$1,286 million reported by Lee (1997) for his sample of issuers. On average, the issue size for our sample is roughly 14.23% of the market capitalization of the issuing firm, which is similar to the statistics reported by Pilotte

**TABLE 1**      **Distribution and Descriptive Statistics of Seasoned Equity Offerings, 1992–99**

<b>A. Sample Selection Filters and Distribution of Seasoned Equity Offerings by Year</b>						
Year	First Screen: Number of SEOs from SDC	Second Screen: Issuers with CRSP Perm Numbers	Third Screen: Common Stock Issuers with Returns around Filing Date	Final Sample: Issuers on ExecuComp Database	Percent of Final Sample	Average Issue Size (1999 \$ millions)
1992	397	304	244	7	1.6	56.17
1993	631	485	373	97	21.8	76.70
1994	376	282	206	62	14.0	87.57
1995	591	468	387	70	15.8	103.63
1996	670	536	404	78	17.6	119.96
1997	661	499	405	69	15.5	157.73
1998	371	316	255	53	11.9	316.83
1999	202	147	124	8	1.8	256.23
Total/Average	3,899	3,037	2,398	444	100%	134.23

<b>B. Descriptive Statistics</b>			
Issue Characteristics	Observations	Mean	Median
Issuer market capitalization (\$ millions)	444	2,358.74	576.44
Issue size relative to market capitalization	438	14.23%	11.66%
Issuer market-to-book	438	2.95	1.98
Pre-SEO (CE + RD)/TA	403	13.52%	8.87%
Pre-SEO wealth relative	444	1.44	1.20

TABLE 1 (Continued)

C. Distribution of Seasoned Equity Offerings by Type and Size of Issue				
Type of Issue	Number of Offerings	Percent of Subsample	Average Issue Size	Issue Size Relative to Market Cap.
Primary	347	78.2	132.82	14.09%
Secondary	29	6.5	119.85	23.54%
Unknown	68	15.3	131.21	10.76%
Total	444	100%		

NOTE.—The sample consists of 444 completed seasoned equity offerings during the period January 1, 1992, to December 31, 1999. The firms are listed in the Securities Data Company's New Issues database and have executive compensation data in Standard and Poor's ExecuComp database. Issue size refers to gross proceeds (from SDC) measured in constant 1999 dollars (millions) using the consumer price index. Market capitalization is measured on the day prior to the SEO filing date using CRSP. The market-to-book ratio is measured as book value of total assets (item 6) minus book value of equity (item 60) (both from Compustat) plus market value of equity (from CRSP) divided by book value of total assets (TA). CE + RD represents the sum of capital expenditures (item 128) and R&D expenses (item 46) from Compustat. Variables in Compustat are measured at the most recent fiscal year-end prior to the SEO filing date. Pre-SEO wealth relative is measured as (1 + issuing firm's buy-and-hold return [BHR] in the year prior to the filing date) divided by (1 + contemporaneous BHR for the CRSP value-weighted index). Primary offerings are those with at least 50% or more of the offering consisting of primary shares. All others are classified as secondary offerings with the exception of issues for which the data on primary/secondary shares offered is missing in SDC.

(1992) for an earlier sample period. We measure investment opportunities using market-to-book (M/B) ratio as in previous studies (market value of equity plus book value of assets minus book value of equity divided by book value of assets; see, e.g., Smith and Watts 1992). The average market-to-book ratio of 2.95 for our sample firms suggests that issuers are characterized by high investment opportunities at the filing date. We also use the pre-SEO ratio of capital expenditures plus research and development costs to the book value of total assets (using Compustat) as a second measure of investment opportunities.<sup>5</sup> At the filing date, we find that the mean level of this ratio is 13.52%. Consistent with Loughran and Ritter (1995), among others, we find that issuing firms' common stock performs well prior to the equity issue announcement as indicated by the mean pre-SEO wealth relative of 1.44. We measure wealth relative over the 1-year period prior to the filing date using the CRSP value-weighted index as the benchmark.

Following Lee (1997), we define primary offerings as SEOs comprising 50% or more primary shares, where primary shares are those issued by the firm. Secondary offerings are those with less than 50% primary shares. As reported in panel C, a significant majority of our sample (78.2%) consists of primary issuers. To summarize, our sample consists of large firms with pre-SEO characteristics that are quite similar to those reported by previous studies.

Table 2 provides descriptive statistics on the compensation awarded to the top five executives prior to the filing date, along with related issuing firm characteristics. Panel A reports the statistics for executive compensation. Total compensation is the sum of salary, bonus, other annual compensation, value of new restricted stock granted, value of new stock options granted during the year, long-term incentive payouts, and all other compensation paid to the top five executives. While the median total compensation paid to the top five executives is \$3.13 million, the median of the annual combined salaries is \$1.75 million. The results also indicate that a significant proportion of the compensation package (median of 25.34%) comprises new stock-option grants, reflecting the growth in the use of equity-based compensation during the 1990s.

We define equity-based compensation as the Black-Scholes value of new stock options granted the top five executives (in the fiscal year preceding the SEO filing date) divided by their total compensation in the same year.<sup>6</sup> In our measurement of total compensation, we exclude the value realized by exercising previous options. A firm is categorized in the low-EC group if the proportion of equity-based compensation

5. For missing R&D observations, we set the value of R&D to zero (see, e.g., Denis 1994 and Loughran and Ritter 1997).

6. Given the data constraints in ExecuComp regarding the terms of previous option grants, we are unable to compute managers' portfolio deltas, which ideally would include all previously awarded stock options.

**TABLE 2 Compensation Characteristics of Top Five Executives of Issuing Firms**

<b>A. Compensation of Top Five Executives</b>				
Compensation (\$000s)	Mean	Median	Minimum	Maximum
Salary and bonus	2,352.45	1,749.89	125.00	25,289.97
Stock options granted	2,869.75	741.44	.00	201,645.70
Restricted stock granted	388.99	0.00	.00	43,062.50
Total compensation	6,128.76	3,131.95	185.17	238,559.00
Equity-based compensation (%)	29.19	25.34	.00	94.84
Ownership (%), $N = 425$	7.97	2.45	.00	85.43
<b>B. Issuing Firm Characteristics Categorized by EC</b>				
Issuer Characteristic	Number of Obs.	Mean	Median	
Market capitalization				
High EC	222	2,978.65	613.44	
Low EC	222	1,738.84	518.96	
<i>t/z</i> statistic of difference		1.86*	.70	
Market-to-book				
High-EC	218	3.52	2.52	
Low EC	220	2.39	1.59	
<i>t/z</i> statistic of difference		4.42***	6.58***	
(CE + RD)/TA				
High EC	207	16.45%	10.91%	
Low EC	196	10.43%	7.77%	
<i>t/z</i> statistic of difference		4.32***	3.55***	
Information asymmetry				
High EC	222	2.88%	2.83%	
Low EC	222	2.12%	2.00%	
<i>t/z</i> statistic of difference		7.03***	6.46***	
Pre-SEO wealth relative				
High EC	222	1.51	1.26	
Low EC	222	1.37	1.13	
<i>t/z</i> statistic of difference		1.58	2.01**	
Executive ownership				
High EC	220	7.68%	2.88%	
Low EC	205	8.28%	1.82%	
<i>t/z</i> statistic of difference		.49	1.24	
Relative issue size				
High EC	218	15.00%	13.01%	
Low EC	220	13.46%	10.64%	
<i>t/z</i> statistic of difference		1.48	2.66***	

NOTE.—The sample consists of 444 completed seasoned equity offerings during the period January 1, 1992, to December 31, 1999. The firms are listed in the Securities Data Company's New Issues database and have executive compensation data in Standard and Poor's ExecuComp database. All compensation data are recorded at the fiscal year-end preceding the offer filing date. For each issuing firm, total compensation is the sum of salary, bonus, other annual compensation, value of restricted stock granted, value of new stock options granted during the year, long-term incentive payouts, and all other compensation paid to the top five executives. Equity-based compensation is the sum of the value of new stock options (using modified Black-Scholes method) granted to the top five executives as a percent of total compensation paid them. Ownership is defined as the sum of common and restricted stock owned or previously acquired divided by shares outstanding on the day prior to the filing date. Information asymmetry is measured as the market model residual standard deviation of returns during the year preceding the filing date. All other variables are as defined in table 1. \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% levels.

offered its executives is at or below the median; otherwise, the firm is in the high-EC group. Out of 444 equity issues in the sample, 341 (or 76.8%) of the offers are made by firms awarding new stock-option grants.

The median ownership of common and restricted stock previously granted or acquired by the top five executives is 2.45% of shares outstanding prior to the filing date. This level of ownership for our sample of issuers is much larger than the median managerial ownership level reported by Ofek and Yermack (2000) for the overall sample of firms in ExecuComp.<sup>7</sup>

Panel B of table 2 reports various issuer characteristics (such as investment opportunities, information asymmetry, pre-SEO performance, relative issue size, and executive ownership) categorized by the pre-SEO level of equity-based compensation awarded the top five executives. Following Dierkens (1991), we used the market-model residual standard deviation of stock returns during the year preceding the filing date as a proxy for information asymmetry associated with the issuing firm. We measured the relative size of an issue as the expected gross proceeds divided by the market capitalization on the day prior to the filing date.

Although the median market capitalization for high-EC issuers, \$613.44 million, is larger than the median of \$518.96 million for low-EC issuers, the difference is not statistically significant at conventional levels. As expected, we find that high-EC firms have more investment opportunities and higher levels of information asymmetry than low-EC firms. Consistent with Smith and Watts (1992) and others, the median M/B for high-EC firms is 2.52, which is greater than the median of 1.59 for low-EC firms. The Wilcoxon (rank-sum test) *z*-statistic for the difference between the respective distributions is 6.58, which is statistically significant at the 1% level. Reaffirming this finding, the pre-SEO capital expenditures plus R&D to book-value of total assets ratio for high-EC firms is significantly greater than that for low-EC firms (*p*-value = 0.01). Similarly, the median residual standard deviation of pre-SEO stock returns for high-EC firms (2.83%) is significantly greater than the median of 2.00% for low-EC firms. These results indicate that high-EC firms are associated with substantially more information asymmetry than low-EC firms prior to the SEO.

The results in panel B also show that, in the 1-year period prior to the filing date, the terminal value of \$1 invested in a portfolio of high-EC

7. Given the documented negative relation between firm size and managerial ownership (e.g., Demsetz and Lehn 1985; Cho 1998), we checked if our sample of equity issuers consists of small firms relative to the population of firms. We found that the issuers in our sample are substantially smaller, with an average market capitalization of \$2,359 million compared to \$3,886 million for the overall set of firms in ExecuComp during the period 1992–99.

**TABLE 3** Three-day (-1, 0, +1) Cumulative Abnormal Return for Seasoned Equity Issuers

Attribute	A. Distribution of 3-Day Issuer CARs (%) by Proportion of Equity-Based Compensation			<i>z/t</i> -Statistic for Difference
	Full Sample	Low EC	High EC	
Minimum	-22.95	-18.18	-22.95	
Q1	-4.47	-3.55	-5.42	
Median	-1.26***	-.76***	-1.97***	2.66***
Q3	1.06	1.25	.55	
Maximum	13.14	12.95	13.14	
Mean	-1.70***	-1.14***	-2.25***	2.41***
Percent positive	33.33	36.04	30.63	
No. observations	444	222	222	

**B. Comparison of Issuer CARs (%) Between Lowest and Highest EC Quartiles**

Subsample	Lowest EC quartile	Highest EC quartile	<i>z/t</i> -Statistic for Difference
Median	-.53**	-2.58***	3.80***
Mean	(-.66)*	(-3.08)***	(3.97)***
No. observations	111	111	

NOTE.—The sample consists of 444 completed seasoned equity offerings during the period January 1, 1992, to December 31, 1999. The firms are listed in the SDC New Issues database and have executive compensation data in Standard and Poor's ExecuComp. The 3-day (-1, 0, +1) cumulative abnormal returns (CARs) are computed using the market model and Scholes-Williams betas. The estimation period is from 200 days to 60 days prior to the filing date. All compensation data are recorded at the fiscal year-end preceding the filing date. For each issuing firm, total compensation is the sum of salary, bonus, other annual compensation, value of restricted stock granted, value of new stock options granted during the year, long-term incentive payouts, and all other compensation paid the top five executives. Equity-based compensation is the sum of the value of new stock-options (using modified Black-Scholes method) granted the top five executives as a percent of total compensation paid them. Low-EC refers to firms whose percentage of equity-based compensation is at or below the median; otherwise, the firms are classified as high-EC firms. Column 5 reports *t*-statistic of difference between means and *z*-statistic from the Wilcoxon rank sum test for difference between the respective distributions. \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% levels.

issuing firms is greater than the terminal value of investing \$1 in the CRSP value-weighted index by 26% as indicated by the median wealth relative of 1.26. By comparison, the median wealth relative for low-EC issuing firms is 1.13. The difference between the distribution of wealth relatives for high- and low-EC firms is significant at the 5% level. The data also reveal that the median relative issue size for high EC issuers (13.01%) is significantly greater than that for low EC issuers (10.64%). However, we find no significant difference in the ownership of top executives (as a percent of shares outstanding) between high- and low-EC firms. Collectively, these results motivate the need to control for differences in issuer characteristics between high- and low-EC firms in our analysis of the relation between EC and the information content of SEOs.

*Executive Compensation and Stock Price Response to Seasoned Equity Offerings.* Panel A of table 3 reports the distribution of three-day (-1, 0, +1) cumulative abnormal stock returns (CARs) centered around the SEO filing date for the full sample and for low- and high-EC subsamples.

As expected, for the full sample, both mean ( $-1.70\%$ ) and median ( $-1.26\%$ ) 3-day CARs are significantly negative. This is consistent with Myers and Majluf's (1984) prediction that SEOs are associated with negative information content and confirms that the general result documented by Asquith and Mullins (1986) and Masulis and Korwar (1986) still holds for a more recent study period. More important, however, when we partition the sample into low- and high-EC subgroups, we find a significant difference between the price responses of the two subsamples, as predicted in Hypothesis 1. Specifically, for the high-EC subgroup, we find that both mean and median CARs of  $-2.25\%$  and  $-1.97\%$ , respectively, are more negative than the corresponding CARs of  $-1.14\%$  and  $-0.76\%$  for the low-EC subgroup. Both mean and median differences are highly significant at the 1% level.

*Robustness Tests: EC and Market Response to SEOs.* To check the robustness of our result and address the concern that the CARs may be biased due to the strong pre-SEO share-price performance, we redid our analyses using two alternative approaches to estimate abnormal returns around the filing date. First, using market-adjusted abnormal returns, we found that the mean (median) 3-day CAR for the full sample of 444 SEOs is  $-1.42\%$  ( $-1.08\%$ ). More important, the mean (median) CAR for the low-EC subsample is  $-0.95\%$  ( $-0.66\%$ ), which is substantially smaller in magnitude compared to the mean (median) CAR of  $-1.88\%$  ( $-1.47\%$ ) for the high-EC subsample. The  $t$ -statistic (Wilcoxon  $z$ -statistic) of difference between means (medians) is 2.11 (2.22), both significant at the 5% level using two-tailed tests. Second, we used the 140-day period starting 41 days following the filing date to estimate the market model parameters. Using this approach, we found that the mean (median) 3-day CAR for 442 SEOs (with postevent returns available on CRSP) is  $-1.52\%$  ( $-0.99\%$ ). What is important here is that the mean (median) CAR for the low-EC subsample is  $-0.88\%$  ( $-0.63\%$ ), which is much smaller in magnitude compared to the mean (median) CAR of  $-2.16\%$  ( $-1.52\%$ ) for the high-EC subsample. The two-tailed  $t$ -statistic (Wilcoxon  $z$ -statistic) of difference between means (medians) is 2.60 (2.22), both significant at conventional levels. These robustness checks produce results that are very similar to those we reported earlier and do not affect our conclusions.

Reaffirming the results in panel A, panel B of table 3 shows that the mean (median) CAR for the highest EC quartile,  $-3.08\%$  ( $-2.58\%$ ), is significantly (at the 1% level) more negative than that for the lowest-EC quartile,  $-0.66\%$  ( $-0.53\%$ ). This is consistent with the notion that equity offerings by high-EC managers are associated with a substantially higher value gap than those undertaken by low-EC managers. The substantial difference in CARs across the EC quartiles is also evident from figure 1. Thus, the evidence suggests that equity-based compensation effectively aligns the interest of issuing firm managers



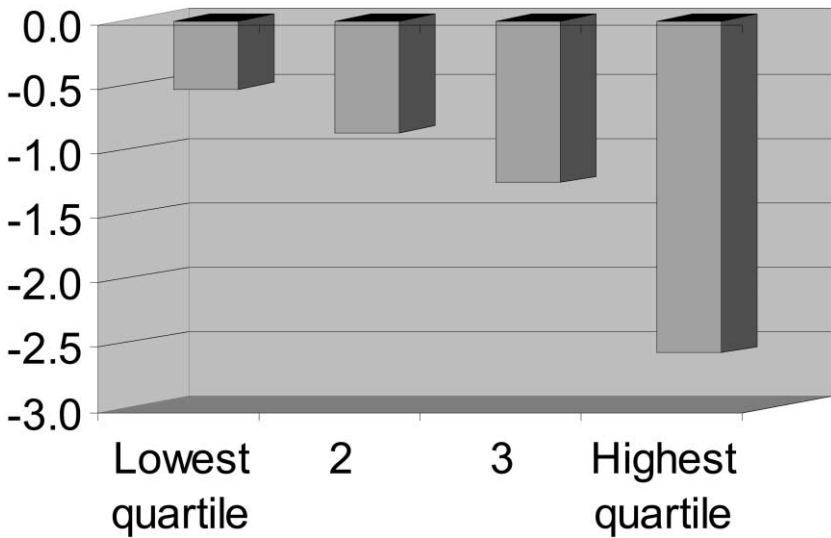


FIG. 1.—Median filing period CARs for seasoned equity issuers categorized by EC quartiles.

with those of the firm's existing shareholders. Taken together, these results provide direct evidence that incentive compensation prompts managers to make value-maximizing financing decisions and plays an important role in determining how the market perceives and reacts to SEOs.

### C. Univariate Analysis

In this section, we report the 3-day CARs for the low- and high-EC groups after categorizing the sample based on various characteristics, such as information asymmetry, investment opportunity, preissue stock-price performance, executive ownership, type of offering (primary versus secondary), and the use of proceeds. Because the results are very similar for both mean and median values, we parsimoniously base our discussion by focusing on mean values.

*Information Asymmetry.* Panels A and B of table 4 present the three-day CARs around the filing date, categorized by high- and low-EC for different proxies of information asymmetry. In panel A, we measure the preissue level of information asymmetry using the standard deviation of the market model residuals during the 1-year period preceding the filing date (see Dierkens 1991; Denis 1994). We categorize firms with residual standard deviation greater than the sample median in the high information-asymmetry group and the rest in the low information-asymmetry group. Consistent with the prediction of Myers and Majluf (1984) and the empirical findings of Dierkens (1991) and others, the

**TABLE 4** Three-day (-1, 0, +1) Cumulative Abnormal Return for Seasoned Equity Issuers: Categorized by Issuer Characteristics

Subsample	All Firms	Low EC	High EC	<i>z/t</i> -Statistic of Difference
<b>A. Distribution of CARs (%) by Preissue Level of Information Asymmetry and EC</b>				
Low asymmetry	-.57*** (-.82)***	-.53*** (-.84)***	-.91* (-.79)*	.52 (-.10)
No. observations	230	139	91	
High asymmetry	-2.52*** (-2.64)***	-1.95*** (-1.65)***	-2.91*** (-3.27)***	1.90* (2.00)**
No. observations	214	83	131	
<b>B. Distribution of CARs (%) by Number of Days between Earnings Announcement and SEO Filing Date and EC (Median Earnings Announcement Precedes Filing Date by 39 Days)</b>				
Less days	-1.84*** (-2.04)***	-1.31*** (-1.84)***	-1.97*** (-2.23)***	.77 (.57)
No. observations	192	96	96	
More days	-.83*** (-1.49)***	-.37* (-.88)**	-2.25*** (-2.23)***	2.40*** (2.01)**
No. observations	186	102	84	
<b>C. Distribution of CARs (%) by Issuer Market-to-Book and EC</b>				
Low M/B	-.53*** (-.99)***	-.51*** (-1.02)***	-.85** (-.92)*	.34 (-.16)
No. observations	219	139	80	
High M/B	-2.42*** (-2.52)***	-1.66*** (-1.51)***	-2.61*** (-3.10)***	1.81* (2.11)**
No. observations	219	81	138	
<b>D. Distribution of CARs (%) by Issuing Firms' Preissue level of (CE + RD)/TA and EC</b>				
Low (CE + RD)/TA	-1.18*** (-1.82)***	-.91*** (-1.65)***	-1.82*** (-2.03)***	.56 (.57)
No. observations	202	114	88	
High (CE + RD)/TA	-1.53*** (-1.87)***	-.70 (-1.01)*	-2.32*** (-2.47)***	2.06** (1.86)*
No. observations	201	82	119	
<b>E. Distribution of CARs (%) by Issuing Firms' Preissue Wealth Relative and EC</b>				
Low preissue wealth relative	-.75*** (-.97)***	-.22* (-.26)	-1.82*** (-1.86)***	3.24*** (2.39)***
No. observations	222	124	98	
High preissue wealth relative	-2.18*** (-2.42)***	-2.24*** (-2.25)***	-2.04*** (-2.56)***	.02 (.47)
No. observations	222	98	124	
<b>F. Distribution of CARs (%) by Executive Stock Ownership and EC</b>				
Low ownership	-.70*** (-1.43)***	-.28** (-.73)**	-1.47*** (-2.18)***	2.28** (2.26)**
No. observations	213	111	102	
High ownership	-1.96*** (-1.97)***	-1.44*** (-1.64)***	-2.24*** (-2.24)***	.94 (.84)
No. observations	212	94	118	

TABLE 4 (Continued)

<b>G. Distribution of CARs (%) by Type of Offering and EC</b>				
Primary	-1.26***	-.60***	-2.25***	3.30***
	(-1.73)***	(-.98)***	(-2.50)***	(2.97)***
No. observations	347	175	172	
Secondary	-1.44***	-2.00*	-1.37	-.55
	(-1.84)**	(-2.21)*	(-1.49)	(-.42)
No. observations	29	14	15	
<b>H. Distribution of CARs (%) by Use of Proceeds and EC</b>				
To repay debt	-1.09***	-.54***	-2.52***	1.85*
	(-1.56)***	(-1.08)***	(-2.25)***	(1.43)
No. observations	146	86	60	
Capital expenditures and other uses	-1.42***	-.87***	-1.91***	1.94**
	(-1.83)***	(-1.22)***	(-2.34)***	(1.90)*
No. observations	291	133	158	

NOTE.—The sample consists of 444 completed seasoned equity offerings during the period January 1, 1992, to December 31, 1999. The firms are listed in the Securities Data Company's New Issues database and have executive compensation data in Standard and Poor's ExecuComp database. The 3-day (-1, 0, +1) cumulative abnormal returns are computed using the market model and Scholes-Williams betas. The estimation period is from 200 days to 60 days prior to the filing date. All compensation data are recorded at the fiscal year-end preceding the filing date. Equity-based compensation is the sum of the value of new stock options (using modified Black-Scholes method) granted to the top five executives as a percent of total compensation paid them. Low-EC refers to firms whose percentage of equity-based compensation is at or below the median; otherwise, the firms are classified as high-EC firms. Column 5 reports *t*-statistic of difference between means and *z*-statistic from the Wilcoxon rank sum test for difference between the respective distributions. The date of the most recent earnings announcement preceding the filing date (required to calculate the number of days between the earnings announcement and the filing date) is obtained from the Wall Street Journal Index. Medians (means) are presented. \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% levels. The number of observations in the subsamples are not equal because firms are classified as low- or high-EC firms based on the median for the full sample of 444 offerings.

results in panel A show that firms with high information asymmetry experience a mean 3-day CAR of -2.64% which is significantly greater in magnitude than the mean of -0.82% for issuers associated with low asymmetry. Notably, among the firms with a high degree of information asymmetry, we find that high-EC issuers experience a significantly more adverse mean stock price response (-3.27%) than that for their low EC counterparts (-1.65%). In contrast, we find no significant difference between the CARs of high- and low-EC firms among issuers with low information asymmetry. These results support Hypothesis 2a.

Korajczyk, Lucas, and McDonald (1991) argue that there is relatively less information asymmetry if the issue announcement closely follows an earnings announcement. Therefore, the market's response is expected to be less adverse for SEOs announced shortly after earnings announcements. We use the number of days between the last preissue earnings announcement and the SEO filing date as another proxy for the preissue level of information asymmetry. The earnings announcement dates are obtained from the Wall Street Journal Index. For our sample of issuers, the median time interval between the earnings release and the equity offer filing date is 39 days. We classify issuing

firms below (above) the median as having low (high) information asymmetry.

The results, presented in panel B of table 4, show that the significant negative relation between EC and the market response to the equity offering exists only for the subsample of issuers with high information asymmetry, demonstrating that our results are robust to the information-asymmetry proxy used. More important, our findings suggest that, irrespective of the incentives designed to align the goals of managers with those of existing shareholders, if there is no asymmetric information, an equity issue cannot possibly provide new information to the market. Hence, managerial incentives must matter only when information asymmetry matters. Our findings confirm the intuition that managerial incentive compensation closely aligns the goals of managers with those of existing shareholders and exacerbates the adverse-selection problem faced by potential shareholders especially at firms with high levels of information asymmetry.

*Investment Opportunities.* As per Hypothesis 2b, we argue that an equity offering with greater information asymmetry presents managers whose interests are aligned with shareholders with a greater opportunity to exploit new shareholders by issuing overpriced equity. Thus, under such circumstances, we expect that shareholders would rationally discount future investment opportunities and attribute the equity-offering announcement to overvaluation of the firm's shares.

In panels C and D of table 4, we present 3-day CARs categorized by high and low EC for different proxies for investment opportunities. Following Smith and Watts (1992) and others, we use the market-to-book assets ratio as our first proxy for the issuing firm's investment opportunity set and classify firms above (below) the median as having more (less) investment opportunities. The results in panel C show a strong negative relation between growth options and the 3-day CAR around the SEO filing date. The average 3-day CAR for high-M/B firms is  $-2.52\%$ , which is more than twice the mean of  $-0.99\%$  for low-M/B issuers. The  $t$ -statistic of difference between means is 3.33, which is statistically significant at the 1% level. This finding contrasts with those reported by previous studies on SEOs (e.g., Dierkens 1991 and Jung et al. 1996). We also find that, among the high-M/B issuers, the mean 3-day CAR for high-EC firms is  $-3.10\%$ , which is more than twice the mean of  $-1.51\%$  for low-EC firms. The difference is statistically significant at the 5% level, and the results are quite similar using medians. In contrast, there is no significant difference in CARs between high- and low-EC firms among low-M/B issuers, indicating that the managerial compensation structure is irrelevant to the stock price response experienced by firms with low growth opportunities.

As a robustness check, we also use actual investment by firms (capital expenditures plus R&D expenses, scaled by total assets) prior to the

filing date as another proxy for the investment opportunity set. As shown in panel D of table 4, the result is similar to that obtained using the M/B proxy.<sup>8</sup> These results are consistent with the view that equity-based compensation exacerbates the adverse market response to equity-offering announcements for issuers with more growth options (Hypothesis 2b). The findings provide stock-market-based evidence that, in an asymmetrically informed market, higher EC improves the alignment of interest between managers and existing shareholders, thereby worsening the adverse-selection problem faced by new shareholders.

*Preissue Stock Price Performance, Executive Compensation, and Market Reaction to SEOs.* As suggested by Hypothesis 3, the negative relation between equity-based compensation and the market reaction to SEOs is expected to be more pronounced for firms with weaker preoffer stock price performance. In panel E of table 4, we categorize the 3-day CARs by pre-SEO stock-price run-up and EC. Consistent with the result in previous studies (e.g., Denis 1994), we find a negative relation between prior run-up and the market response to the offering. Specifically, firms with high pre-SEO stock-price run-up experience a 3-day average CAR of  $-2.42\%$ , which is more than twice that experienced by low pre-SEO stock price run-up firms ( $\text{CAR} = -0.97\%$ ).

Notably however, while the CARs are significantly negative for all subgroups, high-EC issuers experience substantially more adverse stock price response ( $-1.86\%$ ) than their low EC counterparts ( $-0.26\%$ ) for the low pre-SEO run-up subsample. The difference between the two means is statistically significant ( $t = 2.39$ ). This result documents that the market perceives SEOs by high-EC firms to be associated with a greater degree of managerial opportunism to maximize the value gap and, therefore, a more acute adverse-selection problem. However, for issuers in the large pre-SEO run-up group, there is no significant difference in price response between the low- and high-EC issuers. Collectively, these results support Hypothesis 3.

*Executive Ownership, Executive Compensation, and Market Response to SEOs.* Ofek and Yermack (2000) document that executives with

8. Although the difference between the CARs of low and high (CE+RD)/TA subsamples is not significant, we find (in unreported results) that when RD/TA is used as a proxy for investment opportunities, the difference between the CARs of low- and high-RD/TA subsamples is significant at the 1% level (Wilcoxon  $z$ -statistic is 3.27 and  $t$ -statistic is 2.97). However, using RD/TA as a proxy for investment opportunities results in sample sizes of 284 and 139 for the low- and high-RD/TA subsamples, respectively. Consequently, when the high-RD/TA subsample is further partitioned into low- and high-EC firms, the number of observations in each subsample declines to 48 low-EC and 91 high-EC issuers. The mean (median) CAR for low-EC firms is  $-1.83\%$  ( $-1.91\%$ ). The mean (median) CARs for the high-EC firms is  $-3.34\%$  ( $-2.46\%$ ). Although the differences are economically significant and broadly consistent with the results presented in this study, they are not statistically significant at conventional levels using the two-tailed test. The  $t$ -statistic (Wilcoxon  $z$ -statistic) is 1.30 (1.57).

higher levels of equity ownership tend to offset the incentive effects of new stock option grants by selling previously owned shares. This suggests that the incentives derived from new stock-option grants plateau at higher levels of executive ownership. Consistent with this argument, Zhou (2001) provides further evidence suggesting that the incentive effect of executive stock options depends on the level of managerial ownership. In panel F of table 4, we document that, for the low equity-ownership subgroup, the market response to SEOs is substantially more adverse for high-EC issuers ( $-2.18\%$ ) than for their low-EC counterparts ( $-0.73\%$ ). The  $t$ -statistic for the difference between the means is 2.26, which is significant at the 5% level.

It is also noteworthy that the stock-price response for low-EC firms with low managerial ownership ( $-0.73\%$ ) is significantly less adverse than that for low-EC issuers with high managerial ownership ( $-1.64\%$ ). Supporting Hypothesis 4, these results indicate that market participants recognize the differential incentive effects (to maximize the value gap) provided by new stock-option grants at low and high executive-ownership levels and react to the offering accordingly.

*Primary Versus Secondary Offerings.* To be certain that our principal finding of a negative relation between EC and the market response to the SEOs is not driven by our inclusion of secondary offers in the sample, in panel G of table 4, we partition the shareholder wealth response to SEO filings by the type of the offer and EC. A majority of our sample consists of primary offerings ( $n = 347$ ). Similar to our results for the full sample, we document that high-EC firms making primary offerings experience a significantly greater negative mean stock-price response of  $-2.50\%$  than their low-EC counterparts with a mean CAR of  $-0.98\%$ . We also find that the stock-price response for secondary SEOs is significantly negative. However, small sample sizes for the low- and high-EC subgroups of secondary offers prevent us from drawing any reliable conclusions regarding the effect of EC on stock-price response for these types of offerings.

*Use of Proceeds.* In panel H of table 4, we present the issuing firm CARs broadly partitioned by the stated purpose of the offering (repay debt, capital expenditure, or other uses) and further categorized them into high- and low-EC subsamples. One factor expected to influence the stock price response to SEOs is the reduction in leverage of the issuing firm as a result of the offering. Using the SEO proceeds to repay debt should result in a larger reduction in leverage than when proceeds are used for investment, such as capital expenditures and investment in working capital. Similar to Masulis and Korwar (1986), we find that, irrespective of the stated use of the proceeds, the stock-price response is significantly negative. Again, we find that CARs for the high-EC subgroup is significantly more negative than that for the low-EC firms. This result illustrates that our main finding of a more adverse market

reaction to SEOs for high-EC firms relative to their low-EC counterparts is robust to the stated use of issue proceeds.

#### *D. Multivariate Regression Analysis*

To examine the link between incentive compensation and the information content of SEO announcements in a multivariate setting, we use cross-sectional regression analysis. The dependent variable, LCAR, is the natural logarithm of  $(1 + \text{the 3-day CAR})$ .<sup>9</sup> Several configurations of the following general model are estimated:

$$\begin{aligned} \text{LCAR} = f(\text{Incentive, MgtOwner, PastOptions, RelIssueSize, M/B,} \\ \text{Asymmetry, NumDays, PreIssueRunup,} \\ \text{Use-of-Proceeds, Slack, Size)} \end{aligned} \quad (5)$$

The ordinary least squares regression estimates are presented in table 5. The  $t$ -statistics are calculated using White's (1980) correction for heteroscedasticity. Our focus variable, Incentive, is the natural logarithm of  $(1 + \text{the proportion of new stock-option grants, using the modified Black-Scholes method, in the total compensation paid the top five executives in the year preceding the filing date})$ . The term MgtOwner is defined as the sum of previously granted or acquired common stock and restricted stock owned by the top five executives at the year-end preceding the filing date divided by the total number of shares outstanding on the day prior to the filing date. We include past option grants, PastOptions, as a control variable, because we expect these options to have very different incentive effects than new option grants captured by the Incentive variable. The variable PastOptions is defined as the sum of shares underlying all previous options granted the top five executives as a proportion of total shares outstanding.

Asquith and Mullins (1986) and Masulis and Korwar (1986) find that the relative size of the offering has explanatory power. Therefore, we include RelIssueSize, defined as the gross proceeds from the issue (from SDC) divided by the market capitalization of the issuer on the day prior to the filing date. The M/B, used as a proxy for the investment opportunity set, is defined as natural logarithm of the market-to-book ratio. The term Asymmetry, measured as the natural logarithm of  $(1 + \text{standard deviation of the residuals from the market model over the year preceding the filing date})$ , is used as a proxy for information asymmetry at the filing date. Similar proxies are used by Booth and Smith (1986) and Masulis

9. We use the natural logarithmic transformation of these variables to ameliorate their skewness and reduce the influence of outliers. In unreported tests, we find that our results are basically similar when we do not use log transformations in our regressions. The  $t$ -statistics are still significant at conventional levels using two-tailed tests.

**TABLE 5**      **Multivariate Regressions Explaining the Three-day (-1, 0, +1) Cumulative Abnormal Stock Returns Around Seasoned Equity Offerings**

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	.01 (.92)	-.02 (-1.05)	.002 (.09)	.02 (.82)	.01 (.41)	.04 (2.19)**	-.004 (-.17)	.04 (1.91)*
<i>Incentive</i>	-.04 (3.91)***	-.04 (-3.67)***	-.04 (-3.27)***	-.04 (-3.71)***	-.04 (-2.76)***	-.04 (-2.83)***	-.04 (-3.18)***	-.03 (-2.19)**
<i>MgtOwner</i>					.01 (.45)	.01 (.45)	.01 (.46)	.001 (.05)
<i>PastOptions</i>					.08 (1.03)	.06 (.77)	.08 (.98)	.07 (.86)
<i>RelIssueSize</i>						-.04 (-1.37)		
<i>M/B</i>		-.01 (-2.43)***			-.001 (-.22)	-.005 (-1.12)	.002 (.32)	-.01 (-1.83)*
<i>Asymmetry</i>				-.42 (-1.88)*	-.37 (-1.63)			
<i>Numdays</i> (×10000)								.02 (.04)
<i>PreIssueRunup</i>			-.01 (-2.19)**		-.01 (-1.90)*	-.01 (-1.88)*	-.01 (-1.43)	-.01 (-1.29)



TABLE 5 (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<i>Use-of-Proceeds</i>						-.002 (-.38)		
<i>Slack</i>							-.04 (-1.79)*	
<i>Size</i>		.01 (5.77)***	.01 (2.89)***	.004 (2.31)***	.004 (2.15)**		.005 (2.33)***	.005 (2.36)***
R <sup>2</sup> <sub>adjusted</sub>	8.73	10.48	10.74	10.50	11.03	10.34	11.10	10.99
F-statistic	4.03	4.20	4.14	3.61	4.06	3.27	3.41	3.01
p-value	.00	.00	.00	.00	.00	.00	.00	.00
Observations	444	438	444	420	444	414	406	359

NOTE.—Dependent variable is  $\ln(1 + \text{issuer's three-day CAR around the filing date})$ . *Incentive* is defined as  $\ln(1 + \text{EC})$ . *MgtOwner* is defined as the sum of previously granted/acquired common stock and restricted stock owned by the top five executives at the year-end preceding the filing date divided by the total number of shares outstanding on the day prior to the filing date. *PastOptions* is measured as the sum of shares underlying all previous options granted to the issuing firm's top five executives as a proportion of total shares outstanding on the day prior to the filing date. *RelIssueSize* is defined as gross proceeds divided by the market capitalization of the issuer on the day prior to the filing date. *M/B* is defined as  $\ln(1 + \text{issuer's market-to-book assets ratio})$ . *Asymmetry* is measured as the natural logarithm of  $(1 + \text{standard deviation of the residuals from the market model over the year preceding the filing date})$ . *NumDays* is the number of days between the last earnings announcement and the SEO filing date. *PreIssueRunup* is defined as  $\ln(\text{issuer's preissue wealth relative measured using the CRSP value-weighted index during the year preceding the filing date})$ . *Use-of-Proceeds* equals 1 if the stated purpose of the issue is to repay debt, and 0 otherwise. *Slack* is the ratio of cash and marketable securities to total assets prior to the filing date. *Size* is defined as the natural logarithm of the market capitalization of the issuer on the day prior to the SEO filing date. All models include *Year* dummies (qualitative variables capturing the year of the equity offer filing) and *Industry* dummies based on two-digit SIC codes. White's (1980) heteroskedasticity consistent t-statistics are in parentheses. \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% levels.

and Korwar (1986) to capture the differential information advantage of managers over investors. Based on Korajczyk et al. (1991), we include the variable NumDays, defined as the number of days between last earnings announcement and the SEO filing as another proxy for information asymmetry.

We reasoned earlier that a more pronounced negative relation between incentive compensation and market response to SEOs is expected for firms with weaker preoffer stock-price performance, because it is easier for the market to ascribe the offering to managerial discretion in timing and pricing the issue. To capture the influence of pre-SEO stock price performance on the market reaction to the offer, we include the independent variable PreIssueRunup. It is measured as the natural logarithm of (the issuing firm's wealth relative using the CRSP value-weighted index during the year preceding the SEO filing date). Because previous studies suggest that the use of the proceeds may influence the market response to the SEO (see, e.g., Masulis and Korwar 1986), we control for the use of proceeds by including the Use-of-Proceeds dummy. The dummy variable equals 1 if the stated purpose of the issue is to repay debt and 0 otherwise. Finally, Size is defined as the natural logarithm of the market capitalization of the issuer on the day prior to the SEO filing date. We include firm size as a control variable, because small firms may have greater information problems and hence larger mispricing associated with corporate announcements (see, e.g., Ikenberry, Lakonishok, and Vermaelen 1995 for share repurchases). Myers and Majluf (1984) argue that firms with more financial slack have greater flexibility in pricing the equity offer and therefore issue stock only if it is overpriced. Hence, we control for the financial slack of the issuing firm at the filing date captured by the variable Slack, which is defined as cash plus marketable securities divided by total assets at the month-end preceding the filing date. We include Year dummies (qualitative variables capturing the year of the equity offer filing) and Industry dummies based on two-digit SIC codes in all the regressions to control for any time trends and industry effects, respectively.<sup>10</sup>

Our central proposition, that managerial incentives to maximize the value gap of the stock offering increases with higher proportions of equity-based compensation, implies that the offering firm's executive compensation structure is expected to be a critical determinant of the adverse market response to SEOs. After controlling for various factors that may influence market response to SEOs, in support of Hypothesis 1, we document that the coefficient of the Incentive variable is consistently negative, stable, and highly significant in all models reported in table 5. This result establishes, based on stock market response to SEOs, a

10. The results remain qualitatively unchanged when we eliminate the Year and Industry dummies.

strong link between managerial compensation structure and the efficiency of corporate financing decisions.<sup>11</sup>

Among the independent control variables, we find that the issuing firm's market value (Size) has a positive and significant coefficient in all the models, indicating that large issuers are associated with less severe adverse selection problems at the offering. We also find that the coefficient of M/B is significantly negative at the 1% level when Pre-IssueRunup is not included in the regression (Model 2). Reinforcing our earlier univariate result, this finding shows that firms with more investment opportunities are associated with a more adverse price reaction at the offering due to greater information asymmetry. However, the obvious correlation between M/B and PreIssueRunup precludes us from drawing reliable conclusions about the coefficient of M/B in models that also include PreIssueRunup as an independent variable. In Models 3 (without M/B), 5, and 6, we find that the coefficient of PreIssueRunup is significantly negative, indicating that better preoffer stock-price performance is associated with a more adverse stock-price response to the SEO filing.

Next, we conduct further regression analysis to examine, in a multivariate framework, the validity of the remaining propositions advanced in this study. The results are presented in table 6. To test Hypotheses 2a and 2b, we partition the sample based on the median values of four proxies for information asymmetry: the market model residual standard deviation (Models 1 and 2); the time interval between earnings announcement and SEO filing (Models 3 and 4); investment opportunity set, M/B (Models 5 and 6); and preoffer investment level (Models 7 and 8). Supporting Hypotheses 2a and 2b, we consistently find that the coefficient of Incentive is significantly negative only for firms in the high information-asymmetry subgroups (Models 2, 4, 6, and 8). These results indicate that our finding is robust to the use of the information-asymmetry proxies.

We estimate Models 9 and 10 by partitioning the sample based on preissue stock price performance. As expected in Hypothesis 3, we find that the Incentive variable is significant for the low preissue run-up

11. We test the structural stability of the relation between market response to SEOs and EC within the high- and low-EC subgroups by estimating the following regression for our full sample:

$$\text{LCAR}_i = 0.04 + 0.01 \text{ Dummy} - 0.10 \text{ Incentive} + 0.04 (\text{Dummy} * \text{Incentive}) + \varepsilon_i$$

(2.02) (0.77)            (-3.25)            (0.75)

$R^2_{\text{adj}} = 9.58$ ;  $F = 3.76$ ,  $p$ -value = 0.00, where, Dummy = 1 for high-EC issuers and 0 otherwise. White's (1980) corrected  $t$ -statistics are in parentheses below the coefficients. The insignificant coefficient of the (Dummy \* Incentive) variable indicates that the documented negative relation between the market response and EC is structurally robust and similar across both the high-EC and low-EC subsamples.

**TABLE 6** Multivariate Regressions Explaining Three-day CARs [Ln (1 + three-day CAR)] around SEO Filing Segmented by (1) Degree of Information Asymmetry (Market Model Residual Standard Deviation Over the Year Preceding the SEO) (Models 1 and 2), Number of Days between Earnings Announcement and SEO Filing (Models 3 and 4), (2) Investment opportunity set (Market-to-book Ratio (Models 5 and 6), Preissue Investment Level ((CE + RD)/TA) (Models 7 and 8), (3) Preissue wealth relative (Models 9 and 10), and (4) Top Executives' Ownership (Models 11 and 12)

	Low Asymmetry Model 1	High Asymmetry Model 2	Less Days Model 3	More Days Model 4	Low M/B Model 5	High M/B Model 6
Intercept	.004 (.18)	-.01 (-.32)	.04 (1.19)	-.02 (-.82)	-.04 (-1.26)	-.01 (-.38)
Incentive	.003 (.15)	-.07 (-2.86)***	-.02 (-.89)	-.04 (-2.20)**	-.01 (-.41)	-.05 (-2.04)**
MgtOwner	.04 (1.41)	-.02 (-.63)	.01 (.38)	-.04 (-1.26)	.06 (2.51)***	-.05 (-1.58)
PastOptions	.07 (.84)	.05 (.42)	.05 (.48)	.09 (.76)	.03 (.36)	.04 (.33)
M/B	-.01 (-1.20)	-.001 (-.14)	-.01 (-1.41)	-.01 (-1.30)		
PreIssueRunup	-.02 (-1.67)*	-.01 (1.29)	-.01 (-.99)	-.02 (-1.63)	-.03 (-3.35)***	-.01 (-.74)
Size	.003 (1.73)*	.01 (2.24)**	.004 (1.26)	.004 (1.41)	.01 (2.28)**	.01 (2.35)**
Investment					.10 (1.71)*	-.05 (-1.93)*
R <sup>2</sup> <sub>adjusted</sub>	5.12	11.45	12.42	14.19	20.05	14.18
F-statistic	1.57	2.21	2.22	2.46	3.32	2.61
p-value	.06	.00	.00	.00	.00	.00
Observations	222	198	182	177	186	196
	Low Investment Model 7	High Investment Model 8	Low Runup Model 9	High Runup Model 10	Low Ownership Model 11	High Ownership Model 12
Intercept	-.06 (-1.41)	-.005 (-.16)	-.0006 (-.02)	-.00 (-.00)	-.05 (-1.39)	.08 (1.79)*
Incentive	-.02 (-.82)	-.06 (-2.68)***	-.05 (-1.89)*	-.02 (-.82)	-.05 (-2.12)**	-.02 (-.89)
MgtOwner	-.01 (-.32)	.02 (.67)	.05 (1.51)	-.01 (-.28)		
PastOptions	.0004 (.00)	.21 (2.21)**	.18 (1.64)	.02 (.18)	.16 (1.13)	-.03 (-.26)
M/B	-.01 (-1.29)	-.005 (-.71)	-.02 (-1.91)*	.004 (.63)	.001 (.08)	.002 (.29)
PreIssueRunup	-.01 (-1.40)	-.01 (-.98)			-.006 (-.51)	-.03 (-3.38)***
Size	.01 (3.28)***	.01 (3.16)***	.01 (3.78)***	.01 (2.53)***	.01 (3.67)***	-.003 (-.67)
Investment			-.02 (-.45)	-.03 (-1.00)	-.06 (-.79)	-.04 (-1.51)
R <sup>2</sup> <sub>adjusted</sub>	8.37	14.55	13.69	5.29	12.91	14.54
F-statistic	1.87	2.62	2.59	1.53	2.37	2.66
p-value	.02	.00	.00	.08	.00	.00
Observations	191	191	191	191	186	196

sample (Model 9), but not for the high run-up subsample (Model 10). This result indicates that, for firms with low preissue run-up, the market associates higher proportions of new equity-based managerial compensation with a greater degree of managerial opportunism to maximize the value gap and, hence, a more acute adverse-selection problem at the offering. In contrast, for firms with high preissue stock-price run-up, the rising-tide-lifts-all-boats scenario consistent with a pooling equilibrium weakens the role of managerial discretion in maximizing the value gap. Our result, that EC is significant only for the low preissue run-up subgroup, indicates that preissue run-up is not merely a proxy for information-asymmetry. If preissue run-up were simply a proxy for information-asymmetry, then one would expect the coefficient of EC to be insignificant for the low preissue run-up subgroup, just as it is insignificant for the low information-asymmetry subgroups in Models 1, 3, 5, and 7. Moreover, as shown in Model 9 in table 6, Incentive is significant even after controlling for the issuer's degree of information asymmetry (as measured by the M/B and Investment variables).

We estimate Models 11 and 12 based on low and high managerial ownership subsamples, respectively. Consistent with Hypothesis 4, our analysis reveals that the Incentive variable is significantly negative for the low-ownership group only. This suggests that the market response to SEOs is conditional on the incentive provided by new stock-option grants at different levels of managerial ownership.

In summary, we document, in table 6, that the effect of incentive compensation on market response to equity offerings is more pronounced for issuing firms with more information asymmetry (Hypothesis 2a), a larger investment opportunity set (Hypothesis 2b), a smaller preissue stock-price run-up (Hypothesis 3), and a lower management ownership stake (Hypothesis 4).

## V. Summary and Conclusions

Outside equity financing is an important financial decision made by corporate managers. Given that the timing and pricing of equity offers are at managers' discretion, executive compensation structure is expected to play an important role in aligning managerial and existing shareholders' interests, thereby providing strong incentive for managers to maximize the value gap of SEOs. Using a sample of 444 SEOs made during the period January 1, 1992, to December 31, 1999, this is the first study to establish a link between the managerial compensation structure and the efficacy of corporate equity financing decisions. Specifically, we find a strong negative relation between the stock-price response to SEO announcements and incentive compensation awarded to issuing firm managers. Our result indicates that the market response to SEOs depends significantly on the degree of alignment of managerial goals with

those of existing shareholders, as determined by the executive compensation structure.

Myers and Majluf's (1984) information asymmetry model is commonly invoked by previous studies to explain the well-documented adverse stock-price response to SEOs. However, at the heart of the Myers and Majluf framework is the critical underlying assumption that managerial goals are perfectly aligned with those of the existing shareholders. In this study, we show how cross-sectional variations in the degree of interest alignment (via executive compensation structure) play an important role in determining the market reaction to SEOs. Our results indicate that the executive compensation structure motivates managers to make optimal corporate financing decisions on behalf of the existing shareholders, which is recognized by the market through the appropriate stock price response to SEO announcements. We document that the effect of incentive compensation on market response to SEOs is significantly more pronounced for issuing firms with higher growth opportunities, greater information asymmetry, a smaller preissue stock-price run-up, and a lower management ownership stake.

These findings have important implications for our understanding of the information content of security offerings. At a minimum, the extent of overvaluation in equity offerings partly depends on the incentives in place for managers at issuing firms. For researchers, investment bankers, and investors, the results highlight the influence of management incentives on the optimal pricing of the offering. In a broader context, the results of our study strongly suggest that corporate financing decisions can be better understood by taking into consideration the role of the executive compensation policy.

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