Do stock prices underreact to SEO announcements? Evidence from SEO Valuation

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Comments Welcome

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Abstract

This paper examines whether the market underreacts to the negative information implicit in SEO announcements. We find that it does but conditional on the valuation of SEO firms prior to the SEO issue date. SEO firms that are overvalued relative to their industry peers experience a smaller decline in market value on the SEO announcement day but experience a larger decline over the next five years. The results are robust to various ways of choosing industry peers and valuation multiples and various methodologies for computing risk-adjusted abnormal returns. Cross-sectional regressions indicate SEO P/V ratios (offer-price to value ratio based on relative valuation techniques) are significantly positively related to announcement day returns and significantly negatively related to long-run returns even after controlling for expected growth rates, accruals, and B/M ratios. Additional tests indicate overvalued SEOs earn lower returns around future quarterly earnings announcement dates and do not exhibit superior ex-post operating performance. Yes! Stock prices do underreact to SEO announcements.

1. Introduction

There are two well known empirical findings with respect to seasoned equity offerings (SEO henceforth): (a) Firms that announce SEOs experience, on average, a decline of 2% of their market value relative to the overall market on the announcement day and (b) Over the next 3 to 5 years, the SEO firms 'underperform' various style benchmarks by about 3 to 4% a year. The announcement day effects are typically attributed to an explanation based on the adverse selection model of Myers and Majluf (1984). According to this explanation, since only overvalued firms are likely to issue equity (when they cannot issue debt) the market rationally lowers their market price to the intrinsic value on the announcement day. The explanations for long-run SEO 'underperformance' fall under three categories: (a) overoptimism on the part of managers and investors about the future prospects of the issuing firm which leads to initial overvaluation, under-reaction to the SEO announcement and subsequent slow reversion to intrinsic value (Loughran and Ritter, 1995), (b) model misspecification in measuring risk-adjusted abnormal returns giving rise to 'spurious' underperformance (Fama, 1998) and (c) a risk-based explanation that suggests issuing firms are less risky (Eckbo, Masulis, and Norli, 2000).

The efficient market view of SEO announcement effects and long-run returns is that the market correctly reacts to the SEO announcement and lowers the value of the SEO firm to its intrinsic value while the long-run 'underperformance' is due to either model misspecification or lower risk. The inefficient market view is that the market underreacts to the initial announcement (that is the market value does not fall sufficiently after learning about the SEO) and continues to move in the same direction over the long run. These explanations are a source of great debate and controversy in the literature.

In this paper, in one of the first attempts to systematically value seasoned equity offerings, we estimate the values (as of the offer date) of about 1,700 SEOs from 1978 to 2000 based on the market valuations of their non-issuing industry peers and use these valuations to explain the cross-section of short-run announcement effects and long-run abnormal returns.[1] Unlike earlier studies, the use of ex ante valuations allows us to directly examine a key implication of the

[1] Purnanandam and Swaminathan (2004) use a similar approach to value IPOs.

Myers and Majluf (1984) model: the more overvalued is the SEO firm prior to the SEO announcement the larger should be the decline in market value on the announcement day.[2] In addition, if the market value declines to intrinsic value on the announcement day as expected under efficient markets, there should be no relationship between ex-ante valuations and long-run abnormal returns once we carefully control for risk. In contrast, the inefficient market explanation predicts that the most overvalued SEOs should under-react more to the SEO announcement and underperform the most in the long run.

The industry peers are chosen by carefully matching the SEO firm to a non-issuing firm in the same industry (using Fama and French (1997) 48 industry groups) on past sales growth, current EBITDA profit margin, and sales (as a proxy for size). We value the SEOs using a variety of valuation multiples: price-to-earnings multiple (both based on trailing earnings and analyst forecasts of earnings), price-to-sales multiple, price-to-EBITDA multiple, Enterprise Value-to-sales multiples and Enterprise Value-to-EBITDA multiple. We also experiment with different ways of choosing industry peers to ensure that our methodology is robust and our findings are not specific to the choice of a particular multiple or a particular way of choosing industry peers.

Our results are as follows. At the offer price, the median SEO firm is overvalued by 15% to 90% relative to its industry peers depending on the multiple and the methodology used to select industry peers. In the cross-section, the firms that are the most overvalued prior to the SEO announcement date (or as of the offer date) relative to their industry peers experience the smallest decline (under-react more to the SEO announcement) in market value on the announcement day. These firms also underperform the most over the next five years. The top 40% of the most overvalued firms underperform the bottom 40% of the most undervalued or the least overvalued firms by 3% to 5% a year over the next five years depending on the benchmark

[2] In Myers and Majluf (1984), the information that the firm is overvalued is private known only to the managers. The SEO announcement conveys this private information to investors. Investors know only the distribution of overvalued and fairly valued firms in the population. In contrast, our valuation measure is based on public information. However, individual investors are unlikely to have access to the knowledge or information necessary to do valuations of the kind we undertake in this paper. Therefore, from their perspective, these valuation measures can be considered private information. Empirically, these valuation measures are likely to represent noisy proxies of the managers' private valuations.

and the methodology used to compute abnormal returns. The long-run results are robust to various ways of measuring abnormal returns and are strongly confirmed in cross-sectional regressions that control for various firm characteristics such as accruals, B/M ratios, and long-term growth that are known to predict long-run returns. The more overvalued SEOs also experience significantly more negative price reactions around future quarterly earnings announcements (compared to the less overvalued SEOs) suggesting that the investors' earnings expectations are too high for the overvalued SEOs as suggested by the overoptimism hypothesis. Thus, the cross-sectional dispersion in the long-run underperformance documented in this paper is unlikely to be all due to model misspecification.

Furthermore, our analysis of post-issuance operating performance shows that overvalued SEOs have lower profitability than their undervalued counterparts. They exhibit higher sales growth in the first few years, but in the long-run there is no difference in growth rates across two groups. Thus, overvalued SEOs are unable to convert their initial high growth rates into high profits. It seems that the SEO investors (just as in the case of IPOs) focus too much on initial growth and too little on profitability in valuing SEOs. Overall, our results suggest that the most overvalued SEOs experience the smallest price decline on the SEO announcement date while underperforming the most in the long run. Our results support the underreaction hypothesis and are inconsistent with the efficient markets explanation.

The rest of the paper proceeds as follows. Section 2 describes sample selection and the SEO valuation methodology. Section 3 presents the valuation results. Section 4 presents the cross-sectional results with respect to the announcement effects. Section 5 presents long-run results and Section 6 concludes.

2. Sample Selection and SEO Valuation Methodology

2.1. Sample Selection

Data on SEOs is obtained from the Securities Data Corporation (SDC) database for the 1978 to 2000 time period. We start in 1978 to obtain sufficient number of SEOs per year for our sample and to ensure that our analysis does not suffer from any COMPUSTAT data back-filling biases.

We stop in 2000 in order to be able to compute five-year returns for our sample firms. For inclusion in our sample a SEO has to satisfy the following criteria:

a) The SEO should be of common stocks of US firms (share codes 10 and 11) listed on NYSE, AMEX and NASDAQ. Units, REITs, closed-end funds and ADRs are eliminated from the sample. The firms must be covered on *Compustat* (active or research) and *CRS*P (Center for Research in Security Prices) databases.
b) SEOs should be a non-financial, non-utility firm. We remove financials and utilities since these firms' incentive to issue equity (for example, banks may issue equity to meet regulatory capital requirements) as well as the applicability of multiple based valuations to these firms are not comparable to other firms.
c) At least part of the SEO issue should be 'primary shares'. In other words, 100% secondary issues are removed in line with the earlier literature.
d) The SEO should have an offer price of at least $1.
e) Further if a firm issues multiple SEOs within a five-year window, we keep only the first issue in our sample. Subsequent issues are dropped. This is in line with Loughran and Ritter (1995). We repeat the analysis with these issues included in the sample and get similar results.
f) For meaningful valuations we restrict our sample to firms with positive EBITDA (item 13 of *Compustat*) in the prior fiscal year only.
g) We should be able to find a seasoned matching firm for the SEO firm based on the algorithm described below.

There are 1,967 SEOs satisfying these criteria from 1978 to 2000. Our data requirements tend to eliminate many of the smaller SEOs. As a result, the magnitude of the underperformance in our sample is likely to be lower than that reported in the prior literature. The SDC database also provides filing dates**,** which we use to compute announcement day returns. Since the filing date is not available for all firms the sample size for computing announcement effects falls to 1,561 firms.[3]

[3] This is consistent with earlier papers such as Jegadeesh, Weinstein and Welch (1993). Using Factiva search, we checked the actual SEO announcement dates for a sub-sample of about 300 firms during 1993-2000. We find that

Summary statistics on our SEO sample and matching firms are provided in Table 1. The median offer price for SEO firms is $19.25, median new shares offered as a percentage of pre-issue shares outstanding is 17.11% and the median pre-issue market cap is $139.38 MM. The median sales of the SEOs in our sample is $82.11 million, median EBITDA profit margin is 13.34%, median net profit margin is 4.82% and median sales growth rate is 24.02%. Thus, SEOs are firms with historically high growth rates and profit margins. The matching firm sample, by design, has similar characteristics. The next section explains the procedure for choosing matching firms.

2.2 Choosing Industry Peers

We choose industry peers following the methodology outlined in Purnanandam and Swaminathan (2004). For each SEO in our sample, we find a *non-SEO industry peer* with comparable sales, EBITDA profit margin (as of prior fiscal year) and sales growth that did not issue equity in the last three years. Sales growth is computed by taking the average of yearly sales growth of last three fiscal years. As explained in Purnanandam and Swaminathan (2004), matching on industry allows us to find firms with *similar operating risks*. We use sales as a proxy for firm size. EBITDA margin and past sales growth ensures finding firms with similar profitability and growth characteristics. The objective is to find a non-SEO matching firm that is as close as possible to the SEO firms in operating characteristics that determine a firm's value. We use EBITDA profit margin instead of net profit margin in order to maximize the sample size since many firms that have negative net profit margin might still have positive EBITDA profit margin. EBITDA profit margin is also likely to be a more robust measure of a firm's profitability than net profit margin, which is influenced by non-operating items that tend to be more volatile. The same logic applies to using sales growth instead of growth in earnings or EBITDA.

We eliminate from the universe of potential matching firms the following: (a) firms that went public during the past three years, (b) firms that issued seasoned equity in the past three years, (c) firms that are not ordinary common shares, (d) REITs, closed-end funds and ADRs and (e)

90% of SEOs made their announcements on the same day as their filing dates. Out of the remaining, the majority made announcements a day before the filing date. We conduct our announcement-day returns analysis using both 3-day and 5-day event windows to make sure that we are able to capture the actual announcement date in our event window.

firms with stock price less than five dollars as of the prior June or December, whichever is later. The remaining firms are grouped into 48 industries using the industry classifications in Fama and French (1997), which are constructed, by grouping various four-digit SIC codes (obtained from CRSP as of the end of the prior calendar year). We group firms in each industry into three portfolios based on past sales and then each portfolio based on sales into three portfolios based on past EBITDA profit margin (defined as EBITDA/Sales). Within each Sales-EBITDA group we find the firm with a sales growth that is closest to the SEO firm. If there is insufficient number of firms in an industry, we limit ourselves to a 3 by 2 or a 2 by 2 classification. Each year almost all firms in our sample get unique matching firms. There are some cases where the same matching firm may be chosen for more than one SEO firm. We value SEOs based on the price multiples of these matching firms. The valuation methodology is described in the next section.

2.3 SEO Valuation Using Price Multiples

For each SEO firm, we compute a price-to-value (P/V) ratio where P is the SEO offer price and V is the "fair/intrinsic value" of equity computed from comparable firm's equity or enterprise value multiples and SEO firm's sales, EBITDA, or earnings. We use price-to-sales (P/S), (P/EBITDA), (P/E), (P/E_{fwd}), (TEV/Sales), (TEV/EBITDA), and ($TEV/EBITDA_{fwd}$) as our multiples. E_{fwd} is the consensus analyst forecast of next year's earnings. TEV is total enterprise value computed as Book value of interest bearing debt + Book value of preferred stock + Market Value of equity – Cash, short-term investments and marketable securities. $EBITDA_{fwd}$ is an estimate of forecasted EBITDA computed as E_{fwd} + prior fiscal year's difference between EBITDA and net income, $(EBITDA - E)_{prior\ fiscal\ year}$. The assumption is that prior year's numbers are the best forecast of next year's numbers.

Price-to-Value (P/V) ratio using price multiples

The P/V ratio for the SEO is estimated as the ratio of the SEO offer price multiple to the comparable firm's price multiple. The offer price multiples for SEOs are computed as follows:

$$\left(\frac{P}{F}\right)_{SEO} = \frac{\text{Offer Price} \times (\text{Beginning shares outstanding} + \text{Primary shares offered in the SEO})}{\text{Prior Fiscal Year Accounting Fundamentals}} \quad (1)$$

where '*Beginning shares outstanding*' is the CRSP shares outstanding as of the week prior to the SEO offer date. The '*primary shares offered*' in the SEO is obtained from the SDC database. *F* stands for accounting fundamentals: Sales, EBITDA, and trailing or forecasted earnings (net income before extraordinary items). All accounting information is for the fiscal year ending at least 3 months prior to the offer date. Analyst forecasts are as of the prior month. The price multiples for matching firms are computed in a similar manner:

$$\left(\frac{P}{F}\right)_{Match} = \frac{\text{Market price} \times \text{CRSP Shares outstanding}}{\text{Prior Fiscal Year Accounting Fundamentals}} \tag{2}$$

The comparable firms' stock prices and shares outstanding are as of the week prior to the SEO offer date. The P/V ratio for the SEO firm is computed as follows:

$$\left(\frac{P}{V}\right)_{F} = \frac{(P/F)_{SEO}}{(P/F)_{Match}} \tag{3}$$

Price-to-Value (P/V) ratio using enterprise value multiples

In this case, we first compute the *implied TEV* of SEO firm by multiplying the *TEV/F* ratio of the matching firm with *F* of SEO firm. *TEV* stands for total enterprise value and is defined as market value of equity plus book value of interest bearing debt plus book value of preferred stocks minus cash. Cash consists of cash, marketable securities and short-term investments. The market value of equity of the matching firm is the product of market price and shares outstanding as of the week prior to the SEO offer date (see equation 2). From the *implied TEV* of SEO firms, we subtract the book-value of debt and book value of preferred equity, and add cash to get the *implied value of the firm's equity*. P/V ratio is computed as the ratio of SEO firm's market value based on offer price to the implied value of the firm's equity as follows:

$$\left(\frac{P}{V}\right)_{F} = \frac{\text{Offer Price x (Beginning shares outstanding} + \text{Primary shares offered in the SEO)}}{\left(\frac{\text{TEV}}{\text{F}}\right)_{\text{Match}} \text{x F}_{\text{SEO}} - (\text{BV of Debt} + \text{BV of preferred-equity} - \text{Cash})_{\text{SEO}}}$$

The TEV based models account for leverage of the firm as well. For all valuation ratios, we require the implied value to be positive. For example, the TEV-based value of equity of a firm can be negative if implied TEV of the SEO firm is less than the (BV of debt + BV of preferred equity – Cash). We drop such observations from the sample. Finding a different matching firm for these SEOs, such that the implied value is positive, provides similar result.

3. SEO Valuation

Table 2 presents the median P/V ratios based on various equity multiples and enterprise value multiples for each year from 1978 to 2000. The results show that, overall, SEOs are overvalued at the offer relative to their industry peers by 15% to 90% depending on the multiples used to perform the valuation. The least overvaluation (15%) is obtained using the price-to-earnings multiple $(P/E)_{fwd}$ which is based on consensus analyst forecasts of next year's earnings. Using analyst forecasts of earnings, however, reduces the sample size by almost half since not every SEO firm is covered by security analysts. The most overvaluation (87%) is obtained using TEV/Sales multiple. The overvaluation is fairly robust over time. Even with the $(P/E)_{fwd}$ multiple the median SEO is overvalued in sixteen out of 23 years. Wilcoxon rank sum tests strongly reject the null hypothesis that the median P/V ratios are equal to 1. The annual medians also reveal a significant upward trend in the median P/V ratios during the second half of the 1990s, when the US stock market experienced significant double-digit gains (see Figure 1 for an annual plot of P/V ratios based on P/EBITDA multiple).

Next, we show that our results are not specific to the specific methodology we used to choose comparable firms. We consider the following alternate procedures of choosing comparable firms:

- Match on sales and EBITDA profit margin
- Match on sales, EBITDA margin, and analyst consensus long-term growth forecasts
- Match on sales and historical sales growth
- Match on sales and analyst consensus long-term growth forecast

The valuation results from the alternate matching procedures are presented in Table 3. The results mirror the findings in Table 2 and show that the overvaluation result is not driven by a specific matching procedure. The results indicate that the median SEO is overvalued by 7% to 95% depending on the matching procedure used. As in Table 2, the least overvaluation is obtained when using price-to-forward earnings multiple which, of course, leads to a loss of half of the sample due to the limited availability of analyst earnings forecasts.

Overall, the overvaluation results in Tables 2 and 3 are consistent with the long-run underperformance of SEOs reported in the literature. However, these results are based on aggregating all SEOs and do not examine the cross-sectional relationship between P/V ratios, announcement day effects and long-run returns. In the following sections, we examine such cross-sectional relationships which can shed light on the underreaction hypothesis and the risk vs. mispricing explanations of the long-run 'underperformance' of SEOs. To save space, in the rest of the paper, we present our results based on P/V ratio computed using TEV/EBITDA multiple of an industry peer chosen based on sales, EBIDTA margin and historical sales growth. We choose this measure since TEV approach takes into account leverage and EBITDA is a fairly clean measure of cash flows generated by the firm.

4. SEO Valuation and Announcement Effects

SEOs experience a decline in market value on the announcement day. The most popular explanation for this decline is based on Myers and Majluf (1984) according to which the SEO announcement reveals the managers' private information, that the firm is overvalued, to the investors. In an efficient market, investors rationally lower the firm's market value to its intrinsic value. The efficient market explanation suggests that the more overvalued a SEO firm is, the larger should be the decline in its stock price on the announcement day. In contrast, the underreaction hypothesis suggests that the more overvalued firm should experience a smaller decline in stock price on the announcement day (under-react more) and a larger (more delayed) decline in the long run. In this section, we focus on the short-run announcement effects. In Section 5, we examine the long-run returns.

In order to examine the relationship between P/V ratios and announcement day returns, we construct three portfolios of SEOs based on their P/V ratios as follows. At the beginning of each month, from 1980 to 2000, we construct a cross-sectional distribution of P/V ratios of firms that issued seasoned equity during the prior 24 months.[4] SEOs whose P/V ratios are below the 40th percentile of this distribution are termed *Low P/V*, SEOs whose P/V ratios are above the 60th percentile are termed *High P/V* and the rest are termed *Medium P/V*. This procedure ensures that there is no look-ahead bias in the construction of the three portfolios. It also ensures that there is no calendar time clustering in the membership of the portfolios. Each annual cohort of SEOs is distributed across the three portfolios roughly based on the 40-20-40-percentile distribution.

Table 4 presents the average and median announcement day returns for the three SEO portfolios. Note that the sample size is smaller in this table because the filing date is not available for all SEO firms. The results show that high P/V SEOs experience a smaller decline in market value compared to low P/V SEOs on the announcement day. The 3-day mean CAR (5-day CAR) for high P/V SEOs is -1.55% (-1.39%) while the 3-day CAR for low P/V SEOs is -2.46% (-2.65%). The difference in announcement day returns between high P/V and low P/V SEOs is 0.90% for the 3-day window and 1.26% for the 5-day window. These differences are both economically and statistically significant and indicate a positive relationship between P/V ratios and announcement day effects. The positive relationship is inconsistent with the prediction of Myers and Majluf (1984) since their model would predict the most overvalued SEOs to experience the largest decline in market value on the SEO announcement day. In contrast, the results in Table 4 indicate that the most overvalued SEOs experience the smallest decline in market value on the announcement day. This is more consistent with the *underreaction hypothesis*.

The results in Table 4, however, provide only a univariate test of the relationship between P/V ratios and announcement day returns. Will this relationship hold once we directly control for past growth rates and other firm characteristics? We examine this issue using the following cross-sectional regression:

[4] SEOs in 1978 and 1979 are used to construct the initial distribution.

$$R(AnnDay)_i = a + b \times LnPV_i + c \times LnBM_i + d \times LnGrowth_i + e \times Accruals_i + f \times LnSales_i + g \times EBITDA\ Margin_i + u_i \quad (4)$$

The index *i* refers to the SEO firm/event. R(AnnDay) is the VW market adjusted three-day cumulative abnormal returns around the filing/ announcement date. *LnPV* is the natural log of offer price-to-value ratio. All accounting variables used in the above regressions come from the most recent fiscal year of the SEO firm ending at least three months prior to the offer-date. *LnBM* is the natural log of book-to-market ratio where *book* is the book value of equity (COMPUSTAT item number 60) for the fiscal year just before the SEO date and *market* is the market value of equity a day before the offer-date. *LnGrowth* is the natural log of (1+consensus analyst earnings growth rate for the SEO) or (1+historical sales growth rate). Historical sales growth is taken as the average year-to-year sales growth computed over the past three years.

The *Accruals* variable is the ratio of accruals to total assets based on the most recent fiscal year before the offer-date. This variable is constructed from the statement of cash flows for fiscal years after 1987 and from the balance sheet data for the earlier period. Using the cash flow statement, we construct accrual variable as Income Before Extraordinary Items (item 123) minus Cash Flows from Operations (item 308 minus item 124). For the earlier period, we construct the accrual variable as Change in Current Assets (Δ4) minus Change in Cash (Δ1) minus Change in Current Liabilities (Δ5) plus Change in Debt included in Current Liabilities (Δ34) plus Change in Income Tax Payable (Δ71) minus Depreciation & Amortization (14). The accrual variable is scaled by the average of beginning and year-end total assets (item 6). *LnSales* is the log of sales (item 12) for the prior fiscal year and is used as a control for size. *EBITDA Margin* (item 13 divided by 12) is computed for the same fiscal year as the *LnSales* variable.

We estimate regression (4) with and without growth to examine the effect of growth rates on the relationship between P/V ratios and announcement-day returns. The regression is estimated both as a pooled time-series-cross-sectional regression and using the Fama-MacBeth cross-sectional regression approach where we estimate a cross-sectional regression for each annual cohort of SEOs. In the pooled regressions, the numbers in parentheses are White heteroskedasticity

corrected t-statistics. In the Fama-MacBeth regressions, the numbers in parentheses are simple t-statistics.

Panel A of Table 5 presents the results from the cross-sectional regressions. The results reveal an economically and statistically significant positive relationship between P/V ratios and announcement day returns confirming that SEOs with high P/V ratios decline less on the SEO announcement. In contrast, B/M ratios have mixed signs and are statistically insignificant. Announcement day returns are positively correlated with growth rates suggesting that high growth firms are likely to experience a smaller decline in market value on the announcement day. The relationship, however, is not statistically significant. The other variables, accruals, sales, and EBITDA margin are not significantly related to announcement day returns. The variable that best explains announcement day effects is the P/V ratio based on the offer price.

Note, however, that the P/V ratio is based on offer price, which is set well after the SEO announcement day. This could give rise to an endogeneity bias if the market reaction to the SEO announcement helps determine the SEO offer price. In other words, if a less negative price reaction causes the SEO firm to set a higher offer price, possibly because the firm interprets the less negative reaction as an affirmation of its growth and capital expenditure strategy, this could give rise to the positive relation between P/V ratios and announcement day returns. To address this concern, we compute an alternate P/V ratio based on the market value of the SEO firm the day before the filing date (instead of the market value based on the SEO offer price) and estimate the cross-sectional regression (in equation 4) using this alternate measure. The results from these regressions, provided in Panel B of Table 5, confirm the findings in Panel A of Table 5. The most overvalued SEOs experience the smallest decline in their market value on the announcement day.

In our discussion so far, we have interpreted the positive relationship between P/V ratios and announcement day returns as being more consistent with the underreaction hypothesis. However, there is an alternate scenario in which the smaller decline in market value observed for high P/V SEOs can be consistent with efficient markets. Table 4 shows that the sales of high P/V SEOs grew at about 22% in the prior year while those of the low P/V SEOs grew at a rate of only about

16% indicating a positive correlation between P/V ratios and past growth rates. In the context of Myers and Majluf (1984), if investors interpret past high growth rates as an indication of superior firm quality, i.e., a greater likelihood that a firm possesses positive NPV projects, then they are less likely to punish such firms on the announcement of a SEO. They would interpret the SEO as a legitimate action on the part of the firm to raise capital to invest in positive NPV projects and not as opportunistic issuance of overvalued equity. On the other hand, if past high growth rates are not sustainable in the future and are poor indicators of whether a firm possesses positive NPV projects, then the smaller decline experienced by high P/V SEOs would be an underreaction to the SEO announcement.

One way to differentiate between these two cases is to examine long-run returns. In the case of rational reaction, P/V ratios would not be related to long-run abnormal returns. In the case of underreaction, P/V ratios would be negatively related to long-run abnormal returns. Thus, the underreaction hypothesis requires not only a showing that the most overvalued SEOs experience the least decline in market value on the announcement day but also that they continue to decline in market value over the long-run. This is the essence of the underreaction hypothesis: smaller decline than predicted by the efficient market hypothesis initially because investors do not revise their cash flow expectations down sufficiently and continuing declines over the long run as investors slowly realize their mistake with the arrival of additional information. We examine this issue at depth in the next section.

5. SEO Valuation and Long Run Returns

5.1 Buy-and-hold abnormal returns (BHAR)

Table 6 reports 5-year buy-and-hold abnormal returns for the three P/V portfolios. The returns are computed starting the day after the SEO issue date and ending five years after the issue date or the delisting date whichever is earlier. The abnormal returns are measured with respect to three benchmarks: (a) NYSE/AMEX/NASDAQ value-weighted market index, (b) size matched control firms (these are firms whose market capitalization as of prior June or December, whichever is later, is closest to the market capitalization of the SEO firm at close on the offer date) and (c) size and B/M matched control firms. In addition to computing the traditional buy-and-hold abnormal returns (BHAR), following Purnanandam and Swaminathan (2004), we also

compute log buy-and-hold abnormal returns (LBHAR). The log buy-and-hold abnormal return is calculated as the difference between the log buy-and-hold return of the SEO firm, $\log(1+R_{SEO})$ and the log buy-and-hold return of the benchmark firm, $\log(1+R_{BM})$.[5] Panel A of Table 6 presents traditional BHAR and Panel B presents LBHAR. The methodology for the construction of Low, Medium, and High P/V SEO portfolios is the same as that described in Section 4 (see Table 4).

The results in Panel A show that in the long-run, high P/V SEO portfolios underperform low P/V SEO portfolios by 27% to 44% depending on the benchmark used. In Panel B which employs LBHAR, the underperformance ranges from 16% to 35%. The lower bound on underperformance is observed, not surprisingly, when abnormal returns are computed with respect to size and B/M matched control firms. The t-stats for equality of means, which are computed under the assumption of independence and with heterogeneous variances, reject the null of equality strongly for size and market benchmarks and marginally for size and B/M benchmark. While these results provide support for the underreaction hypothesis, these are univariate findings that still leave open the possibility that the P/V might be an instrument for other characteristics such as growth and accruals that are related to the long-run underperformance of SEOs.

5.2 Cross-sectional regressions

We, therefore, turn to cross-sectional regressions to examine the robustness of the relationship between P/V ratios and long-run SEO returns in a multivariate setting:

$$R_i^* = a + b \times LnPV_i + c \times LnBM_i + d \times LnGrowth_i + e \times Accruals_i + f \times LnSales_i + g \times EBITDA\ Margin_i + u_i \quad (5)$$

[5] Barber and Lyon (1997), argue against using log (continuously compounded) returns because log returns tend to yield negatively biased estimates of long-run abnormal returns. However, since there is no a priori reason that the bias should be different for the low P/V and the high P/V portfolios, the bias is likely to cancel out when computing the difference in returns earned by the two portfolios. The advantage is that log returns might provide a simple and easy way to control for the skewness problem. Also as expected, LBHAR exhibits much less skewness in each SEO portfolio and very little dispersion in skewness across portfolios compared to BHAR.

The index *i* represents the SEO firm. R_i^* is the long-run risk-adjusted return for each SEO estimated as the intercept from a Fama and French (1993) three factor regression involving individual SEO monthly excess returns starting from the month following the issue date and ending five years after the SEO month. Thus, R_i^* represents the monthly average abnormal return which tends to have better distributional properties and is statistically better behaved than buy-and-hold abnormal returns. The independent variables are the same as those in equation (4) and described in Section 4.

We include analyst growth forecasts because La Porta (1996) has shown that stocks with high analyst growth forecasts subsequently earn lower returns. We include B/M ratios because prior work suggests they are related to the cross-section of stock returns. We include accruals because Teoh, Welch, and Wong (1998) find SEOs with high accruals earn lower long-run returns. Prior fiscal year sales are a proxy for firm size and prior fiscal year EBITDA profit margin a control for profitability.

We estimate regression (5) using both the pooled time-series cross-sectional approach and the Fama-MacBeth cross-sectional regression approach. In the Fama-MacBeth approach, we estimate annual cross-sectional regressions using each annual cohort of SEOs from 1980 to 2000 and compute the time-series average of cross-sectional slope coefficients. In the pooled approach, the standard errors are corrected for heteroskedasticity using the White (1980) correction. In the Fama-MacBeth approach, the standard errors are computed using four Newey-West lags to correct for any autocorrelation in the cross-sectional slope coefficients.

The results in Table 7 show that P/V ratios are significantly negatively related to long-run risk-adjusted returns even after controlling for other characteristics that are related to long-run returns. The relationship is robust in both the pooled regressions and the Fama-MacBeth regressions and is robust to the inclusion or the exclusion of growth rates. The slope coefficients are in the range of 0.17% to 0.39% per month, which can be interpreted as the return premium corresponding to P/V ratios. Among other variables, only growth rates and accruals bear a significant negative relationship to long-run returns. B/M ratio has the wrong sign and is not significant. The strong negative relationship between P/V ratios and long-run risk adjusted SEO

returns is consistent with the underreaction hypothesis and inconsistent with the efficient markets hypothesis.

5.3 Monthly calendar-time multi-factor regressions

We provide additional evidence on the robustness of the relationship between P/V ratios and long-run SEO returns by estimating multi-factor regressions involving monthly calendar-time returns of the low and high P/V SEO portfolios. The portfolio returns are computed as follows. Each SEO is allotted to one of three P/V portfolios starting from the month following the offer date and is held for 60 months (or until the delisting date whichever is earlier) from the end of the offer month. At the end of the holding period, the SEO drops out of its portfolio. The monthly portfolio return is the equal-weighted or value-weighted (based on beginning of year market cap) average of returns of all stocks in the portfolios for each calendar month from the beginning of 1980 till the end of 2004.

Calendar time return regressions suffer from fewer misspecification problems than the BHAR approach. This approach avoids the autocorrelation problems present in using overlapping five-year buy-and-hold returns, takes into account the cross-correlation among returns across clustered events, and presents the most reliable test statistics. On the other hand, these tests are not necessarily the most powerful in detecting abnormal performance (see Loughran and Ritter (2000)).

Panel A of Table 8 presents results based on the Fama and French (1993) three-factor model. The equal-weighted high P/V portfolio earns statistically significant negative abnormal return of 0.35% a month or 4.20% per annum. The difference between Low P/V and high P/V portfolios is 0.25% a month or 3% per annum which is only marginally significant. The results based on value-weighted portfolios are stronger. High P/V portfolio earns significant negative abnormal return of 0.52% a month or 6.2% per annum. The difference between low P/V and high P/V portfolios is a statistically significant 0.57% a month or 6.8% per annum. Panel B presents results from a 4-factor model consisting of the momentum factor. The results are stronger. Now, the difference between equally-weighted low and high P/V portfolios is 0.28% a month or 3.4% per annum and value-weighted low and high P/V portfolios is 0.68% a month or 8.2% per annum

both statistically significant. Overall, the results based on calendar-time portfolio regressions confirm that the high P/V SEOs underperform in the long-run.

6. SEO valuation and return predictability around quarterly earnings announcements

A rational explanation of our long-run findings is that we do not have the right model of expected returns for long-run returns. Thus, any underperformance we observe could be due to exposure to some unknown risk factor. We address this issue by focusing on return predictability around future quarterly earnings announcements. Since expected returns are unlikely to change significantly in the short-run, any predictability in returns around earnings announcement dates is more likely due to expectation errors. Specifically, we expect overvalued (high P/V) SEOs to earn lower returns around future quarterly earnings announcements compared to undervalued (low P/V) SEOs. This is because of the irrationally high cash flow expectations for high P/V SEOs on the part of investors leading into the earnings announcement. When actual earnings are released, investors are negatively surprised leading to a decline in stock prices, on average, immediately following the earnings announcements.

Panel A of Table 9 reports average cumulative abnormal returns (CAR) with respect to the NYSE/Amex/Nasdaq value-weighted market index around quarterly earnings announcements over the next 6 quarters. Specifically, the table provides average returns over the next 6 quarters (Q1-Q6) and breaks up the results in to those over the next two quarters (Q1-Q2) and over quarters 3 to 6 (Q3-Q6). In order to ensure that the results are robust, the average returns are measured over two windows: from day -1 to +1 around the earnings announcement date, CAR (-1, +1), and day -2 to +2, CAR (-2, +2).

The results indicate that overvalued SEOs do earn lower returns than undervalued SEOs around earnings announcement days but only starting in quarter 3. We focus on the results based on CAR (-1, +1). Over the first two quarterly earnings announcements, high P/V SEOs do not underperform low P/V SEOs (the returns for low P/V, medium P/V, and high P/V SEOs are also not monotonic). Over the subsequent four quarterly earnings announcements, however, high P/V SEOs underperform low P/V SEOs, on average, by a statistically significant 0.64%. The results

indicate that it takes at least a couple of quarters for investor expectations to catch up with the fundamentals.

Next, we examine the relationship between P/V ratios and average CAR over the next six quarters in a multivariate setting:

$$\begin{aligned} \text{AvgCAR}_i = a + b \times \text{LnPV}_i + c \times \text{LnBM}_i + d \times \text{LnGrowth}_i + e \times \text{Accruals}_i + \\ f \times \text{LnSales}_i + g \times \text{EBITDA Margin}_i + u_i \end{aligned} \quad (6)$$

where AvgCAR is the average of CAR (-1, +1) over the next six quarters and the independent variables are as described in Sections 4 and 5. The regression is estimated as a pooled time-series-cross-sectional regression and the results are presented in Table 9. The results reveal a moderately significant negative relationship between P/V ratios and returns around future quarterly earnings announcement dates. The results also reveal a moderately significant negative relationship between accruals and AvgCAR. None of the other characteristics appear significantly related to AvgCAR even though growth is negatively related to AvgCAR as expected.

Overall, the results based on quarterly earnings announcements provide strong support for the underreaction hypothesis and indicate that it is unlikely that missing risk factors could be a sole explanation of our findings.

7. Operating performance

Finally, we examine the future operating performance of high, medium, and low P/V SEOs to rule out the possibility that the overvaluation of high P/V SEOs is due to a missing growth premium in our valuation methodology. We consider this unlikely because our valuation methodology also matches on growth. Nevertheless, if SEO firms are expected to sustain high growth rates in the long-run and our methodology does not capture the expected high growth rates, it is possible that a firm might appear overvalued even though it is not.

We focus on four measures of operating performance: growth in sales, EBITDA return on assets (EBITDA/Total Assets), After-tax return on assets (Net Income/Total Assets), and accruals. Growth in sales is a measure of growth opportunities, return on assets measures profitability, and accruals measures earnings quality. We present both raw and industry-adjusted measures of operating performance. To compute the industry adjusted measures, we first classify all COMPUSTAT-CRSP firms into 48 Fama-French industries and compute the median measure of the industry for the given calendar year. The industry-adjusted measure of the SEO firm is given by the difference between the SEO firm's measure and industry median.

Table 10 presents median operating performance measures for low, medium, and high P/V portfolios. The results are reported starting two years prior to the issue month and ending five years after the issue month. Year 0 represents fiscal year ending at least 3 months prior to the SEO issue month; Year -1 is the fiscal year prior to Year 0 and Year 1 is the fiscal year after Year 0. Panel A presents sales growth rates. Initially, in the first 2 years after the issue date, high P/V SEOs grow at a faster rate than low P/V SEOs. However, they are unable to sustain the initial high growth rates for long. By Year 5, the growth rate reverts to that of the median firm in the industry. On the other hand, as shown in Panels B and C, high P/V SEOs, consistently earn a lower return on assets than low P/V SEOs and also lower return on assets than the median firm in the industry especially in Year 4 and Year 5. Furthermore, in the first two years after the SEO, as shown in Panel D, the accruals of high P/V SEOs are higher than that of the low P/V SEOs. What this suggests is that the high P/V SEOs deliver high growth in the short-run at the cost of poorer earnings quality. In other words, they are not successful in converting their high growth rates to high cash flows which is what ultimately determines value. Overall, the results in Table 10 effectively rule out the argument that the estimated overvaluation of high P/V SEOs is due to a missing growth premium.

8. Conclusion

The results in this paper show that the market underreacts to SEO announcements. Overvalued SEOs experience a smaller decline in market value on the SEO announcement day but experience a larger decline over the next 5 years. This is inconsistent with Myers and Majluf (1984) which suggests higher quality firms (implying firms with higher growth opportunities and

positive NPV projects) should experience a smaller decline on the SEO announcement day. This is because for this to be the case, high P/V SEOs should not underperform in the long-run and also should exhibit superior operating performance. Our evidence showed that high P/V SEOs do underperform in the long-run and do not face superior operating performance. Overall, our results are consistent with a market in which investors overreact to past performance and underreact to the SEO announcement in determining the valuation of SEO firms.

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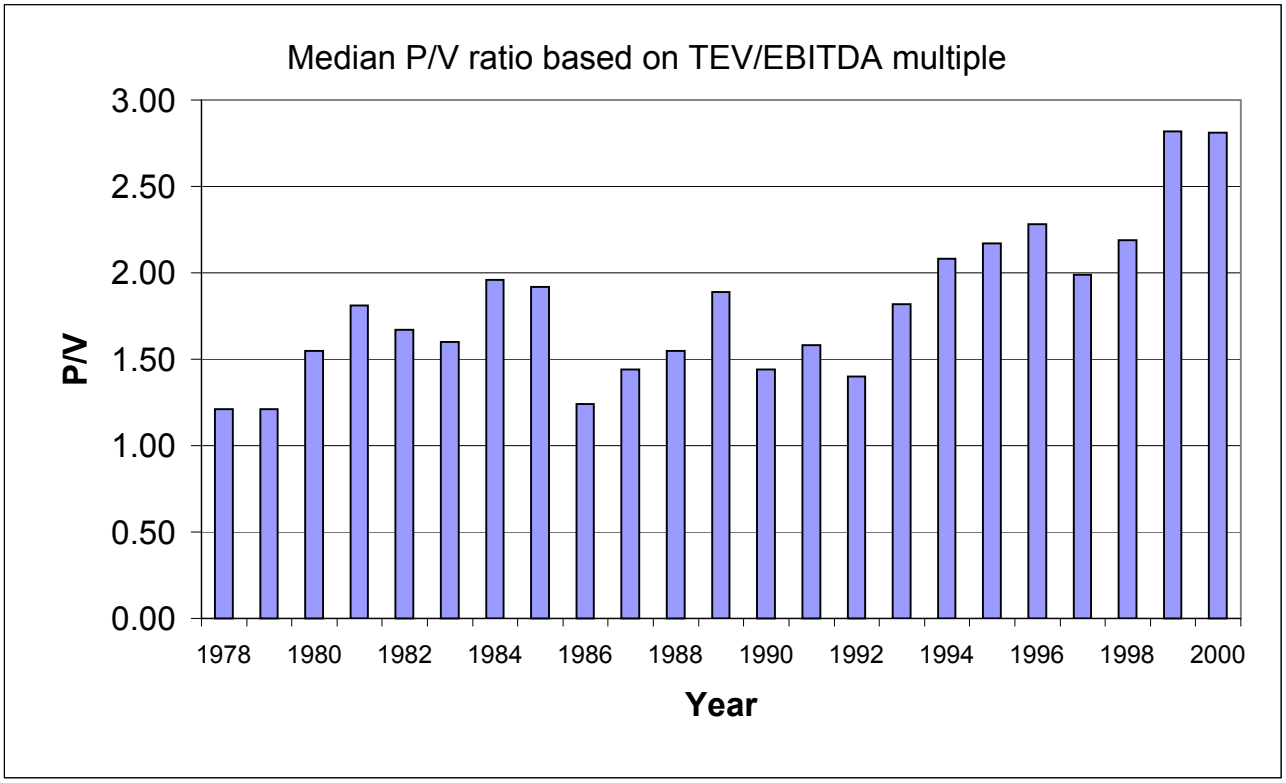

Figure 1: This figure plots relative P/V ratios based on TEV/EBITDA multiple from 1978 to 2000.

Table 1
Descriptive Statistics

This table presents the descriptive statistics for our sample of 1967 SEOs during 1978-2000. Market capitalization denotes the market value of firm's equity (shares outstanding x market price) as of the trading day just before the issuance of new equity. 'Shares Offered' represents the number of new shares issued in the SEO as a percentage of the pre-issue outstanding shares of the firm. SEO and matching firm characteristics provide key accounting information about the SEO and matching firm. Matching firm is a non-issuing firm in the same Fama-French industry group with similar sales, EBITDA (earnings before interest, taxes, depreciation and amortization) profit margins and sales growth rate. Sales, EBITDA and Net Profits come from COMPUSTAT data items 12, 13 and 18 respectively. These numbers are based on the most recent fiscal year as of the equity issuance date. Sales Growth is computed by taking the average year-by-year sales growth of the past three years.

Variable	**Mean**	**Median**
Offer Price ($)	23.09	19.25
Pre-issue Market Cap. (mn $)	648.98	139.38
Shares Offered	20.99%	17.11%
SEO Characteristics		
Sales (mn $)	529.71	82.11
EBITDA/Sales	16.27%	13.34%
Net Profits/Sales	4.95%	4.82%
Sales Growth Rate	61.29%	24.02%
Matching Firm Characteristics		
Sales (mn $)	720.64	102.62
EBITDA/Sales	15.98%	12.80%
Net Profits/Sales	5.86%	5.01%
Sales Growth Rate	27.21%	17.94%

Table 2
Yearly Distribution of P/V Ratios

This table reports the median offer price-to-value *(P/V)* ratios for SEOs from 1978 to 2000. In Panel A, the value is the fair value of the issuing firm based on market price-to-sales *(P/S),* price-to-EBITDA, price-to-earnings *(P/E),* and price-to-forward earnings *($(P/E)_{fwd}$)* ratio of an industry peer. In Panel B, the fair value is computed using total enterprise value-to-sales (TEV/S), TEV-to-EBITDA and TEV-to-forward EBITDA ratios. TEV is defined as the sum of the value of firm's equity, preferred equity, and debt minus the cash balances. Industry peer is a comparable publicly traded non-issuing firm in the same Fama and French (1997) industry as the SEO firm and has the closest sales, EBITDA profit margins (EBITDA/Sales) and sales growth in the most recent fiscal year. EBITDA is the sum of earnings before interest and taxes (EBIT) and depreciation and amortization (DA) and represents the operating cash-flows. Sales Growth is computed by taking the year-by-year average of last three years sales growth. In Panel A, *P/V* is the ratio of offer price-to-sales, offer price-to-EBITDA and offer price-to-Earnings (current and forward) of the SEO firms divided by the corresponding multiples of the comparable firm. The forward EPS represents the analyst's consensus estimate of the earnings per shares of the issuing company in the next fiscal year. The forward EBITDA is based on forward earnings and historical interest expenses and depreciation and amortization and is computed using a bottom-up approach. This information is obtained from the I\B\E\S. In Panel B, P/V ratio is computed as the ratio of issuing firm's market capitalization based on the offer-price to its value based on the TEV/Fundamental based multiple of industry peer. We provide the median *P/V* ratio for every year in our sample period along with the number of observations used in computing these ratios. The p-value represents the Wilcoxon rank sum test for median equal to 1. Pooled represents the aggregate sample of SEOs across the years.

Panel A

	P/Sales			P/EBITDA			P/E			$(P/E)_{fwd}$		
Year	**NOBS**	**Median**	**p-Value**	**NOBS**	**Median**	**p-Value**	**NOBS**	**Median**	**p-Value**	**NOBS**	**Median**	**p-Value**
1978	43	1.29	0.00	43	1.14	0.02	42	1.21	0.00	9	0.92	0.57
1979	40	1.13	0.09	40	1.08	0.12	39	1.14	0.03	11	1.01	0.46
1980	96	1.62	0.00	96	1.48	0.00	90	1.50	0.00	24	1.17	0.07
1981	81	2.08	0.00	81	1.79	0.00	78	1.78	0.00	29	1.04	0.34
1982	58	1.74	0.00	58	1.52	0.00	55	1.95	0.00	16	0.91	0.94
1983	192	1.41	0.00	192	1.38	0.00	171	1.45	0.00	71	0.91	0.90
1984	27	2.28	0.00	27	1.98	0.00	22	1.73	0.00	14	1.19	0.15
1985	58	2.07	0.00	58	1.86	0.00	58	1.66	0.00	20	0.98	0.96
1986	82	1.30	0.00	82	1.21	0.00	73	1.25	0.00	37	0.99	0.90
1987	54	1.23	0.01	54	1.24	0.00	42	1.24	0.01	27	0.86	0.85
1988	33	1.48	0.00	33	1.25	0.02	31	1.25	0.00	20	0.93	1.00
1989	57	1.97	0.00	57	2.05	0.00	49	1.56	0.00	35	1.06	0.21
1990	40	1.39	0.00	40	1.34	0.00	30	1.79	0.00	27	1.03	0.56
1991	115	1.46	0.00	115	1.29	0.00	96	1.59	0.00	75	1.18	0.00
1992	92	1.38	0.00	92	1.34	0.00	67	1.90	0.00	58	1.11	0.05
1993	128	1.63	0.00	128	1.65	0.00	100	1.67	0.00	77	1.31	0.00
1994	84	1.95	0.00	84	2.06	0.00	70	2.20	0.00	49	1.32	0.00
1995	136	2.06	0.00	136	2.12	0.00	113	2.13	0.00	88	1.11	0.00
1996	157	2.35	0.00	157	2.12	0.00	117	2.62	0.00	89	1.40	0.00
1997	140	1.94	0.00	140	1.92	0.00	105	2.07	0.00	89	1.15	0.00
1998	91	1.90	0.00	91	1.84	0.00	75	1.87	0.00	69	1.34	0.00
1999	82	2.75	0.00	82	2.62	0.00	53	2.96	0.00	57	1.39	0.00
2000	81	2.05	0.00	81	2.51	0.00	60	1.93	0.00	55	1.53	0.00
Pooled	1967	1.74	0.00	1967	1.67	0.00	1636	1.72	0.00	1046	1.15	0.00

Table 2 Continued..

Panel B

	TEV/Sales			TEV/EBITDA			$(TEV/EBITDA)_{fwd}$		
Year	**NOBS**	**Median**	**p-Value**	**NOBS**	**Median**	**p-Value**	**NOBS**	**Median**	**p-Value**
1978	41	1.41	0.00	43	1.21	0.00	9	0.84	0.20
1979	38	1.24	0.01	40	1.21	0.02	11	1.03	0.41
1980	93	1.60	0.00	96	1.55	0.00	24	1.15	0.00
1981	79	2.23	0.00	81	1.81	0.00	30	1.21	0.08
1982	57	1.57	0.00	58	1.67	0.00	17	1.10	0.17
1983	189	1.48	0.00	192	1.60	0.00	71	1.12	0.03
1984	26	1.97	0.00	27	1.96	0.00	14	1.60	0.02
1985	56	2.20	0.00	58	1.92	0.00	22	1.46	0.00
1986	81	1.34	0.00	82	1.24	0.00	38	0.86	0.99
1987	53	1.35	0.00	54	1.44	0.00	28	1.03	0.10
1988	33	1.66	0.00	33	1.55	0.00	20	1.22	0.04
1989	56	2.17	0.00	57	1.89	0.00	36	1.57	0.00
1990	39	1.37	0.00	40	1.44	0.00	29	1.49	0.00
1991	111	1.81	0.00	115	1.58	0.00	81	1.48	0.00
1992	90	1.47	0.00	92	1.40	0.00	61	1.27	0.00
1993	125	1.62	0.00	128	1.82	0.00	80	1.42	0.00
1994	82	1.92	0.00	84	2.08	0.00	51	1.86	0.00
1995	135	2.18	0.00	136	2.17	0.00	91	1.66	0.00
1996	153	2.42	0.00	157	2.28	0.00	97	1.67	0.00
1997	133	2.22	0.00	140	1.99	0.00	91	1.50	0.00
1998	90	2.23	0.00	91	2.19	0.00	69	1.58	0.00
1999	80	3.04	0.00	82	2.82	0.00	63	2.05	0.00
2000	79	2.32	0.00	81	2.81	0.00	58	1.87	0.00
Pooled	1919	1.87	0.00	1967	1.81	0.00	1091	1.44	0.00

Table 3
Median P/V Ratios for Alternative Matching Criteria

This table reports the median P/V ratio for pooled observations of SEOs based on the price and TEV (total enterprise value) based multiples of matching firms. We provide various measure of P/V ratios. They differ in terms of the way we select the non-issuing peer firms and the multiples of these firms used to compute the fair value of the SEOs. 'Sales x Margin' matching criterion selects a matching firm in the same industry (based on Fama-French (1997) groupings) with similar sales and EBITDA margin. 'Sales x Margin x Future Growth' selects a firm in the same industry that has similar sales, EBIDTA margin and growth expectations. Future Growth expectations represent the consensus analyst long term growth expectation in the earnings of the firm and are obtained from the I\B\E\S. Historical Growth measures the growth in sales of the firm over the last three (two/one if three year data is not available) fiscal years. 'Sales x Growth' criterion selects a firm in the same industry with similar sales and growth expectations without matching them on any profitability criteria. In panel A, valuation is based on market price based multiples of the matching firm. In Panel B, we use TEV based multiples. TEV is defined as the sum of the value of firms equity, preferred equity, and debt minus the cash balances. Sales, EBIDTA and EPS come from the most recent fiscal years of the issuing and peer firm. Forward EPS is the one year ahead earnings forecast of the issuing and peer firm based on consensus analyst estimates. Number of observations used in each estimation are provided in the brackets. All the median numbers are statistically different from 1 at p-values of 0.001.

Panel A: Based on Price Multiples				
Matching Criteria	**P/Sales**	**P/EBITDA**	**P/E**	**(P/E)fwd**
Sales x Margin	1.91	1.79	1.85	1.18
	[1900]	[1896]	[1582]	[934]
Sales x Margin x Future Growth	1.39	1.35	1.45	1.07
	[1254]	[1175]	[992]	[962]
Sales x Historical Growth	1.66	1.60	1.64	1.15
	[1943]	[1932]	[1598]	[1022]
Sales x Future Growth	1.46	1.44	1.62	1.11
	[1253]	[1217]	[1044]	[979]
Panel B: Based on Total Enterprise Value Multiples				
	TEV/Sales	**TEV/EBITDA**	**(TEV/EBITDA)fwd**	
Sales x Margin	1.95	1.85	1.84	
	[1779]	[1798]	[1431]	
Sales x Margin x Future Growth	1.47	1.44	1.53	
	[1199]	[1151]	[931]	
Sales x Historical Growth	1.69	1.70	1.33	
	[1833]	[1883]	[1049]	
Sales x Future Growth	1.63	1.55	1.62	
	[1221]	[1191]	[969]	

Table 4

SEO Valuation and Announcement day returns

This tables presents mean and median cumulative abnormal returns (CAR) around the SEO filing date/announcement date. We present CARs for two event windows: (a) a three-day window surrounding the filing date (-1,+1) and (b) a five-day window (-2,+2) surrounding the filing date. To compute the CARs, we subtract the return on value weighted market index from the return on the SEO firms for a give day and sum these market adjusted return over the event window. Number of observations used to compute these returns are given in the first column. We present these numbers for the portfolio of 'low' and 'high' PV groups as well as for the entire sample. The portfolios are formed as follows. At the beginning of each month, from 1980 to 2000, we construct a cross-sectional distribution of P/V ratios of firms that issued seasoned equity during the prior 24 months. SEOs whose P/V ratios are below the 40th percentile of this distribution are termed *Low P/V*, SEOs whose P/V ratios are above the 60th percentile are termed *High P/V* and the rest are termed *Medium P/V*. The table presents results for PV ratios based on the Enterprise Value/EBITDA multiple of a comparable firm in the same industry with similar sales, profit margin, and historical sales growth as the SEO firm. 'High PV – Low PV' group presents the difference between the high and low PV groups. All numbers in this table, including the differences across High and Low PV groups are significantly different from zero at a p-value of 0.05 or lower.

				Mean		Median	
	NOBS	Median PV	Prior Year Sales Growth	3-day CAR	5-day CAR	3-day CAR	5-day CAR
Low PV	614	0.83	16.19	-2.46%	-2.65%	-2.22%	-2.61%
Medium PV	321	1.88	18.62	-2.28%	-2.07%	-2.27%	-1.63%
High PV	626	4.42	22.24	-1.55%	-1.39%	-1.83%	-1.80%
High PV-Low PV				0.90%	1.26%	0.39%	0.81%
t-stat/Z-stat				2.55	3.13	2.12	2.84
All Firms	1561	1.89		-2.06%	-2.02%	-2.08%	-2.18%

Table 5

Cross-sectional Regression of Announcement Day Return on P/V ratios and other SEO characteristics

This table reports the results of the following cross-sectional regression:

$$R(AnnDay)_i = a + b \times LnPV_i + c \times LnBM_i + d \times LnGrowth_i + e \times Accruals_i + f \times LnSales_i + g \times EBITDA\ Margin_i + u_i$$

R(AnnDay) is the three-day CAR around the announcement date/filing date. Ln*PV* and Ln*BM* are natural logs of *P/V* ratio and book-to-market ratio, Ln*Growth* is the natural log of one plus analyst consensus growth forecast over the next five year or one year whichever is available or historical sales growth computed as the average year-by-year sales growth over the past three years, accruals is the ratio of accruals to total assets, and EBIDTA margin is the ratio of EBIDTA to sales. All accounting numbers used to compute the independent variables in the above regression come from the most recent fiscal year at the time of the SEO. Analyst growth forecast information is also based on the forecasts made at the time of issuance. In a few cases if the growth information is not available during the issuance month, we collect it from the next available month in a six month window surrounding the SEO date. The regression is estimated using (a) pooled time-series, cross-sectional approach and (b) Fama and MacBeth approach based on each annual cohort of SEOs from 1980 to 2000. For pooled regressions, the numbers in the parentheses are White (1987) heteroscedasticity corrected t-statistics. For the Fama and MacBeth approach, the numbers in the parentheses are simple t-statistics. The sample size with analyst growth forecast is smaller because not all SEOs are covered on I\B\E\S within a six-month window of the issuance of equity.

	Pooled			Fama-MacBeth		
	Without Growth	Analyst Growth	Historical Growth	Without Growth	Analyst Growth	Historical Growth
Panel A: Valuation based on SEO offer price						
Ln*PV*	0.47	0.67	0.46	0.63	0.59	0.61
	(3.09)	(3.70)	(3.07)	(3.60)	(2.26)	(3.56)
Ln*BM*	0.09	0.22	0.10	-0.35	-0.42	-0.36
	(0.36)	(0.79)	(0.42)	(-1.50)	(-1.31)	(-1.49)
Ln*Growth*		0.61	0.21		1.11	-0.03
		(1.27)	(0.59)		(0.86)	(-0.07)
Accruals	-1.00	-0.85	-1.12	-0.98	-1.99	-0.98
	(-0.81)	(-0.61)	(-0.91)	(-0.48)	(-0.86)	(-0.51)
Ln*Sales*	-0.08	0.11	-0.08	-0.05	0.18	-0.09
	(-0.79)	(0.94)	(-0.69)	(-0.58)	(1.61)	(-1.12)
EBITDA margin	-0.76	2.63	-0.79	-0.79	1.36	-0.50
	(-0.48)	(1.40)	(-0.50)	(-0.26)	(0.39)	(-0.16)
NOBS	1459	1026	1459	1459	1026	1459
Panel B: Valuation based on SEO market value day before filing date						
Ln*PV*	0.32	0.53	0.32	0.49	0.60	0.47
	(2.25)	(3.21)	(2.22)	(3.93)	(4.29)	(3.84)
Ln*BM*	0.32	0.41	0.35	-0.08	-0.07	-0.03
	(1.31)	(1.48)	(1.44)	(-0.32)	(-0.25)	(-0.15)
Ln*Growth*		0.61	0.46		1.44	0.31
		(1.27)	(1.26)		(1.00)	(0.79)
Accruals	-0.78	-0.71	-1.03	-0.82	-2.40	-0.96
	(-0.63)	(-0.51)	(-0.84)	(-0.46)	(-1.16)	(-0.57)
Ln*Sales*	-0.13	0.04	-0.12	-0.09	0.01	-0.13
	(-1.26)	(0.36)	(-1.05)	(-0.96)	(0.06)	(-1.56)
EBITDA margin	-0.87	2.44	-0.93	-1.14	0.88	-0.87
	(-0.57)	(1.31)	(-0.61)	(-0.44)	(0.25)	(-0.32)
NOBS	1459	1026	1459	1459	1026	1459

Table 6

P/V Portfolios and Long Run Buy and Hold Returns

This table presents the mean buy-and-hold returns of low and high P/V portfolios of SEOs over 5 year holding periods. Starting with January, 1980, SEOs are allocated to Low, Medium and High portfolios based on the distribution of P/V ratios in the past 24 months as described in Table 4. Market-adjusted returns are computed by subtracting the value weighted NYSE/NASDAQ/AMEX market returns from the raw returns of the SEO firms for the corresponding holding periods. 'High P/V – Low P/V' portfolio represents a hedged portfolio that is long in high P/V SEOs and short in low P/V SEOs. We also report the two-sample t-test statistics for the test of no difference in the returns of high and low P/V firms. These t-stats are corrected for the heteroscedasticity in the returns. Returns are computed from the SEO issue date till the 5th year anniversary or the delisting date, whichever is earlier.

Mean BHAR						
Portfolio	NOBS	Median P/V	Raw	Market Adjusted	Size Adjusted	Size, Bm Adjusted
Low *P/V*	733	0.82	74.95%	-2.10%	-5.50%	11.63%
Medium *P/V*	382	1.81	51.09%	-31.36%	-30.68%	-20.96%
High *P/V*	769	4.24	36.71%	-42.27%	-49.26%	-15.75%
High *P/V* - Low *P/V*			-38.24%	-40.17%	-43.75%	-27.38%
t-stat			(-2.36)	(-2.49)	(-2.12)	(-1.25)
All SEO firms	1884	1.85	54.50%	-24.43%	-28.47%	-6.11%
Mean LBHAR						
Portfolio	NOBS	Median P/V	Raw	Market Adjusted	Size Adjusted	Size, Bm Adjusted
Low *P/V*	733	0.82	-3.38%	-55.36%	-2.28%	4.75%
Medium *P/V*	382	1.81	-15.26%	-70.65%	-19.66%	-5.50%
High *P/V*	769	4.24	-38.14%	-90.89%	-37.87%	-11.27%
High *P/V* - Low *P/V*			-34.76%	-35.53%	-35.59%	-16.02%
t-stat			(-5.27)	(-5.45)	(-3.84)	(-1.83)
All SEO firms	1884	1.85	-19.98%	-72.96%	-20.33%	-3.84%

Table 7
Cross Sectional Distribution of P/V ratios and Long Run Abnormal Returns

This table reports the results of the following cross-sectional regression:

$$R^* = a + b \times \ln PV + c \times \ln BM + d \times \ln Growth + e \times \text{accruals} + f \times \ln Sales + g \times \text{EBITDA margin} + u$$

R* is the long-run risk-adjusted return computed as follows. We regress each SEO's monthly excess return (return in excess of one-month Treasury bills) starting from the month after the issuance of equity and ending five years after the issuance on Fama and French factors (Mkt, SMB and HML) for the same period. The risk-adjusted return R* is the intercept from this regression. ln*PV* and ln*BM* are natural logs of *P/V* ratio and book-to-market ratio, ln*Growth* is the natural log of one plus analyst consensus growth forecast over the next five year or one year whichever is available, accruals is the ratio of accruals to total assets, and EBITDA margin is the ratio of EBITDA to sales. All accounting numbers used to compute the independent variables in the above regression come from the most recent fiscal year at the time of the SEO. Analyst growth forecast information are also based on the forecasts made at the time of issuance. In a few cases if the growth information is not available during the issuance month, we collect it from the next available month in a six month window surrounding the SEO date. The regression is estimated using (a) pooled time-series, cross-sectional approach and (b) Fama and MacBeth approach based on each annual cohort of SEOs from 1980 to 2000. For pooled regressions, the numbers in the parentheses are White (1987) heteroscedasticity corrected t-statistics. For the Fama and MacBeth approach, the numbers in the parentheses are t-statistics computed with Hansen and Hodrick (1980) nd Newey and West (1987) autocorrelation correction with four lags. The aggregate sample size without growth is 1756 and for those with growth is 1156. The sample size with growth is smaller because not all SEOs are covered on I\B\E\S within a six-month window of the issuance of equity.

Dependent Variable: 5-year Monthly Mean Risk-Adjusted Returns						
Independent	Pooled			Fama-MacBeth		
	Without Growth	Analyst Growth	Historical Growth	Without Growth	Analyst Growth	Historical Growth
ln*PV*	-0.17	-0.21	-0.17	-0.19	-0.39	-0.17
	(-2.73)	(-2.45)	(-2.70)	(-2.83)	(-2.26)	(-3.04)
ln*BM*	-0.05	-0.09	-0.08	-0.15	-0.40	-0.25
	(-0.54)	(-0.75)	(-0.85)	(-1.62)	(-2.90)	(-3.03)
ln*Growth*		-0.18	-0.34		-1.59	-0.60
		(-0.45)	(-1.72)		(-2.24)	(-2.28)
Accruals	-2.03	-2.25	-1.86	-2.51	-2.35	-2.26
	(-4.31)	(-3.67)	(-3.89)	(-4.42)	(-2.93)	(-4.33)
ln*Sales*	0.16	0.15	0.15	0.10	0.04	0.10
	(4.27)	(2.94)	(3.94)	(1.13)	(0.53)	(0.93)
EBITDA margin	0.33	0.22	0.39	1.31	-0.77	1.29
	(0.59)	(0.29)	(0.70)	(1.54)	(-0.56)	(1.62)
NOBS	1756	1156	1756	1756	1156	1756

Table 8
P/V Portfolios and Multifactor Regressions

This table reports the results of three-factor and four-factor regressions involving equal-weighted and value-weighted monthly calendar time returns of low, high and high – low P/V SEO portfolios. The SEOs are allocated to high or low P/V portfolio in the first month after the issuance of equity. The SEOs stay in their portfolio for 60 months or delisting date whichever is earlier. The regression model is given below:

$$R_{pt} - r_{ft} = a_p + b_p(R_{mt}-r_{ft}) + s_p SMB_t + h_p HML_t + u_t$$
$$R_{pt} - r_{ft} = a_p + b_p(R_{mt}-r_{ft}) + s_p SMB_t + h_p HML_t + m_p MOM_t + u_t$$

R_{pt} is the monthly portfolio returns, r_{ft} is the one-month Treasury-bill return, (R_{mt}-r_{ft}) is the excess return on NYSE/NASDAQ/AMEX value-weighted index, SMB is the return on small firms minus the return on large firms in month t, HML is the return on high book-to-market stocks minus low book-to-market stocks in month t and MOM_t is the monthly return on 12-month price momentum winner minus loser. a_p is the monthly risk-adjusted return in percentage and b_p, s_p and h_p are the factor loadings.

Panel A: 3-factor model					
Equal Weighted Returns					
Portfolio	a	b	s	h	Adj RSq.
Low PV	-0.10	1.17	0.79	0.24	87.91%
	(-0.72)	(33.50)	(18.13)	(4.65)	
High PV	-0.35	1.13	0.78	0.21	84.07%
	(-2.21)	(28.09)	(15.77)	(3.54)	
Low-High	0.25	0.05	0.01	0.03	0.62%
	(1.77)	(1.27)	(0.05)	(0.58)	
All	-0.28	1.23	0.87	0.16	90.15%
	(-2.04)	(36.05)	(20.65)	(3.15)	
Value Weighted Returns: Weighted by Beginning of Year MCAP					
Portfolio	a	b	s	h	Adj RSq.
Low PV	0.05	1.19	0.43	-0.14	78.86%
	(0.25)	(23.69)	(6.92)	(-1.82)	
High PV	-0.52	1.18	0.23	0.40	67.36%
	(-2.43)	(21.72)	(3.48)	(5.00)	
Low-High	0.57	0.02	0.20	-0.54	18.36%
	(2.00)	(0.21)	(2.21)	(-5.03)	
All	-0.29	1.18	0.32	-0.05	87.58%
	(-2.17)	(34.37)	(7.43)	(-1.04)	

Table 8 continued..

Panel B: 4-factor model						
Equal Weighted Returns						
Portfolio	a	b	s	h	m	Adj RSq.
Low PV	0.10	1.14	0.81	0.20	-0.21	90.05%
	(0.77)	(35.33)	(20.47)	(4.30)	(-7.54)	
High PV	-0.18	1.10	0.80	0.18	-0.18	85.69%
	(-1.15)	(28.45)	(17.00)	(3.12)	(-5.52)	
Low-High	0.28	0.04	0.01	0.03	-0.03	0.88%
	(1.90)	(1.13)	(0.11)	(0.49)	(-0.82)	
All	-0.03	1.19	0.90	0.11	-0.26	93.00%
	(-0.25)	(40.68)	(25.18)	(2.62)	(-10.34)	
Value Weighted Returns: Weighted by Beginning of Year MCAP						
Portfolio	a	b	s	h		R2
Low PV	0.21	1.16	0.45	-0.16	-0.16	79.93%
	(1.04)	(23.44)	(7.36)	(-2.26)	(-3.85)	
High PV	-0.47	1.17	0.24	0.39	-0.05	67.40%
	(-2.14)	(21.30)	(3.56)	(4.85)	(-1.15)	
Low-High	0.68	0.00	0.21	-0.56	-0.11	19.02%
	(2.33)	(-0.06)	(2.34)	(-5.21)	(-1.77)	
All	-0.15	1.15	0.33	-0.08	-0.15	88.80%
	(-1.13)	(34.93)	(8.20)	(-1.67)	(-5.41)	

Table 9

SEO valuation and return predictability around future quarterly earnings announcements

Panel A presents average cumulative abnormal returns (CAR) with respect to the CRSP NYSE/Amex/Nasdaq value-weighted index. CAR is measured over two windows around the quarterly earnings announcement date: day -2 to +2 and day -1 to +1. Q1-Q2 represents first two quarters after the SEO issue date, Q1-Q6 represents the first 6 quarters, and Q3-Q6 represents quarters 3 to 6. Panel B presents results from the following cross-sectional regression:

$$\text{AvgCAR} = a + b \times \ln PV + c \times \ln BM + d \times \ln Growth + e \times \text{accruals} + f \times \ln Sales + g \times \text{EBIDTA margin} + u$$

AvgCAR is the mean CAR (-1, +1) over the next six quarters. ln*PV* and ln*BM* are natural logs of *P/V* ratio and book-to-market ratio, ln*Growth* is the natural log of one plus analyst consensus growth forecast over the next five year or one year whichever is available, accruals is the ratio of accruals to total assets, and EBIDTA margin is the ratio of EBIDTA to sales. All accounting numbers used to compute the independent variables in the above regression come from the most recent fiscal year at the time of the SEO. Analyst growth forecast information are also based on the forecasts made at the time of issuance. In a few cases if the growth information is not available during the issuance month, we collect it from the next available month in a six month window surrounding the SEO date. The regression is estimated using pooled time-series, cross-sectional approach. The numbers in the parentheses are White (1987) heteroscedasticity corrected t-statistics. The aggregate sample size without growth is 1687 and for those with growth is 1146. The sample size with growth is smaller because not all SEOs are covered on I\B\E\S within a six-month window of the issuance of equity.

Panel A: Returns around quarterly earnings announcements (in %)

		CAR (-2,+2)			CAR (-1,+1)		
	N	Q1-Q6	Q1-Q2	Q3-Q6	Q1-Q6	Q1-Q2	Q3-Q6
Low *P/V*	640	0.31	0.46	0.23	0.30	0.65	0.15
Medium *P/V*	349	0.23	1.33	-0.25	0.04	0.84	-0.29
High *P/V*	698	-0.08	0.61	-0.41	-0.12	0.66	-0.49
High *P/V* - Low *P/V*		-0.40	0.15	-0.64	-0.41	0.01	-0.64
t-stat		(-1.54)	(0.37)	(-2.03)	(-1.85)	(0.02)	(-2.32)
All SEO firms		0.13%	0.70%	-0.13%	0.07%	0.69%	-0.21%

Panel B: Cross-sectional regressions of mean CAR over the next 6 quarters on SEO characteristics

Independent	**Pooled**		
	Without Growth	**Analyst Growth**	**Historical Growth**
ln*PV*	-0.19	-0.23	-0.19
	(-2.01)	(-1.89)	(-1.99)
ln*BM*	-0.14	-0.18	-0.16
	(-0.95)	(-0.99)	(-1.07)
ln*Growth*		-0.05	-0.22
		(-0.12)	(-0.83)
Accruals	-1.62	-1.06	-1.49
	(-2.08)	(-1.13)	(-1.85)
ln*Sales*	0.14	0.09	0.13
	(2.22)	(1.05)	(2.11)
EBIDTA margins	0.80	1.67	0.84
	(1.00)	(1.59)	(1.05)
NOBS	1687	1146	1687

Table 10

SEO Valuation and Operating performance

This table presents median raw and industry adjusted operating performance statistics for low, medium, and high P/V SEO portfolios. Year 0 represents the fiscal year ending at least 3 months prior to the SEO issue month. Year 1 is the next fiscal year and Year -1 is the fiscal year prior to Year 0. Sales growth represents annual growth in sales (based on COMPUSTAT data item 12). EBITDA return on assets is the ratio of EBITDA to total assets (item 13 divided by 6), After-tax return on assets is the ratio of net income to total assets (item 18 divided by 6), and Accrual is a measure of earnings quality that captures the difference between earnings and cash flows. The Accrual/TA variable is the ratio of accruals to total assets. This variable is constructed from the statement of cash flows for fiscal years after 1987 and from the balance sheet data for the earlier period. Using the cash flow statement, we construct accrual variable as Income Before Extraordinary Items (item 123) minus Cash Flows from Operations (item 308 minus item 124). For the earlier period, we construct the accrual variable as Change in Current Assets (Δ4) minus Change in Cash (Δ1) minus Change in Current Liabilities (Δ5) plus Change in Debt included in Current Liabilities (Δ34) plus Change in Income Tax Payable (Δ71) minus Depreciation & Amortization (14). Industry-adjusted numbers are computed relative to the industry median where the industry is defined based on Fama and French (1997) 48 industry groups. WMV stands for Wilcoxon-Mann-Whitney test for difference in medians.

Portfolio	Raw - unadjusted							Industry adjusted						
	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Panel A: Sales Growth														
Low P/V	12.06	16.19	20.42	13.53	9.06	7.21	7.14	5.90	9.82	12.92	7.15	2.05	-0.07	0.26
Medium P/V	10.18	18.62	23.36	15.32	8.56	6.74	3.81	6.96	11.38	17.70	12.26	4.06	0.14	-1.86
High P/V	14.38	22.24	33.48	20.60	11.00	7.87	7.00	6.95	15.81	26.98	17.40	7.05	2.94	1.17
Low P/V - high P/V	-2.32	-6.05	-13.06	-7.07	-1.94	-0.66	0.14	-1.05	-5.99	-14.06	-10.25	-5.00	-3.01	-0.91
WMW p-values	0.43	0.00	0.00	0.00	0.05	0.06	0.28	0.43	0.00	0.00	0.00	0.02	0.07	0.59
Panel B: EBITDA return on assets														
Low P/V	17.21	18.64	17.75	16.08	14.96	14.31	14.16	4.24	5.58	5.18	3.21	1.63	0.66	1.07
Medium P/V	17.00	18.23	17.91	15.88	14.78	12.84	12.08	4.10	5.83	5.06	2.99	1.12	-0.18	-1.14
High P/V	14.79	16.91	17.42	14.94	13.17	12.74	13.17	1.80	3.66	4.56	1.62	-0.33	-0.59	-0.76
Low P/V - high P/V	2.42	1.73	0.33	1.14	1.79	1.57	0.99	2.44	1.92	0.62	1.59	1.96	1.25	1.83
WMW p-values	0.00	0.00	0.06	0.00	0.00	0.01	0.03	0.00	0.00	0.02	0.00	0.00	0.01	0.01
Panel C: After-tax return on Assets														
Low P/V	5.63	6.31	6.73	5.95	4.77	4.17	4.15	1.55	2.39	2.61	1.74	0.63	-0.33	0.07
Medium P/V	6.53	7.33	7.43	6.30	4.69	4.20	3.13	2.65	3.41	3.61	2.18	0.76	0.09	-0.85
High P/V	5.47	6.58	7.88	5.66	4.57	3.67	3.69	1.50	2.52	3.61	1.55	0.40	-0.57	-0.76
Low P/V - high P/V	0.16	-0.27	-1.15	0.29	0.20	0.50	0.46	0.05	-0.13	-1.00	0.19	0.23	0.24	0.83
WMW p-values	0.66	0.41	0.00	0.70	0.25	0.55	0.27	0.20	0.98	0.01	0.46	0.20	0.45	0.10
Panel D: Accrual/TA														
Low P/V	-2.99	-2.48	-1.18	-1.80	-3.52	-4.23	-3.93	0.69	1.21	2.39	1.84	0.02	0.00	-0.57
Medium P/V	-1.93	-1.25	0.98	-0.61	-2.23	-3.25	-4.49	1.90	1.95	4.72	2.51	1.04	-0.15	-1.03
High P/V	-1.43	0.55	1.60	-0.40	-3.04	-2.90	-3.71	1.82	3.23	4.85	2.51	0.15	-0.19	-0.79
Low P/V - high P/V	-1.56	-3.03	-2.78	-1.40	-0.48	-1.33	-0.22	-1.13	-2.02	-2.46	-0.67	-0.13	0.19	0.22
WMW p-values	0.06	0.00	0.00	0.12	0.28	0.21	0.86	0.36	0.00	0.00	0.47	0.95	0.96	0.35