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# Seasoned equity offerings, market timing, and the corporate lifecycle ☆

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ABSTRACT

Both a firm's market-timing opportunities and its corporate lifecycle stage exert statistically and economically significant influences on the probability that it conducts a seasoned equity offering (SEO), with the lifecycle effect empirically stronger. Neither effect adequately explains SEO decisions because a near-majority of issuers are not growth firms and the vast majority of firms with high M/B ratios and high recent and poor future stock returns fail to issue stock. Since without the offer proceeds 62.6% of issuers would run out of cash (81.1% would have subnormal cash balances) the year after the SEO, a near-term cash need is the primary SEO motive, with market-timing opportunities and lifecycle stage exerting only ancillary influences.



## 1. Introduction

Firms that conduct seasoned equity offerings (SEOs) typically have high share valuations that increase markedly before the SEO (Asquith and Mullins, 1986; Masulis and Korwar, 1986). These signature regularities are inconsistent with the two theories of financial policy that dominate the post-Modigliani and Miller literature: Myers and Majluf's (1984) pecking-order theory and the many variants of tax and leverage cost trade-off models. Trade-off theories are empirically problematic because they predict that firms will lever up after large share price increases rather than conduct SEOs, since raising equity amplifies rather than offsets the deleveraging that just occurred exogenously. The pecking-order theory is problematic because it predicts that firms do not sell stock when they have untapped debt capacity, yet SEOs typically follow share price run-ups, which imply increased future cash flows that could be used to support additional debt. Given the shortcomings of the trade-off and pecking-order theories, market timing has become the most prominent theoretical explanation for SEOs, with its intuitive and plausible view that managers attempt to sell highly priced shares when stock market conditions permit (Loughran and Ritter, 1995, 1997; Baker and Wurgler, 2002).

Although market timing appears to have a statistically significant influence on the decision to conduct an SEO, the literature contains no evidence on its economic significance, and the purpose of this paper is to fill that gap. We assess the explanatory power of market timing, both as a stand-alone theory of equity issuance and in comparison with a simple theory that explains why firms

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with high valuations issue stock on the basis of economic fundamentals. Specifically, we assess the explanatory power of market timing relative to that of a simple lifecycle theory that predicts young firms with high market-to-book (M/B) ratios and low operating cash flows sell stock to fund investment, whereas mature firms with low M/Bs pay dividends and fund investment internally. In this view, growth-stage issuers dominate the SEO market, and pre-SEO stock price run ups reflect an increase in the value of growth options, with an associated need for capital to exercise them as posited, e.g., by Carlson, Fisher, and Giammarino (2006), who also argue that such exercise explains post-SEO negative abnormal returns.

The evidence in this paper indicates that both market-timing opportunities and stage of corporate lifecycle have statistically material influences on the decision to conduct an SEO, but the lifecycle effect is quantitatively stronger and, individually and collectively, the explanatory power of the two effects is modest. Contrary to Kim and Weisbach (2008), we also find that cash stockpiling of SEO proceeds is the exception and not the rule, as most issuers would have run out of cash by the year after the SEO had they not received the offer proceeds, and an overwhelming majority would have had below normal cash balances without those proceeds. Our finding that most issuers are operating on a tight financial leash also runs counter to Loughran and Ritter's (1997, p. 1848) market-timing prediction that, "when a firm is substantially overvalued it is likely to issue equity, taking advantage of the opportune time to augment what Myers refers to as financial slack." We conclude that the primary reason that firms conduct SEOs is to meet a near-term need for cash, while the opportunity to sell shares at a high price and lifecycle stage are each secondary considerations.

Our logit regressions assess the decision to conduct an SEO using the number of years listed as a proxy for a firm's lifecycle stage, and its market-to-book ratio and recent and future abnormal stock returns—the measures employed by Loughran and Ritter (1995, 1997) and Baker and Wurgler (2002)—as proxies for market-timing opportunities. The probability that a firm conducts an SEO in a given year is (i) positively related to its M/B ratio and prior three-year abnormal stock return and (ii) negatively related to its future three-year abnormal return and to its years listed. While radical improvements in market-timing opportunities increase the (absolute) SEO probability by only 1% or 2%, the relative increase is 176% when we compare a firm with timing opportunities that are poor in all dimensions to one whose timing opportunities are excellent in all dimensions. Holding timing opportunities constant, the SEO probability for a firm listed for one year is 9%, which exceeds by 260% the 2.5% SEO probability for a firm listed at least 20 years. Finally, the SEO probability for a firm listed for one year with poor timing opportunities exceeds by 71% the probability for a firm listed at least 20 years with excellent timing opportunities (6.5% versus 3.8%), indicating that lifecycle stage differences have an economically larger impact on SEO probabilities than do differences in timing opportunities.

Our SEO probability estimates address an important shortcoming of stock return studies, e.g., Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995), whose findings are often interpreted as indicating that market timing is a first-order determinant of the SEO decision. These studies document that the typical issuer exhibits quintessential market-timer characteristics, i.e., pre-issue average stock returns that are indisputably large and post-issue average returns that are negative, albeit less dramatically and reliably so than the pre-issue stock price run-up. The fact that the typical issuer's stock returns differ from those of the average industrial firm—which in an efficient stock market has no market-timing opportunities—does not necessarily indicate that market timing is an important determinant of the decision to sell stock because this approach fails to consider whether many or few firms with market-timer characteristics choose to sell stock. We address this problem by studying the issuance or nonissuance decisions of all industrial firms to gauge the extent to which firms with market-timing opportunities take advantage of those opportunities.

These tests show that, although market-timing and lifecycle effects are statistically and economically significant in relative terms, neither provides a stand-alone theory of stock issuance, and the two taken together do not explain all empirically important features of observed SEO decisions. The problem for the market-timing explanation is that, paraphrasing Sherlock Holmes, many "dogs don't bark" at times when, according to theory, they should be barking. Specifically, while issuers tend to have high M/Bs, high pre-offer abnormal returns, and low post-offer abnormal returns, many firms share these same characteristics, yet fail to sell stock. Our finding that the preponderance of firms with market-timer characteristics do not take advantage of an open financing window that is about to close is incompatible with the view that market timing drives the decision to sell stock, as posited by Loughran and Ritter (1995) and with the mispricing version of Baker and Wurgler's (2002) timing theory. Overall, our evidence is consistent with the asymmetric information/efficient markets version of Baker and Wurgler's theory, in which firms with an existing need for capital time the market.[1] The lifecycle explanation is problematic because too many "old dogs" do in fact bark. For example, 41.4% of issuances and 52.5% of SEO proceeds come from current and former dividend payers, firms that are clearly beyond the growth phase of their lifecycles.

Most issuers do not stockpile the SEO proceeds but instead face soon-to-be-tight internal resource constraints when they sell stock, a finding that is consistent

[1] Baker and Wurgler (2002) report nonstock returns-based evidence in favor of market timing using data for both issuers and nonissuers, and these results are not subject to our criticism that SEO stock returns fail to consider whether many or few nonissuers forego attractive timing opportunities. Their nonstock return evidence does not distinguish between the mispricing and asymmetric information/efficient markets versions of their theory, but Baker and Wurgler do consider stock returns evidence and conclude that "the evidence that distinctly supports the mispricing version comes from the low long-run stock returns following equity issues and the high long-run returns following repurchases." (Baker and Wurgler, 2002, p. 28).

with the view that the primary motive for SEOs is a near-term cash need, and not the chance to sell stock at a high price. In gauging the tightness of resource constraints, we do not employ the financing deficit, used e.g. by Frank and Goyal (2003), because it measures the amount of external capital the firm actually chose to raise. Instead, we determine the amount of outside capital a firm requires by calculating its post-SEO cash position without the SEO proceeds, maintaining all other decisions as taken. Without the SEO proceeds, 62.6% of sample issuers would run out of cash the year after the SEO, and 81.1% would have subnormal cash balances. Most issuers increase their capital expenditures after the SEO, but even had capital expenditures remained flat in the year of and the year after the SEO, without the SEO proceeds 40.3% of issuers would still run out of cash and 59.6% would have subnormal cash balances in the year after the SEO. Furthermore, mature issuers have low pre-SEO Altman *Z*-scores, an observation that reinforces the interpretation that these firms raise equity to meet immediate obligations rather than to stockpile cash.

In contrast, Kim and Weisbach (2008, p. 283) report that firms save a substantial fraction of the cash raised in SEOs and indicate that "this high savings rate could reflect firms issuing equity when their stock price is high, even if the capital raised in the offering is not required for financing investments." Specifically, Kim and Weisbach estimate that each dollar of capital raised in an SEO is associated with a 42¢ higher cash balance in the year after the SEO. Consistent with their evidence, our sample issuers also typically hold a higher dollar amount of cash after the offer. This increase, however, is fully explained by their substantial asset growth and the fact that larger firms normally require more cash to operate (see Opler, Pinkowitz, Stulz, and Williamson, 1999). After adjusting for the normal increase in cash due to asset growth, we find that, for each dollar raised in the SEO, the median issuer retains just six-tenths of 1¢ in the year after the SEO; i.e., 99.4% of the abnormal cash balances attributable to the SEO is spent by the year after the SEO. We do find evidence of stockpiling of offer proceeds for about 10% of issuers, thus we conclude that cash stockpiling is the exception but not the rule for firms that conduct SEOs.

Blanchard, Rhee, and Summers (1993) and Baker, Stein, and Wurgler (2003) advance a market timing scenario that does not require stockpiling of SEO proceeds. They argue that managers sometimes exploit an open financing window to raise cash, which they quickly spend on investments that they otherwise would not make. Our finding that most issuers would have a near-term cash need even had managers not increased capital expenditures indicates that this alternative timing scenario does not underlie most SEO activity, although it may be descriptive of a subset of SEOs. Also problematic for this alternative timing explanation is our finding that mature issuers tend to have low pre-SEO Altman *Z*-scores, since these low scores indicate a cash need that pre-dates the stock sale. Finally, our finding that the vast majority of firms with timing opportunities fail to take advantage of them is also inconsistent with a market-timing explanation in which managers tap the equity markets simply because valuations are high and then spend the proceeds quickly on otherwise unattractive investment projects.

The paper proceeds as follows. Section 2 delineates our sampling procedure and presents descriptive statistics for the cross-sectional distribution of SEO proceeds, issuer market-to-book ratios, recent and future stock returns, the number of years listed, and dividend payment history. As background, and to provide a general intuitive sense of the multivariate logit test results in Section 3, Section 2 also provides univariate analyses that relate issuer characteristics to the estimated probability that a firm conducts an SEO. Section 3 presents the logit analyses that yield our main inferences regarding the impact of market timing and years listed on SEO probabilities. Section 4 documents issuers' cash balances in the years immediately surrounding SEOs and shows that, without the offer proceeds, most issuers would run out of cash and a large majority would have below normal cash balances. Section 5 shows that many issuers have Altman *Z*-scores indicative of financial trouble and presents evidence that any SEO-related leverage rebalancing effect is small at best and is not a sample-wide phenomenon. Section 6 summarizes our main findings and their implications.

## 2. SEO proceeds, issuer characteristics, and estimated issuance probabilities

We analyze SEOs conducted by industrial firms, which we define for each year 1973–2001 as those firms on Compustat and in the file maintained by the Center for Research in Security Prices (CRSP) that (1) have four-digit SIC codes outside the intervals 4900–4949 (utilities) and 6000–6999 (financial companies), (2) are listed on the NYSE, Nasdaq, or Amex, (3) have securities with CRSP share codes 10 or 11 (ordinary common shares), (4) are incorporated in the U.S. according to Compustat, and (5) have nonmissing values on Compustat for dividends and earnings before extraordinary items. We study 4,291 SEOs from Loughran and Ritter's (1995) database (as updated by the authors) conducted during 1973–2001 by firms that satisfy conditions (1) through (5) in the fiscal year prior to the SEO. We impose other data availability conditions as necessary (e.g., nonmissing data on CRSP and Compustat) and so our main findings are based on samples with fewer than 4,291 SEOs.[2] In the few cases of issuers with multiple SEOs in a given year, we aggregate the issue proceeds for that year and treat the total as a single observation. Our sample contains only SEOs in which the firm received cash, i.e., pure secondary offerings are excluded while pure primary and combinations of primary and secondary offerings are included. Here and throughout the paper, SEO proceeds refer to cash raised by the firm and not by stockholders who simultaneously sell shares.

[2] The SEO probabilities in Panel A of Table 2 are based on 4,291 SEOs, whereas the number of SEOs with complete data in Table 3's full sample logits ranges from 3,581 (Rows A–D) to 2,977 (Rows F and G), where the lower figure reflects the fact that the sample is based on 1982–2001 to obtain meaningful measures of the number of years listed.

### 2.1. The size distribution of SEO proceeds

Our SEO sample exhibits significant heterogeneity in size, lifecycle stage, and various other financial characteristics. Table 1 shows material variation across SEOs in the amount of cash raised, and documents the prominent role of current and former dividend payers within our sample. (We report data on dividends here because some of our analysis uses a firm's dividend-payment history as an indicator of whether the firm has passed the growth stage of its lifecycle.) SEOs with the largest 10% of cash proceeds (decile 10) account for 48.6% of the total proceeds from all offerings, while the largest 20% and 30% of offers respectively account for 64.2% and 74.5% of total proceeds. Remarkably, although the lowest eight cash proceeds deciles together contain 80% of SEOs by number, their total proceeds are substantially less than those of the top decile alone (35.8% versus 48.6%). SEOs in the top decile raise an average of $414.6 million for total proceeds of $177.9 billion, both of which are 55 times the average $7.5 million and total $3.2 billion for the bottom decile. Current and former dividend payers account for 56.2% of SEOs in the top decile and 41.4% of all SEOs, contrary to the view that SEOs are mainly the province of young growth firms.

In short, a large number of SEOs raise a small amount of cash and a modest number of SEOs raise a large amount of cash, findings that reflect attributes of the population of publicly held firms. Fama and French (2006) find that the NYSE-Amex-Nasdaq universe contains many tiny to moderate-size firms and a modest number of large firms, with about 60% of stocks accounting for only 3% of total market capitalization. Fama and French (2001, 2004) document that the industrial population contains a large number of publicly traded growth firms, which tend to be small, have higher M/Bs and lower profitability than mature firms, and pay no dividends. DeAngelo, DeAngelo, and Skinner (2004, 2008) find that a small set of firms generates the bulk of earnings and dividends by publicly held industrials, while many firms report only modest earnings and pay few or no dividends. In sum, the universe of potential equity issuers contains many small growth firms and a modest number of mature, profitable firms, and Table 1 shows that the size distribution of SEO proceeds is similarly disparate.

### 2.2. Univariate analysis of issuer and issue characteristics and stock issuance probabilities

Table 2 summarizes the offer incidence, cash proceeds to issuers, and the probability of an SEO for our full sample and for partitions based on dividend history, market-to-book ratio, years listed, and prior and future long-run abnormal (market-adjusted) stock returns. To obtain the M/B and stock returns data for Table 2 and the logits in Section 3, we apply the following algorithm for each sample year, which for brevity we describe only for 1982. We start with all industrial firms (issuers and nonissuers) that meet sampling conditions (1) through (5) described above and that are listed on CRSP at year-end 1982. For each firm, we obtain the standardized M/B ratio (raw M/B divided by median M/B for all firms) for the fiscal year end that falls closest to, but no later than, December 31, 1981, the 36-month abnormal stock return ending December 1981, and the 36-month return beginning in January 1983. To be included, a firm must have nonmissing stock returns on CRSP for at least seven of the 12 months in 1983, 1984, and 1985, provided the firm remains listed in December 1985. For firms that are delisted before then, we use the market-adjusted return beginning with December 31, 1982 and ending with the CRSP delisting return (net of market). We also require nonmissing returns for at least seven of the 12 months in 1979, 1980, and 1981 during which the firm is on CRSP for a full calendar year. For firms listed less than the full three years, we calculate the market-adjusted return from the listing date and treat it as a 36-month return. Finally, we drop firms with more than two consecutive months of missing returns in the pre- or post-1982 period.

Panel A of Table 2 partitions the data based on a firm's dividend history, which we use in some tests as a proxy for lifecycle stage, under the assumption that growth

**Table 1**
Issue proceeds in 4,291 seasoned equity offerings (SEOs) by CRSP/Compustat industrial firms over 1973 to 2001, with SEOs sorted into deciles ranked by issue proceeds. The 10% of sample SEOs with the largest dollar proceeds are in decile 10, the 10% of SEOs with the next largest proceeds are in decile 9, etc. To put SEO proceeds on a comparable dollar basis, the cash received by each issuer is translated to year 2001 dollars using the consumer price index. The final column gives the percent of SEOs by issuers that had paid dividends as of the year prior to the SEO (according to Compustat).

| Decile rank of SEO proceeds to issuer | Mean offer proceeds (millions of dollars) | Total proceeds for decile (billions of dollars) | Percent of total proceeds for all SEOs | Cumulative percent of total proceeds for all SEOs | Percent of SEOs by firms that had previously paid dividends |
|---|---|---|---|---|---|
| 10 | 414.6 | 177.9 | 48.6 | 48.6 | 56.2 |
| 9 | 132.8 | 57.0 | 15.6 | 64.2 | 48.3 |
| 8 | 87.8 | 37.7 | 10.3 | 74.5 | 42.7 |
| 7 | 62.9 | 27.0 | 7.4 | 81.9 | 44.3 |
| 6 | 47.8 | 20.5 | 5.6 | 87.5 | 37.8 |
| 5 | 36.5 | 15.7 | 4.3 | 91.8 | 37.8 |
| 4 | 27.6 | 11.9 | 3.2 | 95.0 | 35.9 |
| 3 | 20.6 | 8.8 | 2.4 | 97.5 | 37.1 |
| 2 | 14.2 | 6.1 | 1.7 | 99.1 | 35.0 |
| 1 | 7.5 | 3.2 | 0.9 | 100.0 | 38.8 |
| All SEOs | 85.2 | 365.7 | 100.0 | 100.0 | 41.4 |

**Table 2**
Number of seasoned equity offerings (SEOs), issue proceeds, and estimated probability that a firm conducts an SEO for a sample of 4,291 SEOs conducted over 1973–2001 by industrial firms on CRSP/Compustat. The estimated probability that a firm conducts an SEO in a given year is the number of firm-year observations with an SEO conducted by firms that satisfy our CRSP and Compustat sampling conditions, divided by the total number of observations over all sample years. Panels A and B contain data for 1973–2001, and Panels C, D, E, and F contain data for 1982–2001 which are the years on which our logits focus because they have more reliable estimates of the number of years a firm has been listed (since CRSP began listing Nasdaq firms in the early 1970s). Sample sizes differ across panels for this reason and because some firms have missing stock returns or market-to-book (M/B) ratios. In Panel A, firm-year observations are sorted into groups based on the firm's dividend history as of the year in question. Cumulative dividends are those reported by Compustat for all years up through and including the year in question, with each year's dividend compounded forward using the consumer price index. The current nonpayers group includes both former dividend payers and those that have never paid dividends. Issue proceeds is the sum over all SEOs of the cash raised (by the firm, not by stockholders who sold shares) in each offering, translated to year 2001 dollars using the consumer price index. The standardized market-to-book ratio is the issuing firm's M/B for the fiscal year end closest in time, but prior to the SEO, divided by the median M/B in that year for all industrial firms. Abnormal stock returns are net of the market index and are calculated over the 36-month (or 12-month) intervals as described in Section 2.

| | Number of SEOs | Percent of total SEOs | Issue proceeds (billions of dollars) | Percent of total issue proceeds | Median standardized M/B ratio | Median number of years listed | Probability of an SEO in a given year |
|---|---|---|---|---|---|---|---|
| Panel A. All industrial firms in all years | 4,291 | 100.0 | $365.7 | 100.0 | 1.71 | 5.1 | 3.4% |
| Have paid dividends | 1,775 | 41.4 | 192.0 | 52.5 | 1.34 | 12.5 | 2.8% |
| Never paid dividends | 2,516 | 58.6 | 173.7 | 47.5 | 2.06 | 3.0 | 4.1% |
| Top five hundred cumulative payers | 333 | 7.8 | 98.9 | 27.1 | 0.98 | 42.3 | 2.3% |
| Ranked below top five hundred | 1,442 | 33.6 | 93.1 | 25.5 | 1.45 | 10.2 | 3.0% |
| Current dividend payers | 1,260 | 29.4 | 142.6 | 39.0 | 1.35 | 12.9 | 2.8% |
| Current nonpayers | 3,031 | 70.6 | 223.0 | 61.0 | 1.91 | 3.6 | 3.8% |
| Former dividend payers | 515 | 12.0 | 49.4 | 13.5 | 1.29 | 11.1 | 2.8% |
| Panel B. Market-to-book quintile | | | | | | | |
| Quintile 1 (lowest) | 153 | 3.7 | 14.4 | 4.1 | 0.45 | 18.0 | 0.6% |
| Quintile 2 | 458 | 11.1 | 48.1 | 13.8 | 0.70 | 11.9 | 1.9% |
| Quintile 3 | 787 | 19.0 | 65.1 | 18.7 | 1.02 | 8.1 | 3.3% |
| Quintile 4 | 1,162 | 28.0 | 92.4 | 26.6 | 1.63 | 4.8 | 4.8% |
| Quintile 5 (highest) | 1,584 | 38.2 | 128.0 | 36.8 | 3.37 | 3.3 | 6.6% |
| Panel C. Years listed | | | | | | | |
| Less than five | 1,871 | 55.0 | 132.5 | 43.9 | 1.94 | 1.7 | 6.5% |
| Five to ten | 526 | 15.5 | 47.6 | 15.8 | 1.51 | 7.0 | 3.5% |
| Ten to 15 | 410 | 12.0 | 27.1 | 9.0 | 1.29 | 11.8 | 3.6% |
| 15 to 20 | 185 | 5.4 | 14.6 | 4.8 | 1.20 | 17.5 | 2.6% |
| 20 or more | 411 | 12.1 | 79.7 | 26.4 | 0.91 | 29.3 | 2.7% |
| Panel D. Prior 36-month abnormal stock return | | | | | | | |
| $R < -75.0\%$ | 289 | 8.6 | 27.6 | 9.2 | 0.92 | 6.8 | 1.3% |
| $-75.0\% < R < -50.0\%$ | 243 | 7.2 | 21.1 | 7.0 | 1.05 | 5.4 | 2.6% |
| $-50.0\% < R < -25.0\%$ | 317 | 9.4 | 30.6 | 10.2 | 1.14 | 4.3 | 3.3% |
| $-25.0\% < R < 0.0\%$ | 412 | 12.2 | 38.1 | 12.7 | 1.34 | 2.4 | 4.8% |
| $0.0\% < R < 25.0\%$ | 398 | 11.8 | 30.6 | 10.2 | 1.51 | 1.8 | 5.9% |
| $25.0\% < R < 50.0\%$ | 347 | 10.3 | 25.0 | 8.3 | 1.71 | 2.0 | 7.3% |
| $50.0\% < R < 75.0\%$ | 244 | 7.2 | 21.8 | 7.3 | 1.77 | 3.1 | 7.3% |
| $75.0\% < R$ | 1,123 | 33.3 | 105.2 | 35.1 | 2.07 | 5.4 | 9.0% |
| Panel E. Prior 12-month abnormal stock return | | | | | | | |
| $R < -75.0\%$ | 22 | 0.7 | 1.1 | 0.4 | 0.76 | 3.7 | 0.5% |
| $-75.0\% < R < -50.0\%$ | 102 | 3.0 | 8.0 | 2.7 | 1.02 | 4.2 | 1.1% |
| $-50.0\% < R < -25.0\%$ | 307 | 9.1 | 30.6 | 10.2 | 1.13 | 4.8 | 2.1% |
| $-25.0\% < R < 0.0\%$ | 580 | 17.2 | 55.5 | 18.5 | 1.38 | 3.5 | 3.3% |
| $0.0\% < R < 25.0\%$ | 644 | 19.1 | 48.3 | 16.1 | 1.40 | 3.9 | 5.0% |
| $5.0\% < R < 50.0\%$ | 534 | 15.8 | 49.8 | 16.6 | 1.61 | 4.4 | 7.6% |
| $50.0\% < R < 75.0\%$ | 330 | 9.8 | 26.8 | 8.9 | 1.63 | 4.5 | 9.2% |
| $75.0\% < R$ | 853 | 25.3 | 79.9 | 26.6 | 2.31 | 4.2 | 12.4% |
| Panel F. Future 36-month abnormal stock return | | | | | | | |
| $R < -75.0\%$ | 1,293 | 38.0 | 86.0 | 28.5 | 1.75 | 3.0 | 5.7% |
| $-75.0\% < R < -50.0\%$ | 446 | 13.1 | 49.8 | 16.5 | 1.76 | 4.3 | 5.0% |
| $-50.0\% < R < -25.0\%$ | 394 | 11.6 | 46.7 | 15.5 | 1.48 | 4.8 | 4.7% |
| $-25.0\% < R < 0.0\%$ | 310 | 9.1 | 31.5 | 10.4 | 1.48 | 6.7 | 3.9% |
| $0.0\% < R < 25.0\%$ | 261 | 7.7 | 28.3 | 9.4 | 1.42 | 5.3 | 3.7% |
| $25.0\% < R < 50.0\%$ | 166 | 4.9 | 19.0 | 6.3 | 1.38 | 5.4 | 3.1% |
| $50.0\% < R < 75.0\%$ | 150 | 4.4 | 13.3 | 4.4 | 1.22 | 6.7 | 3.9% |
| $75.0\% < R$ | 383 | 11.3 | 26.9 | 8.9 | 1.48 | 4.1 | 2.9% |

firms are those that have never paid dividends and mature firms are those whose cumulative dividends rank in the top five hundred of industrial firms.[3] The data in Panel A show that these dividend groups are reasonable proxies for lifecycle stage, in that the median issuer in the top payer group has been listed 42.3 years and has an M/B ratio below that of the typical industrial firm, whereas the median issuer in the never paid group has been listed only 3.0 years and has an M/B more than twice that of the typical firm.

The partitions in Panels B through F of Table 2 are based on univariate sorting(s) of variables that are inputs to Section 3's multivariate logits. Sample sizes differ across panels because some SEOs have missing values on CRSP or Compustat for one partitioning variable, but not others. Panels A and B include all sample years, while the others exclude observations prior to 1982 because CRSP added Nasdaq firms in the early 1970s, making the number of years listed in the 1970s possibly a poor indicator of the true amount of time listed. We accordingly emphasize the 1982–2001 subsample in our logit analysis, but this is not an important restriction because we obtain qualitatively identical results for the full sample in all specifications that exclude the years listed variable.

The importance of mature issuers in the SEO market is evident from Table 2, which shows that 52.5% of the total SEO proceeds are raised by current and former dividend payers, with 27.1% raised by top payers and 25.5% by other payers (per Panel A, fourth column of data). While other payers raise one-fourth of all SEO proceeds, they account for one-third of all offers because, like issuers in the never paid group, they are typically much smaller than the top payers. [The median issuer in the other payer and never paid groups ranks at the 22nd and 25th percentiles of NYSE industrials in total market value of equity, respectively, while the median issuer in the top payer group ranks at the 74th percentile (data not reported in Table 2).] Top payers conduct only 7.8% of SEOs, but raise more than a quarter of the total proceeds because this group is dominated by large, mature firms that typically raise sizable amounts of cash. Their offers are a modest fraction of SEOs because their total number in any year is, by definition, limited to five hundred firms whereas the other classes are not so limited and, in fact, contain many more firms.

Although mature issuers raise a large portion of the total SEO proceeds, most issuers conform to the high M/B growth-firm stereotype normally ascribed to firms that conduct SEOs. The median issuer in the full sample is listed 5.1 years at the time of the SEO and has a standardized M/B of 1.71, i.e., an M/B ratio 71% above the industrial firm median (Panel A, fifth column). Panel B documents that 38.2% of SEOs are conducted by firms in the highest M/B quintile for all industrial firms, and 66.2% are conducted by firms in the top two M/B quintiles. Panel B also shows that a lifecycle effect is associated with the high M/B ratios in the sample, with the median issuer in the highest M/B quintile listed for only 3.3 years at the time of issuance, and the median issuer in the next highest M/B quintile listed for just 4.8 years. The years-listed distribution in Panel C directly shows the same association: 55.0% of issuers are listed for less than five years and this subgroup has a median standardized M/B ratio of 1.94. [The median issuer in the 1982–2001 sample is listed for 4.1 years (figure not in table), versus 5.1 years for the median issuer in the full 1973–2001 sample (Panel A).]

The long-horizon (net-of-market) stock returns of our sample issuers also fit the general pattern documented in prior SEO studies. Specifically, the first two columns of data in Table 2 show that firms that conduct SEOs tend to have experienced high abnormal stock returns over the most recent 36-month period (Panel D), and the relation is even stronger when we examine abnormal returns over the prior 12-month period (Panel E). The same columns also show that issuers tend to have low abnormal returns over the subsequent 36-month period (Panel F). As Loughran and Ritter (1995) and others point out, stock return patterns of this type are compatible with theories in which managers conduct SEOs to take advantage of attractive stock market-timing opportunities.

Evidence consistent with both the market-timing and lifecycle explanations for SEOs is reported in the far right column of Table 2, which shows the estimated annual probability of an SEO as a function of each issuer characteristic listed in the far left column. The probability of an SEO by firms in the full sample of industrials is 3.4% (Panel A), consistent with Loughran and Ritter (1995, footnote 11), who report an SEO probability of about 3%. More important for assessing the relative merits of the timing and lifecycle theories, Panel B shows that firms with high M/Bs conduct SEOs with higher probabilities than firms with low M/Bs, while Panel C indicates that those listed only a short time tend to conduct SEOs more often than do firms listed for a long time. We also observe a uniformly positive relation between the probability of an SEO and the firm's most recent 36- and 12-month abnormal stock returns (Panels D and E) and an almost uniformly negative relation between the SEO probability and the firm's future 36-month abnormal return (Panel F).

While all of Table 2's probability comparisons are consistent with the market-timing and lifecycle theories, their univariate nature dictates that they must be viewed as providing only preliminary support for these theories. To see the potential inference problems, note that firms with high M/B ratios tend to be listed for just a short time (Panel B, sixth column of data) and that firms that have been listed only a short time tend to have high M/B ratios (Panel C, fifth column). Given the strong inverse relation between M/B and years listed, it is not possible to use the comparisons in Table 2 as reliable indicators of their

[3] We use the cumulative dividend rank to identify mature firms because a firm that has previously paid substantial dividends, but whose dividends are now low or zero due, e.g., to financial distress remains, nonetheless, a mature firm in terms of growth opportunities. We expect firms whose cumulative dividends rank below the top five hundred to fall between the mature and growth stages on average, because they include both firms in transition from growth to maturity that have just begun to pay dividends and small mature firms whose dividends are simply not that large.

separate influences on the probability that a firm conducts an SEO, and so we turn to multivariate tests to gauge the extent to which these factors—as well as recent and prospective stock price performance—affect the SEO decision.

## 3. Logit analysis of the decision to conduct an SEO

This section presents our findings on the determinants of the decision to conduct an SEO. The findings build successively on one another, and so it is useful to begin with a brief overview. Section 3.1 presents the results of logit-based statistical tests to assess the influence on the SEO decision of market-timing opportunities (proxied by standardized M/B and recent and future stock returns) and stage of corporate lifecycle (proxied by the number of years a firm has been listed), and it also reports the results of a variety of sensitivity checks on the basic model specification. Section 3.2 uses Section 3.1's logit coefficients to quantify the economic significance of market-timing and lifecycle considerations by comparing how the estimated probability of an SEO varies as a function of the number of years a firm has been listed, versus how it varies with differences in timing opportunities. Section 3.3 reports the results of sensitivity-check comparisons of estimated SEO probabilities when our logit analyses are re-run with other proxies for equity mispricing that have been advanced in the literature.

### 3.1. Basic logit tests

We run logit regressions on data for the full set of industrial firms to assess whether the probability that a firm conducts an SEO is positively related to its standardized M/B ratio and recent net-of market stock return, and negatively related to its future abnormal return and to the number of years listed. We emphasize tests that use these stock return measures because they are employed by Loughran and Ritter (1995, 1997) in their market-timing analysis of SEOs, and we also include M/B as an index of security misvaluation in our basic tests since it is the focus of Baker and Wurgler's (2002) timing analysis. We use the realized future 36-month abnormal (market-adjusted) stock return to test whether managers conduct SEOs when a financing window is soon to close because firms' ex post (realized) return will be positively correlated with managers' ex ante expected return if, as market-timing theories assume, managers can predict stock returns more accurately than investors can. Our use of realized future stock returns as a proxy for managers' expectations of the firm's share price performance is analogous to Baker, Stein, and Wurgler's (2003, Subsection IV.D) and Huang and Ritter's (2009, Table 4) use of future stock returns as an explanatory variable in their market-timing tests.

In interpreting our tests, we attribute the full impact on the SEO decision of M/B and stock returns to market timing. This interpretation gives timing theories the benefit of the doubt because these proxy variables plausibly also capture the existence and arrival of profitable investments at growth firms as argued, e.g., by Jung, Kim, and Stulz (1996) and Carlson, Fisher, and Giammarino (2006). Put another way, we interpret the years-listed coefficient as capturing the full impact of lifecycle stage on the SEO decision. This interpretation understates the true lifecycle impact to the extent that M/B and stock returns measure real growth prospects rather than (or as well as) market-timing opportunities. Although our approach tilts the field in favor of market timing, our results nonetheless indicate that lifecycle stage is economically more relevant than market-timing opportunities in explaining firms' decisions to conduct (or not to conduct) an SEO.

Our logit regressions use 27 years of data (1975–2001) on industrial firms' SEO decisions. For a given firm in a given year, the dependent variable equals one if the firm conducts an SEO in that year, and zero if it does not. The independent variables are the firm's most recent standardized M/B ratio, its most recent 36-month (or 12-month in some tests) abnormal stock return, and its future 36-month abnormal return. We pool observations for 1975–2001[4] and generate standard errors clustered by both time and firm (per Petersen, 2007) to obtain *t*-statistics to gauge whether the coefficients on M/B and the pre- and post-period abnormal stock returns differ significantly from zero. We measure abnormal stock returns as the raw return minus the contemporaneous return on the value-weighted market index, with no firm-specific risk adjustments. We also include the number of years listed as an explanatory variable in some regressions and, for reasons described below, drop observations for years prior to 1982 for these tests.

Table 3 reports our basic logit results, with the rows of the table differing in (i) the particular measures of the market-timing variables employed in the logit (Rows A through E), (ii) inclusion of years listed as an explanatory variable (Rows F and G), and (iii) their focus on subsamples sorted by firms' dividend-payment histories (Rows H though J). In each row, we report estimated logit coefficients, as well as the corresponding marginal probabilities of an SEO evaluated at sample means (in parentheses) and *t*-statistics (in square brackets). We report marginal probabilities to provide a feel for how small variation in each right-hand side variable translates to a change in the probability of an SEO. We use the fitted coefficient values to obtain the estimated probability levels that we analyze in subsequent sections.

Row A of Table 3 shows that the estimated SEO probability in a given year is significantly positively related to the firm's standardized M/B ratio (*t*-statistic=6.21) and to its prior period market-adjusted stock

[4] Our logits cover 1975–2001 because they require Compustat data from at least one calendar year prior to each analysis year. Because Nasdaq firms are not on CRSP until 1972, our use of the merged CRSP/Compustat database makes the 1973 Compustat file the earliest complete data source that we have. Because of cross-firm heterogeneity in Compustat's fiscal year-end timing conventions, the 1974 file is the first year with complete pre-SEO data for our logits. Accordingly, while we use all observations over 1973–2001 when possible in the paper, our logit regressions are necessarily restricted to 1975 and later years.

**Table 3**
Logit analysis of the seasoned equity offering (SEO) decision in a given year as a function of the firm's most recent standardized market-to-book (M/B) ratio, its market-adjusted stock returns over the prior and subsequent three years, and number of years listed, for a sample of CRSP/Compustat industrial firms over 1975–2001. Rows A through H report estimated coefficients (with marginal probabilities evaluated at sample means in parentheses and *t*-statistics in brackets) for logit models that pool all firm-year observations over 1975–2001 for all CRSP/Compustat industrial firms with nonmissing stock return and M/B data. Rows F and G use observations over 1982–2001 to avoid artificial truncation of the measured number of years listed due to the fact that CRSP added Nasdaq firms in 1972. Top dividend payers are among the five hundred industrial firms with the highest cumulative dividends as of the year in question, and other dividend payers have cumulative dividends below the top five hundred. We calculate *t*-statistics using standard errors based on the two-way (firm and year) clustering method in Petersen (2007). The dependent variable equals one if the firm conducts an SEO in the year in question and zero otherwise. The explanatory variables are (i) the standardized M/B ratio, (ii) the market-adjusted stock return over the 36 months ending immediately before the year in question (or over the prior 12 months in Rows D, E, and G), (iii) the market-adjusted return over the 36-month interval starting with the closing price of the year in question, and (iv) number of years listed. The abnormal return is the firm's actual stock return minus the contemporaneous return on the value-weighted market index. The standardized M/B ratio employs the market and book values of equity as of the end of the fiscal year closest in time to, but not later than, the beginning of the calendar year in question. Values greater than 10 are set equal to 10, and our findings are unchanged when standardized M/B is truncated at 15. The number of years listed is truncated at 20, but we obtain similar results when it is truncated at 30 and when we use indicator variables to differentiate firms listed less than five years, between five and ten years, etc. All pseudo *R*-squareds are very low and reach a maximum of 0.027 for the model in Row G.

| | Intercept | Market to book ratio | Prior stock return | Future stock return | Years listed |
|---|---|---|---|---|---|
| A. All firms | | | | | |
| Coefficient | −3.437 | 0.109 | 0.086 | −0.195 | – |
| (Marginal probability) | | (0.004) | (0.003) | (−0.007) | |
| [*t*-statistic] | [−31.77] | [6.21] | [4.31] | [−6.16] | |
| B. All firms with raw returns in lieu of market-adjusted returns | | | | | |
| Coefficient | −3.330 | 0.110 | 0.082 | −0.179 | – |
| (Marginal probability) | | (0.004) | (0.003) | (−0.006) | |
| [*t*-statistic] | [−31.42] | [6.74] | [4.24] | [−5.34] | |
| C. All firms with raw M/B in lieu of standardized M/B | | | | | |
| Coefficient | −3.590 | 0.121 | 0.078 | −0.174 | – |
| (Marginal probability) | | (0.004) | (0.003) | (−0.006) | |
| [*t*-statistic] | [−28.58] | [6.84] | [3.92] | [−5.56] | |
| D. All firms with 12-month prior market-adjusted return in lieu of 36-month prior return | | | | | |
| Coefficient | −3.438 | 0.096 | 0.310 | −0.191 | – |
| (Marginal probability) | | (0.003) | (0.011) | (−0.007) | |
| [*t*-statistic] | [−31.90] | [6.65] | [4.37] | [−5.73] | |
| E. All firms with $5 minimum price and 12-month prior return in lieu of 36-month return | | | | | |
| Coefficient | −3.178 | 0.112 | 0.307 | −0.231 | – |
| (Marginal probability) | | (0.005) | (0.014) | (−0.011) | |
| [*t*-statistic] | [−29.45] | [7.89] | [3.45] | [−5.72] | |
| F. All firms with years listed included | | | | | |
| Coefficient | −2.776 | 0.060 | 0.089 | −0.137 | −0.055 |
| (Marginal probability) | | (0.002) | (0.003) | (−0.005) | (−0.002) |
| [*t*-statistic] | [−24.70] | [3.07] | [3.75] | [−4.43] | [−5.30] |
| G. All firms with years listed included, $5 minimum price, and 12-month prior return in lieu of 36-month return | | | | | |
| Coefficient | −2.288 | 0.045 | 0.285 | −0.162 | −0.071 |
| (Marginal probability) | | (0.002) | (0.013) | (−0.008) | (−0.003) |
| [*t*-statistic] | [−24.05] | [2.74] | [2.96] | [−4.08] | [−7.68] |
| H. Top dividend payers | | | | | |
| Coefficient | −3.561 | −0.103 | 0.004 | −0.455 | – |
| (Marginal probability) | | (−0.002) | (0.001) | (−0.010) | |
| [*t*-statistic] | [−13.39] | [−1.13] | [0.040] | [−4.24] | |
| I. Other dividend payers | | | | | |
| Coefficient | −3.636 | 0.174 | 0.101 | −0.281 | – |
| (Marginal probability) | | (0.005) | (0.003) | (−0.008) | |
| [*t*-statistic] | [−25.81] | [7.66] | [4.37] | [−4.76] | |
| J. Never paid dividends | | | | | |
| Coefficient | −3.183 | 0.082 | 0.077 | −0.117 | – |
| (Marginal probability) | | (0.004) | (0.003) | (−0.005) | |
| [*t*-statistic] | [−33.15] | [4.26] | [3.42] | [−3.18] | |

return ($t$-statistic=4.31), and negatively related to its future market-adjusted return ($t$-statistic=−6.16). Logits that employ each of these explanatory variables in isolation or in pairs yield similarly significant relations (details not provided). In all models we estimate, the intercept is significantly negative, indicating the probability of an SEO is low when all explanatory variables take values near zero. The fitted models mechanically classify a high percentage of observations correctly (as nonissuers), but the incremental explanatory power of the market-timing and lifecycle variables is low, as reflected in a very low pseudo R-squared of around 0.01 (details not shown). The statistically significant positive M/B and prior period stock return coefficients and the significantly negative future stock return coefficient are all consistent with the market-timing explanation for SEOs.

Table 3 presents a variety of sensitivity checks, all of which confirm our inferences based on the full sample regressions. For example, all coefficients remain of the same sign, significance level, and approximate magnitude when we replace market-adjusted stock returns with raw returns (Row B of Table 3), when we replace standardized M/B with raw M/B (Row C), and when we make both substitutions simultaneously (details not in table). We also substitute the 12-month prior market-adjusted stock return for the 36-month return (Row D), then we couple that substitution with the requirement that all firms have a minimum $5 share price at the beginning of the period (Row E). Again, all coefficient signs and significance levels remain essentially the same. The prior period stock return coefficient more than triples when we use the 12-month prior stock return in place of the 36-month return (compare Rows D and E with A). To give market timing the benefit of the doubt, our subsequent analysis of the quantitative impact of market-timing employs models estimated with the 12-month prior return.

Table 3 also presents the results of regressions that include years listed as an explanatory variable, with Row F reporting full sample logits (analogous to Row A), and Row G substituting 12-month prior for 36-month prior market-adjusted returns and imposing a $5 share price minimum (analogous to Row E). We exclude sample years prior to 1982 because CRSP began including Nasdaq firms in 1972 so that, during the 1970s, CRSP-based measures of the number of years listed are likely to be materially attenuated. The years-listed variable is capped at 20, with all firms listed for a longer time treated as listed for 20 years. Our inferences are unchanged under a variety of alternative approaches, including capping the number of years listed at 30, using the square root of the number of years listed, and using indicator variables to group firms listed from one to five years, five to ten years, etc. (details not in table).

As predicted by the lifecycle theory, the estimated probability of an SEO declines significantly with increases in the number of years listed (per Rows F and G of Table 3). Our findings regarding M/B and stock returns are qualitatively unchanged when we include years listed as an explanatory variable and run alternative specifications analogous to those in Rows B, C, and D (details not reported in the table). The M/B coefficient is cut roughly in half when we add years listed, consistent with the idea that a high M/B reflects the profitable investment opportunities of growth firms and is not simply an indication of an attractive market-timing opportunity (compare Rows A versus F and Rows E versus G). This finding underscores our earlier suggestion that, by allocating the entire M/B effect to market timing, our tests likely give too much credit to timing and too little to lifecycle influences on the SEO decision.

Table 3 also presents results from a market-timing test that addresses the problem that high M/B ratios can indicate both ample profitable growth opportunities (reflecting a lifecycle effect) and a high stock market valuation for reasons unrelated to growth opportunities (indicating a timing motive to sell stock). We expect that high M/B dividend payers are more likely firms with a high stock market valuation not attributable to growth opportunities, because presumably these firms are past the growth stage of their lifecycle. (Test results that are not reported in a table confirm that, controlling for M/B, the growth rates of sales and capital expenditures around the SEO are substantially lower for the top payer group than for nonpayers.) We find that M/B is not significantly related to the decision to conduct an SEO for the top payer group (Row H), but it remains significant for firms that have paid only modest dividends (Row I) and for those that have never paid them (Row J). The future stock return remains significantly negative for the top payers and, while the prior return effect is insignificantly different from zero, it is significantly positive when we substitute 12-month for 36-month prior period returns (details not reported in the table). These findings support theories in which M/B influences stock issuance decisions because it proxies for growth opportunities, while recent and future stock returns are more indicative of differential stock market-timing opportunities.

### 3.2. *Relative impact on the SEO decision of market timing versus stage of corporate lifecycle*

Table 4 reports the estimated probability of an SEO as a function of specific hypothesized values of standardized M/B, prior and future excess stock returns, and the number of years a firm has been listed. (These probabilities are based on model G of Table 3, whose fitted coefficients provide the strongest support for market timing.) Row 1 of Table 4 considers a firm with neutral timing opportunities defined as a standardized M/B of 1.0 and prior and future excess stock returns of 0.0%, while Rows 2–7 offer pairwise comparisons of extreme variation in each of the three market-timing variables. The middle columns of Table 4 report the estimated probability that a firm conducts an SEO as a function of the number of years a firm has been listed, holding constant market-timing opportunities at the level specified in the row in question. The far right column gives the estimated SEO probabilities as a function only of the timing variables (per model E of Table 3). We begin by discussing this last case to provide an assessment of the influence of variation in timing opportunities alone,

**Table 4**
Estimated probability of a seasoned equity offering (SEO) in a given year as a function of the firm's number of years listed, standardized market-to-book (M/B) ratio, and its market-adjusted stock returns over the prior 12 months and subsequent 36 months. The table reports the estimated probability of an SEO conditional on specific hypothesized values of the explanatory variables, with the rows containing different hypothesized market-timing conditions and the columns containing different hypothesized numbers of years that a firm has been listed. Row 1 reports the probability of an SEO for a firm that faces neutral market-timing opportunities, with an M/B ratio at the sample median (standardized M/B equal to one) and current and future net-of-market stock returns of zero. Rows 2–7 describe the impact of changing each timing variable by large amounts, while holding the others constant at neutral levels. Rows 8–10 describe the impact of large swings in future stock returns while holding M/B and prior stock returns constant at levels indicative of highly favorable market-timing opportunities. SEO probabilities for firms with highly unfavorable versus highly favorable timing opportunities are given in Rows 11 and 12 respectively. The estimated probabilities in the far right column are based on the model in Row E of Table 3, which includes only the market-timing variables and no control for the number of years a firm has been listed. All other probabilities are based on the logit estimates for the model in Row G of Table 3, which includes the number of years listed and the market-timing variables as explanatory variables.

| | Standardized M/B ratio | Prior excess stock return | Future excess stock return | Estimated probability of an SEO as a function of number of years listed | | | | | SEO probability as a function of market-timing variables only (no years listed effect) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 5 | 10 | 15 | 20 | |
| Neutral market-timing opportunities | | | | | | | | | |
| 1. | 1.0 | 0.0% | 0.0% | 9.0% | 6.9% | 5.0% | 3.5% | 2.5% | 4.5% |
| Effect of large variation in each market-timing variable | | | | | | | | | |
| 2. | 1.0 | −75.0% | 0.0% | 7.4% | 5.7% | 4.0% | 2.9% | 2.0% | 3.6% |
| 3. | 1.0 | 75.0% | 0.0% | 10.9% | 8.4% | 6.1% | 4.3% | 3.1% | 5.5% |
| 4. | 1.0 | 0.0% | −75.0% | 10.0% | 7.8% | 5.6% | 4.0% | 2.8% | 5.3% |
| 5. | 1.0 | 0.0% | 75.0% | 8.1% | 6.2% | 4.4% | 3.1% | 2.2% | 3.8% |
| 6. | 0.5 | 0.0% | 0.0% | 8.8% | 6.8% | 4.9% | 3.5% | 2.4% | 4.2% |
| 7. | 3.0 | 0.0% | 0.0% | 9.8% | 7.5% | 5.4% | 3.8% | 2.7% | 5.5% |
| Future returns effect, given very high M/B and prior returns | | | | | | | | | |
| 8. | 3.0 | 75.0% | −75.0% | 13.1% | 10.2% | 7.4% | 5.3% | 3.8% | 8.0% |
| 9. | 3.0 | 75.0% | 0.0% | 11.8% | 9.2% | 6.6% | 4.7% | 3.4% | 6.8% |
| 10 | 3.0 | 75.0% | 75.0% | 10.6% | 8.2% | 5.9% | 4.2% | 3.0% | 5.8% |
| Extremely unfavorable versus favorable timing opportunities | | | | | | | | | |
| 11. | 0.5 | −75.0% | 75.0% | 6.5% | 4.9% | 3.5% | 2.7% | 1.8% | 2.9% |
| 12. | 3.0 | 75.0% | −75.0% | 13.1% | 10.2% | 7.4% | 5.3% | 3.8% | 8.0% |

before turning to a comparison of the timing impact with that of the length of time a firm has been listed.

We find that the estimated SEO probability increases by 1.5% (i.e., it equals 5.3% instead of 3.8%) when the firm is soon to experience a negative market-adjusted stock return of −75.0% instead of a future positive abnormal return of 75.0% (compare Rows 4 and 5 of Table 4). (In an efficient market, outside investors obviously cannot systematically predict negative stock returns, but the presumption of timing theories of the type posited by Loughran and Ritter (1995, 1997) and the mispricing theory in Baker and Wurgler (2002) is that managers have such ability and exploit it, and our objective here is to gauge the explanatory power of these theories.) We find similar SEO probability differences when we compare a recent stock price increase of 75.0% with a recent decline of −75.0% (Rows 2 and 3), or an M/B equal to one-half the sample median with one three times the median (Rows 6 and 7). Holding M/B and prior stock returns constant at very high levels as in Rows 8–10, a swing of 150% in future returns (from 75.0% to −75.0%) implies an absolute increase in SEO probability of 2.2% (from 5.8% to 8.0%). Finally, the probability that a firm conducts an SEO is 5.1% higher in absolute value (8.0% instead of 2.9%, per Rows 12 and 11) when all variables coincide to provide a highly favorable market-timing opportunity than when all coincide to provide a highly unfavorable timing opportunity. (Row 11 considers a firm with a standardized M/B of 0.5, a prior excess return of −75.0%, and a future excess stock return of 75.0%, while Row 12 considers a firm with a standardized M/B of 3.0, a prior return of 75.0%, and a −75.0% future excess return.)

These last estimates indicate that few firms with excellent stock market-timing opportunities conduct SEOs—so few, in fact, that their propensity to sell stock is only slightly higher than that of firms with poor timing opportunities. Of every one hundred firms with a standardized M/B ratio of 3.0, prior abnormal returns of +75%, and future abnormal returns of −75%, roughly 92 firms fail to sell stock (SEO probability of 8.0%, per Row 12 of Table 4, far right column). And only five additional firms decide to conduct an SEO when faced with excellent rather than poor timing opportunities (SEO probability increase of 5.1%=8.0%−2.9%, per Rows 11 and 12). These estimates imply that market timing as conventionally articulated is, at best, an incomplete theory that requires modification to explain why so few firms conduct SEOs when they face attractive timing opportunities. In the conclusion we discuss some possible explanations for the low rate at which managers actually take advantage of market-timing opportunities.

Despite the fact that large differences in timing opportunities imply only a modest absolute change in the probability of an SEO, the relative impact—i.e., the percentage change in probability—is large because firms conduct SEOs only infrequently. For example, a swing in prior excess stock returns from −75.0% to 75.0% implies a 52.7% increase in SEO probability (1.9%/3.6%, per Table 4's

far right column, Rows 2 versus 3), which is an economically significant marginal effect. Nontrivial relative probability changes of 39.5% and 31.0% accompany large changes in the other timing variables (1.5%/3.8% per Rows 4 and 5, and 1.3%/4.2% per Rows 6 and 7). When all market-timing variables simultaneously indicate a favorable timing opportunity, the probability of an SEO exceeds by 141.4% the offer probability when all variables simultaneously indicate a poor timing opportunity (4.1%/2.9%, per Rows 11 and 12).

Although market-timing effects are substantial when measured in relative terms, variation in the number of years a firm has been listed has a greater effect on the probability that it conducts an SEO. The strength of the years-listed effect is evident in Row 1 of Table 4, which indicates that, for a firm listed one year with neutral market-timing opportunities, the estimated probability of conducting an SEO is 9.0%, or 260.0% higher than the 2.5% SEO probability if it has been listed 20 years. For all of the other market-timing scenarios in the table, comparably large absolute and relative differences in SEO probability obtain for a firm listed one year versus a firm listed 20 years. Consider for example Row 12, which examines a firm with highly favorable timing opportunities and indicates that the SEO probability is 13.1% if the firm has been listed one year, which is 244.7% above the 3.8% SEO probability if it has been listed 20 years.

The relative influence on SEO probabilities of market-timing opportunities and the number of years listed is best assessed by comparing Rows 11 and 12 of Table 4. This comparison shows that a firm listed one year with highly unfavorable timing opportunities has an SEO probability of 6.5% (Row 11), which is 71.1% higher than the SEO probability of 3.8% for a firm listed for 20 years with highly favorable timing opportunities (Row 12), and so the years-listed effect overrides the market-timing effect.

### 3.3. *Sensitivity analysis: alternative measures of stock-market timing opportunities*

Empirical support for market timing is potentially sensitive to the benchmarks used to measure equity mispricing. This point is raised, e.g., by Wagner (2007), who takes issue with M/B as an index of market mispricing and instead uses estimates of discounted earnings per share and the present value of growth opportunities. He rejects the hypothesis that shares are mispriced in stock offerings and finds no systematic post-offer returns drift.

To assess the robustness of our inferences to alternative measures of mispricing, we re-run our logit regressions using (i) the equity mispricing index of Rhodes-Kropf, Robinson, and Viswanathan (RRV, 2005), (ii) the mispricing index of Polk and Sapienza (PS, 2009), and (iii) both the RRV and PS indices coupled with the mispricing measures (standardized M/B and prior and future excess stock returns) used in the tests in Sections 3.1 and 3.2. Under specification (i), the coefficient on the RRV index is positive as expected, with a $t$-statistic of 22.64. Under specification (ii), the coefficient on the PS index is also positive as expected ($t$-statistic of 2.63) while, under (iii), the coefficients on RRV and PS are both positive and significant ($t$-statistics of 9.49 and 2.21 respectively). Under specification (iii), the coefficients on prior and future returns retain their predicted signs and remain statistically significant, but the coefficient on standardized M/B turns significantly negative ($t$-statistic of −5.42), plausibly reflecting the fact that the RRV index measures market mispricing relative to book value. In all three specifications, the years-listed coefficient remains negative and significant, with $t$-statistics of −7.03, −7.67, and −7.00, respectively, which are essentially identical to the $t$-statistic of −7.68 in Row G of Table 3.

Table 5 reports SEO probabilities for logit models that include the RRV or PS mispricing indices or both as explanatory variables. For convenience in comparing the RRV and PS results with our earlier findings, Panel A of Table 5 repeats the results in Rows 11 and 12 of Table 4, with "base case variables" referring to standardized M/B and prior and future excess stock returns. The probability estimates in Panels B and C of Table 5 are based on logit regressions that exclude the base case variables. Panel B compares SEO probabilities when the RRV index is at its 10th percentile value (highly unfavorable timing opportunity) as opposed to when it is at its 90th percentile value (highly favorable timing opportunity). Panel C provides the same probability comparison for the PS index set at its 10th and 90th percentile values. Panels D, E, and F report SEO probabilities for logit models estimated with the base case variables included together with the RRV and PS indices. In these panels, we set the base case variables at the same extreme values in Rows 11 and 12 of Table 4. For example, the last row in Table 5 (Panel F) gives SEO probabilities for a firm that by every measure has highly favorable timing opportunities: a standardized M/B of 3.0, a prior excess return of 75.0%, a future excess return of −75.0%, RRV index at the 90th percentile, and PS index at the 90th percentile. And the row immediately above it (also in Panel F) reports SEO probabilities for a firm that, in all respects, has highly unfavorable timing opportunities.

Table 5 indicates that the estimated SEO probabilities are close to one another under both the RRV model (Panel B) and the base case analysis reported in prior tables (Panel A of Table 5). For the RRV model, the SEO probability is 6.8% for a firm listed for one year with highly unfavorable market-timing opportunities, which exceeds by 61.9% the 4.2% probability for a firm listed 20 years with highly favorable timing opportunities (Panel B, far right column). The comparable figures for our base case analysis are 6.5% and 3.8% for an excess of the former over the latter of 71.1% (Panel A). A similar comparison reveals that the PS-inclusive logit model is more strongly supportive (than our base case analysis) of our earlier inference that the years-listed effect dominates the market-timing effect. Specifically, the PS results in Panel C indicate that the SEO probability is 9.1% for a firm listed one year with highly unfavorable timing opportunities, which is 213.7% above the SEO probability for a firm listed 20 years with highly favorable timing opportunities.

**Table 5**
Estimated probability of a seasoned equity offering (SEO) for a firm listed one year with highly unfavorable market-timing opportunities versus a firm listed 20 years with highly favorable market-timing opportunities, with SEO probabilities reported as a function of the number of years the firm has been listed and of various measures of stock market mispricing. The table reports the estimated probability of an SEO conditional on specific hypothesized values of the explanatory variables, with each pair of rows juxtaposing different hypothesized market-timing conditions and the columns considering different hypothesized numbers of years that a firm has been listed. The base case findings in Panel A are those implied by the parameter estimates in Row G of Table 3, and they simply replicate the probability estimates reported in Rows 11 and 12 of Table 4. The base variables are the standardized market-to-book ratio and prior and future excess stock returns. Panels B though F in the current table report probability estimates calculated analogously, but with the model in Row G of Table 3 re-estimated with other measures of stock market mispricing. The mispricing index labeled PS corresponds to that employed by Polk and Sapienza (2009). The mispricing index labeled RRV corresponds to that employed by Rhodes-Kropf, Robinson, and Viswanathan (2005, Table 4, Model 3). In calculating SEO probabilities, we take the 10th percentile value of PS (or RRV) as representative of highly unfavorable timing opportunities and the 90th percentile value as representative of highly favorable timing opportunities. The number in the far right column gives the ratio of (i) the estimated probability of an SEO by a firm that has been listed for one year with poor market-timing opportunities according to all mispricing measures in the specific model under consideration to (ii) the probability of an SEO by a firm listed 20 years with excellent timing opportunities. For example, in Panel B, the ratio 0.068/0.042 equals 1.62, which indicates that, when we use the RRV index to measure stock market mispricing, a firm listed one year with poor timing opportunities is 62% more likely to conduct an SEO than is a firm listed 20 years with excellent timing opportunities.

| Market mispricing indices (base case variables, RRV, PS) included in logit model | Standardized M/B ratio | Prior excess stock return | Future excess stock return | Percentile of supplementary mispricing index | Probability of an SEO as a function of number of years listed | | | | | SEO probability ratio: highly unfavorable versus highly favorable timing opportunities |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 5 | 10 | 15 | 20 | |
| A. Base case variables | 0.5 | −75.0% | 75.0% | – | **6.5%** | 4.9% | 3.5% | 2.7% | 1.8% | 1.71 |
| | 3.0 | 75.0% | −75.0% | – | 13.1% | 10.2% | 7.4% | 5.3% | **3.8%** | |
| B. RRV index alone | – | – | – | 10th | **6.8%** | 5.1% | 3.6% | 2.6% | 1.8% | 1.62 |
| | – | – | – | 90th | 14.7% | 11.4% | 8.2% | 5.9% | **4.2%** | |
| C. PS index alone | – | – | – | 10th | **9.1%** | 7.1% | 5.1% | 3.6% | 2.6% | 3.14 |
| | – | – | – | 90th | 10.3% | 8.0% | 5.8% | 4.1% | **2.9%** | |
| D. Base and RRV index | 0.5 | −75.0% | 75.0% | 10th | **5.3%** | 4.0% | 2.8% | 2.0% | 1.4% | 1.13 |
| | 3.0 | 75.0% | −75.0% | 90th | 16.4% | 12.8% | 9.2% | 6.6% | **4.7%** | |
| E. Base and PS index | 0.5 | −75.0% | 75.0% | 10th | **5.6%** | 4.4% | 3.3% | 2.4% | 1.7% | 1.33 |
| | 3.0 | 75.0% | −75.0% | 90th | 12.5% | 10.0% | 7.6% | 5.7% | **4.2%** | |
| F. Base and RRV and PS indices | 0.5 | −75.0% | 75.0% | 10th | **4.5%** | 3.5% | 2.5% | 1.9% | 1.3% | 0.90 |
| | 3.0 | 75.0% | −75.0% | 90th | 15.4% | 12.3% | 9.2% | 6.8% | **5.0%** | |

When we add the RRV index to our base case model, we continue to find that the years-listed effect dominates the market-timing effect, but the difference between the two narrows markedly and becomes economically inconsequential (compare the boldface probability estimates in Panel D of Table 5). The difference also narrows when we add the PS index to the base case analysis, but not to the same degree as when we add the RRV index (compare the boldface probabilities in Panels D and E). When we add both the RRV and PS indices to the base case analysis, we find that the probability comparison reverses by a small margin, so that the quantitative impact of changes in market-timing and lifecycle effects are very close to one another. Specifically, the SEO probability is 4.5% for a firm listed one year with highly unfavorable timing opportunities, versus 5.0% for a firm listed 20 years with highly favorable timing opportunities (Panel F of Table 5). While this last comparison gives an edge to market-timing over lifecycle effects, the edge is modest insofar as the absolute difference in the probability of an SEO is only 0.5%, with the 4.5% probability constituting a 10.0% decline from the 5.0% probability. Thus, with five measures of market-timing opportunities included in the model, the two extreme scenarios (a newly listed firm with poor timing opportunities versus a long-listed firm with excellent timing opportunities) are essentially identical in terms of estimated probability of an SEO.

Overall then, while the preponderance of our logit evidence indicates that lifecycle considerations exert a stronger influence on the SEO decision than do timing considerations, some evidence indicates that the two influences are roughly comparable in magnitude.

## 4. Cash balances, SEO proceeds, and the need for external capital

If market timing were the primary motive for selling stock, only by chance would issuers be operating with seriously limited resources when a financing window opens, thus they would most often stockpile the cash proceeds from SEOs until suitable investment opportunities materialize. In this section we analyze corporate cash balances in the years surrounding SEOs and find that stockpiling of offer proceeds is the exception and a cash shortfall is the norm for issuers in our sample. We begin in Section 4.1 by documenting that 62.6% of firms that conduct SEOs would have run out of cash without the offer proceeds, and 81.1% would have had below normal cash holdings in the year after the offer. Section 4.1 also explains why we reach different conclusions about the

extent of stockpiling of SEO proceeds than do Kim and Weisbach (2008). Section 4.2 shows that, although most issuers increase capital expenditures after their SEOs, increased CapEx does not cause their near-term need for cash. Section 4.2 also analyzes the role of debt and dividends on issuers' near-term cash needs, and reports evidence that about 10% of issuers do stockpile the SEO proceeds. Section 4.3 presents evidence on the underlying causes of issuers' financing deficits, while Section 4.4 reports the results of sensitivity checks on our Section 3 logit findings by examining the decision to conduct or not conduct an SEO by firms that have financing deficits.

### 4.1. Most issuers would run out of cash without the SEO proceeds

Table 6 shows that the median issuer's cash to total assets ratio (Cash/TA) increases from 7.2% in the year before the SEO to 13.3% at the end of the SEO year, then falls to 8.8% in the year after the SEO—nearly three-quarters of the way back to the pre-SEO level. All sample partitions exhibit an SEO-induced increase and an immediate and almost-complete reversion in median Cash/TA, which indicates that issuers in all dividend classes quickly utilize the SEO proceeds (Rows 1–3). The typical behavior of Cash/TA around the SEO is more dramatic for firms that have never paid dividends (14.5% to 25.0% to 17.5%) than for the top payers (2.7% to 3.1% to 2.8%) or the other payers (4.5% to 7.1% to 4.6%). (Our finding that firms that have never paid dividends have higher Cash/TA ratios is consistent with the Opler, Pinkowitz, Stulz, and Williamson (1999) finding that growth firms carry higher cash balances than mature firms.) Qualitatively similar but muted trends characterize Excess Cash/TA (i.e., the firm's actual Cash/TA minus the estimated normal level required to operate the firm) in the years surrounding the SEO (Rows 4–6).[5]

Although Rows 1–6 of Table 6 show that issuers typically quickly utilize the SEO proceeds, these Cash/TA trends mask the pivotal role of those proceeds in enabling issuers to implement their operating and other financing decisions. The speed with which issuers typically put the SEO proceeds to work is evident from the fact that the median issuer in the full sample raises $30.4 million in the SEO (Row 10) but has only $18.3 million in cash the year after the SEO (Row 9), and similar differentials hold for all sample partitions. [The SEO proceeds are 29.7% of pre-SEO total assets for the median issuer (Row 11).] To capture the pivotal importance of the SEO proceeds, we calculate pro forma Cash/TA ratios for each issuer in the year after the SEO that assume firms did not receive the offer proceeds, but otherwise maintained all other non-SEO investment and financing decisions. This hypothetical exercise holds all other decisions fixed and therefore, e.g., rules out asset sales or other security offerings to replace the SEO proceeds. We also calculate pro forma Excess Cash/TA ratios for each issuer by subtracting from pro forma Cash/TA an estimate of the firm's normal Cash/TA ratio.

The most striking finding in Table 6 is that, all other decisions fixed, a clear majority of issuers would almost immediately run out of cash had they not received the issue proceeds. The median pro forma Cash/TA ratio in the year after the SEO is −4.2% for the full sample and −1.0%, −4.8%, and −5.3% respectively for the top payer, other payer, and never paid groups (Row 12). Median pro forma Excess Cash/TA is −11.7% for the full sample, and −5.1%, −10.8%, and −15.4% respectively for the three groups (Row 13). Without the SEO proceeds, 62.6% of issuers would have negative Cash/TA (Row 14) and 81.1% would have subnormal Cash/TA (Row 15) in the year after the SEO.[6] All sample partitions exhibit the same pattern: without the SEO proceeds, between 58.4% and 69.3% of issuers would be forced to alter their operating and financial policies to avoid running out of cash, and between 74.6% and 86.0% would have subnormal Cash/TA ratios.

The cash shortfall documented in Table 6 differs fundamentally from the literature's concept of a financing deficit, which measures the amount of external capital actually raised in a given period and not the amount of cash required to carry out the firm's plans, which is what we estimate here.[7] A firm with ample cash balances that chooses to sell a large amount of stock (e.g., to exploit a market-timing opportunity) will show a large financing deficit in the period that it issues equity. But this firm is not strapped for resources to carry out its plans, as would be evident under our Table 6 measure, which takes cash

[5] Normal Cash/TA is calculated by sorting all industrial firms (not limited to issuers) that meet our Section 2 sampling criteria for the year in question into three equal size groups based on total book assets and three equal size groups based on the ratio of the market to book values of assets (not of equity as in our earlier logit tests). Each observation is then allocated to one of nine groups based on relative size and market-to-book. Within each of the nine groups, a normal Cash/TA ratio is calculated for each two-digit SIC industry as the median ratio among all firms in that industry for the year in question.

[6] Sources of corporate liquidity extend beyond holdings of cash and marketable securities. For example, some firms could be able to raise cash by drawing down inventory or by selling divisions. Others could hold long-term debt securities that are not included in Compustat Item #1. The latter should be included in Compustat's Item #32, which also contains miscellaneous assets such as royalty interests, land or property held for resale, long-term receivables, partnerships in which there is no significant control, a variety of leases, equity securities, and sundry investments. We re-ran our analysis under the assumption that all assets in Item #32 are cash equivalents. Even with this upward biased estimate of cash holdings, a majority of issuers (57.3%) would still have run out of cash without the SEO proceeds, and three-quarters (75.6%) would have had below normal cash holdings in the year after the SEO.

[7] Frank and Goyal (2003, p. 221) measure the financing deficit as the change in long-term debt plus cash raised from stock sales minus cash paid to repurchase shares. Fama and French (2005) measure the financing deficit as the one-year change in the book value of total assets minus the change in retained earnings which, through the accounting identity, equals the change in total liabilities (not limited to debt) plus the change in contributed equity capital. Both measures are estimates of the amount of external capital raised in a given period, not the amount of cash required by the firm. Shyam-Sunder and Myers' (1999, p. 224) funds flow deficit estimates the firm's financing need, but does not take the stock of cash into account in the estimation. A firm with a large current funds flow deficit and ample cash balances has no immediate need to raise outside capital.

**Table 6**
Actual and pro forma ratios of cash to total assets (Cash/TA) if the firm did not receive the cash proceeds from the seasoned equity offering (SEO) for a sample of 4,291 SEOs conducted by CRSP/Compustat industrial firms, with the sample partitioned by issuer's dividend history. Pro forma values of Cash and Total Assets are the values these variables would take had the firm not received the SEO proceeds and all operating and other financing decisions remained unchanged. The year before and year of the SEO refer, respectively, to the fiscal year ends immediately before and immediately after the SEO. The year after the SEO refers to the end of the first full fiscal year after the offering. Excess Cash/TA equals actual Cash/TA minus normal Cash/TA where the latter benchmark is calculated for a given year by sorting all industrial firms into (i) three equal size groups based on total book assets and (ii) three equal size groups based on market to book values (of assets). Each observation is then allocated to one of nine groups based on relative size and market to book. Within each of the nine groups, a normal Cash/TA ratio is calculated for each two-digit standard industrial classification as the median ratio among all firms in the industry for the year in question. The figures for Cash reported in Rows 7–9 are denominated in dollars as of the calendar year in question. To preserve comparability with the Row 7–9 figures, the SEO proceeds figures in Row 10 have not been converted to 2001 dollars, as was done with the SEO proceeds figures reported in earlier tables. In Rows 16–19, the raw change in cash in the numerator equals the dollar cash balance in the year in question minus the dollar cash balance in the year before the SEO. In Rows 20–23, the abnormal change in cash in the numerator equals (i) the dollar cash balance in the year in question minus (ii) the dollar cash balance in the year before the SEO multiplied by one plus the rate of change in total assets from the year before the SEO through the year in question.

| | All issuers | Top payers | Other payers | Never paid |
|---|---|---|---|---|
| 1. Median Cash/TA in year before SEO | 7.2% | 2.7% | 4.5% | 14.5% |
| 2. Median Cash/TA in year of SEO | 13.3% | 3.1% | 7.1% | 25.0% |
| 3. Median Cash/TA in year after SEO | 8.8% | 2.8% | 4.6% | 17.5% |
| 4. Median Excess Cash/TA in year before SEO | −0.1% | −0.6% | −0.7% | 0.0% |
| 5. Median Excess Cash/TA in year of SEO | 1.4% | −0.4% | 0.0% | 5.6% |
| 6. Median Excess Cash/TA in year after SEO | 0.0% | −0.6% | −0.2% | 2.1% |
| 7. Median Cash (millions of dollars) in year before SEO | 8.3 | 55.0 | 6.0 | 8.2 |
| 8. Median Cash (millions of dollars) in year of SEO | 20.2 | 72.7 | 12.6 | 22.7 |
| 9. Median Cash (millions of dollars) in year after SEO | 18.3 | 69.3 | 10.9 | 20.2 |
| 10. Median SEO proceeds (millions of dollars) | 30.4 | 96.3 | 25.0 | 29.6 |
| 11. Median SEO proceeds/TA in year before SEO | 29.7% | 5.3% | 18.4% | 47.5% |
| 12. Median pro forma Cash/TA in year after the SEO | −4.2% | −1.0% | −4.8% | −5.3% |
| 13. Median pro forma Excess Cash/TA in year after the SEO | −11.7% | −5.1% | −10.8% | −15.4% |
| 14. Percent with pro forma Cash/TA < 0 in year after the SEO | 62.6% | 58.4% | 69.3% | 59.3% |
| 15. Percent with pro forma Excess Cash/TA < 0 in year after the SEO | 81.1% | 74.6% | 86.0% | 77.7% |
| *Median raw change in cash/SEO proceeds* | | | | |
| 16. from year before to year of SEO | 39.0% | 7.8% | 26.0% | 51.2% |
| 17. from year before to year after SEO | 22.4% | 6.2% | 13.9% | 32.7% |
| 18. from year before to two years after SEO | 21.6% | 8.8% | 15.1% | 28.7% |
| 19. from year before to three years after SEO | 25.7% | 14.0% | 18.1% | 35.5% |
| *Median abnormal change in cash/SEO proceeds* | | | | |
| 20. from year before to year of SEO | 10.4% | 1.7% | 10.2% | 11.7% |
| 21. from year before to year after SEO | 0.6% | −0.8% | 1.4% | 0.3% |
| 22. from year before to two years after SEO | −1.1% | −1.8% | −0.5% | −1.5% |
| 23. from year before to three years after SEO | −1.9% | −4.2% | −1.3% | −2.0% |

balances into account in gauging whether a firm truly requires outside funds.

Kim and Weisbach (2008) fit cross-sectional regressions for the year of the SEO and the next three years, and find that the change in cash held is positively related to the SEO proceeds. For example, the data in their Table 4 show that raising one more dollar in the SEO is associated with a 42¢ higher cash balance in the year after the SEO relative to the pre-SEO cash balance. Our sample conforms to the pattern found by Kim and Weisbach, with each dollar raised in the SEO associated with median cash holdings that exceed pre-SEO cash balances by 39¢ in the year of the SEO, 22¢ in the year after the SEO, and 22¢ and 26¢ respectively in the following two years (Rows 16–19 of Table 6). Kim and Weisbach interpret their findings as indicative of stockpiling of SEO proceeds, thus as supportive of theories in which managers sell stock primarily to exploit a market-timing opportunity.

However, higher post-SEO levels of cash do not necessarily indicate that firms stockpile the SEO proceeds, since larger firms typically require more cash to operate (Opler, Pinkowitz, Stulz, and Williamson, 1999), and neither the estimates in Rows 16–19 of our Table 6 nor Kim and Weisbach's Table 4 control for the cash increase expected at growing firms. This omission is nontrivial because our median issuer has total asset growth of 54.2% in the year of the SEO and of 87.6% from the year before to the year after the SEO (data not in table). We accordingly calculate the abnormal change in cash as the difference between the cash held in the year in question minus the cash the firm would have if it maintained its pre-SEO Cash/TA ratio, with the difference divided by the SEO proceeds. The abnormal change in cash per dollar of SEO proceeds for the median issuer in the year of and three years following the SEO is reported in Rows 20–23 of Table 6. For each dollar raised in the SEO, the median issuer retains just six-tenths of 1¢ in excess cash in the year after the SEO; i.e., 99.4% of the excess cash obtained through the SEO is spent by the year after the SEO. This finding indicates that cash stockpiling is the exception

and not the rule in our sample, and it is consistent with our evidence in Rows 12–15 that most issuers face serious resource limitations.

### 4.2. Capital expenditures, debt, dividends, and the need for external capital

We conclude that, because the typical SEO firm would run out of cash without the SEO proceeds, market timing cannot be the sole motivation for the stock issues in our sample. It is possible, however, that many or most sample issuers did not, in fact, need the offer proceeds, but rather they issued stock purely to time the market and quickly spent the offer proceeds on new investments that managers would not otherwise have undertaken. To address this concern, we next ascertain the extent to which sample issuers would run out of cash without the offer proceeds, had firms' post-offer capital expenditures remained fixed at their pre-SEO levels. As in Table 6, we report data for all issuers and, in order to separately evaluate issuers at different stages of their lifecycles, for the sample partitioned into top dividend payers, other dividend payers, and firms that have never paid dividends.

Panel A of Table 7 reports that, for the median issuer in the full sample, capital expenditures (CapEx) in the year before the SEO are 24.3% of SEO proceeds (Row 1). For all dividend partitions, pre-SEO CapEx is roughly 6–7% of total assets at the median (data not tabulated) but varies widely, from 128.4% of SEO proceeds for the median top payer to 13.7% for the median issuer in the never paid dividends group. Thus, holding CapEx fixed at the pre-SEO level, the SEO proceeds cover less than one year of outlays for the median top payer and roughly seven years of outlays for the median issuer in the never paid group. However, the rate of increase in CapEx is not constant—the median issuer in the never paid group increases CapEx by 14.0% of total assets from the year before to the year after the SEO, whereas the median issuer in the top payer and other groups increases CapEx by 1.9% and 7.8% (Row 5). As a fraction of SEO proceeds, the median change in CapEx is less disparate: 34.0% for top payers, 42.5% for other payers, and 24.4% for the never paid group.

Perhaps the most important finding in Table 7 is that most issuers would experience an immediate cash shortfall even had they not increased capital expenditures following their SEOs. This finding is documented in Panel B, which reports pro forma Cash/TA and Excess Cash/TA under the assumptions that (i) each issuer did not increase CapEx in the year of or year after the SEO and instead retained the freed-up resources as cash balances, and that (ii) each issuer did not receive the SEO proceeds. We find that, had their capital expenditures remained flat at the level of the year before the SEO, 40.3% of issuers would run out of cash and 59.6% would have subnormal cash balances the year after the SEO (Rows 10 and 11). Thus, while the desire to raise cash to fund increased investment influences firms' decisions to issue stock, it is not the only consideration. Rather most issuers would have subnormal cash balances the year after the SEO, even if managers had chosen not to increase capital expenditures.

Further evidence that most issuers face an immediate cash shortfall is the fact reported in Panel C of Table 7 that 60.4% of issuers increase the absolute level of their debt obligations from the year before to the year after the SEO. This fact indicates that Table 6 understates the extent of issuers' near-term need for cash, and that a better estimate of that cash need would take into account contemporaneous increases in debt by firms that conduct SEOs. We accordingly report in Panel D of Table 7 pro forma Cash/TA and Excess Cash/TA as of the year after the SEO under the assumptions that (i) each issuer does not increase its debt obligations and cash balances decrease by the amount of the foregone borrowing, and that (ii) each issuer does not receive the SEO proceeds. Under these new assumptions, 74.2% of issuers would run out of cash (Row 19 of Table 7) and 87.3% would have below normal cash balances (Row 20) by the year after the SEO. The median issuer has pro forma Cash/TA of −16.0% and pro forma Excess Cash/TA of −26.3% (Rows 17 and 18 of Table 7, respectively). Clearly, most issuers would have serious liquidity problems had they not raised external capital through either debt or equity issuances.

Panel E of Table 7 reexamines the Cash/TA findings reported in Rows 12–15 of Table 6 under the assumption that each issuer pays zero dividends in the year of and the year after the SEO, and uses the retained cash to increase its cash balances. For the full sample, the median issuer would still have negative cash holdings (pro forma Cash/TA of −3.0%, per Row 21 of Table 7) and subnormal cash holdings (pro forma Excess Cash/TA of −10.6%, per Row 22). Moreover, 57.6% of issuers would have negative Cash/TA (Row 23) and 78.5% would have below normal Cash/TA (Row 24) under this assumption. Thus, retaining the cash instead of paying dividends in the year of and after the SEO would help some firms address their immediate cash needs, but such hypothetical retention would still leave 57.6% of issuers with no cash and arguably, because of the dividend omission, facing less advantageous offer terms if they sold stock to make up the shortfall.

A dividend omission would free up more cash for issuers ranked in the top five hundred based on their cumulative dividends, and so avoiding an omission plausibly contributed to the SEO decisions of some issuers in the top payer group. Rows 21 and 23 of Table 7 shows that, if the top payers omitted dividends and did not receive the SEO proceeds, median pro forma Cash/TA is 2.3% instead of −1.0% (per Table 6) and 28.2% of issuers instead of 58.4% would have negative cash balances. Even had they eliminated dividends, 67.7% of issuers would still have subnormal cash holdings (Row 24), with a median pro forma Excess Cash/TA of −2.1% (Row 22). The median issuer in the top payer group paid dividends for 32 years before the SEO (data not tabulated), and extant evidence indicates that long-standing payers are especially reluctant to omit dividends (DeAngelo and DeAngelo, 1990). On the other hand, 15.9% of the issuers in the top payer group had already eliminated dividends by the year before the SEO (data not tabulated), a finding that is both indicative of a near-term cash need and a precursor to our Section 5 evidence that mature firms that issue stock tend to be financially troubled.

**Table 7**
Capital expenditures (CapEx), the incidence of debt increases in years surrounding seasoned equity offerings (SEOs), and the hypothetical impact on the ratio of cash to total assets (Cash/TA) had the firm not received the SEO proceeds, and also not increased CapEx, not paid dividends, and not increased debt in the year of and year after SEO, for a sample of 4,291 SEOs conducted by CRSP/Compustat industrial firms, with the sample partitioned by the issuer's dividend history. The year before and the year of the SEO refer to the fiscal year ends immediately before and immediately after the SEO in question. The year after the SEO refers to the end of the first full fiscal year after the offering. In Panel B, pro forma values of Cash and Total Assets in the year after the SEO are adjusted to the values that they would hypothetically take had the firm not received the SEO proceeds and had it allocated to cash balances any increases it had made in capital expenditures in the year of and year after the SEO. The pro forma Excess Cash/TA ratio subtracts the estimated normal level of Cash/TA for the firm from its pro forma Cash/TA. In Panel D, the pro forma ratios are calculated as though any actual increase in the dollar level of debt as of the year after the SEO was not available to the firm. In Panel E, the pro forma Cash/TA ratio is calculated assuming that each firm paid zero dividends in the year of and year after the SEO and held the retained resources as cash balances. The never paid dividends designation refers to issuers that had not paid dividends as of the year before the SEO. The dividend-adjusted figures for the never paid group in Panel E differ slightly from those for the same group in Table 6 because of the small amount of dividends paid by these firms in the year of or year after the SEO.

| | All issuers | Top payers | Other payers | Never paid |
|---|---|---|---|---|
| **A. Capital expenditures in years surrounding SEO** | | | | |
| 1. Median [CapEx in year before SEO]/SEO proceeds | 24.3% | 128.4% | 39.6% | 13.7% |
| 2. Median [CapEx in year of SEO]/SEO proceeds | 38.8% | 148.3% | 58.3% | 25.7% |
| 3. Median [CapEx in year after SEO]/SEO proceeds | 51.3% | 165.9% | 74.0% | 32.8% |
| 4. Median [two-year change in CapEx]/SEO proceeds | 30.5% | 34.0% | 42.5% | 24.4% |
| 5. Median [two-year change in CapEx]/TA in year before SEO | 10.0% | 1.9% | 7.8% | 14.0% |
| 6. Median percent change in CapEx (year before to year after SEO) | 40.8% | 11.8% | 34.9% | 55.2% |
| 7. Percent with CapEx increase (year before to year after SEO) | 81.4% | 67.5% | 83.0% | 82.4% |
| **B. Cash holdings given no SEO proceeds received and no CapEx increases made in year of and after SEO** | | | | |
| 8. Median pro forma Cash/TA in year after SEO | 4.1% | 2.4% | 2.8% | 6.6% |
| 9. Median pro forma Excess Cash/TA in year after SEO | −3.7% | −2.1% | −3.4% | −5.2% |
| 10. Percent with pro forma Cash/TA < 0 in year after SEO | 40.3% | 34.4% | 42.2% | 39.1% |
| 11. Percent with pro forma Excess Cash/TA < 0 in year after SEO | 59.6% | 61.8% | 60.8% | 58.1% |
| **C. Absolute change in debt (year before to year after SEO)** | | | | |
| 12. Percent of issuers with debt increase | 60.4% | 53.8% | 62.9% | 60.0% |
| 13. Percent with no change in debt | 5.4% | 0.0% | 2.5% | 7.9% |
| 14. Percent with debt decrease less than 25% of SEO proceeds | 17.4% | 6.3% | 12.3% | 22.0% |
| 15. Percent with debt decrease between 25% and 50% of SEO proceeds | 4.9% | 5.2% | 6.3% | 4.1% |
| 16. Percent with debt decrease equal to 50% or more of SEO proceeds | 11.9% | 34.7% | 16.0% | 6.2% |
| **D. Cash holdings in year after SEO given no SEO proceeds received and no increase in debt** | | | | |
| 17. Median pro forma Cash/TA in year after SEO | −16.0% | −4.4% | −15.8% | −20.4% |
| 18. Median pro forma Excess Cash/TA in year after SEO | −26.3% | −9.5% | −23.2% | −32.8% |
| 19. Percent with pro forma Cash/TA < 0 in year after SEO | 74.2% | 75.9% | 81.0% | 69.9% |
| 20. Percent with pro forma Excess Cash/TA < 0 in year after SEO | 87.3% | 89.0% | 92.0% | 84.3% |
| **E. Cash holdings given no SEO proceeds received and no dividends paid in year of and after SEO** | | | | |
| 21. Median pro forma Cash/TA in year after SEO | −3.0% | 2.3% | −3.1% | −5.3% |
| 22. Median pro forma Excess Cash/TA in year after SEO | −10.6% | −2.1% | −9.1% | −15.1% |
| 23. Percent with pro forma Cash/TA < 0 in year after SEO | 57.6% | 28.2% | 61.7% | 59.1% |
| 24. Percent with pro forma Excess Cash/TA < 0 in year after SEO | 78.5% | 67.7% | 82.7% | 77.6% |

Although Tables 6 and 7 show that a substantial majority of issuers face a cash shortfall around the time of the SEO, a nontrivial minority of issuers has cash balances substantially above normal levels. In 387 cases (9.0% of our sample), the issuer's pro forma Excess Cash/TA exceeds 0.10 in the year after the SEO (details not tabulated). These firms clearly do not face a near-term cash need that implies that managers must choose between raising outside funds immediately or changing some aspect(s) of their operating decisions.[8] Rather these firms can avoid the stock issue, carry out their full set of operating and other financing decisions through the year after the SEO, and still have Cash/TA ratios that are 10% or more above normal. The median issuer in this group has actual Cash/TA of 48.1% and Excess Cash/TA of 30.3% (inclusive of SEO proceeds) in the year after the SEO. These notably strong cash positions fit the cash stockpiling predictions of Loughran and Ritter (1997, p. 1848). Thus, while market timing does not by itself explain the preponderance of our findings, a minority of firms in our sample issues stock with no near-term need for cash, apparently to take advantage of high market valuations.

### 4.3. Components of issuers' near-term need for capital

For most issuers, the proximate cause of the need to raise capital is not a decline in internally generated cash flow, but rather investment and working capital outlays that exceed internal cash flow. We reach this conclusion

[8] We reach a similar conclusion about the extent of stockpiling when we examine the abnormal change in cash measure employed in Rows 20–23 of Table 6. For example, in the year after the SEO, 10.9% of issuers have an abnormal change in cash balances that is greater than the amount of cash they raised in the SEO.

using the approach of Frank and Goyal (2003, Table 2) who decompose annual corporate cash flow into (i) dividends (on common and preferred shares), (ii) investments, (iii) change in working capital, and (iv) internal cash flow. A firm has a financing deficit in a given year if [(i)+(ii)+(iii)] exceeds (iv), because its internally generated cash is insufficient to cover its uses of cash, and it has a surplus if the reverse relation holds. The median issuer in our full sample has internally generated cash flow (as a percent of assets) of 8.7% in the year of the SEO, whereas the medians for investment outlays and the change in working capital are 17.8% and 9.8%, respectively. The comparable medians in the year before the SEO are 8.9%, 12.1%, and 4.8%, which are also indicative of a substantial gap between internally generated cash and investment and working capital outlays.

The inability of internally generated cash flows to cover investment outflows reflects the fact that our sample contains many growth-stage issuers that have never paid dividends. For the median issuer in the never paid dividends subsample, internal cash flow in the year of the SEO is 7.7% of assets, while investment outlays and increases in working capital are 21.0% and 12.6%, respectively (versus 8.0%, 13.0%, and 6.3% the year before). The picture is very different for the mature firms in the top dividend payer subsample, in which internal cash flow is 8.3% of assets in the year of the SEO, whereas investment outlays and increases in working capital are 8.1% and 1.5% (versus 8.0%, 7.5%, and 0.9% the year before). Thus internally generated cash flow almost covers investment for the top payers, while funds raised by the median issuer in the year of the SEO are used to pay dividends on common and preferred stock (1.3%) and to reduce debt (by 1.1%) after raising debt the year before (by 1.5%).

We also find that, without external financing, 47.6% of issuers would have run out of cash in the year before the SEO, and that they rely more heavily on debt financing in that year than in the SEO year. For our full sample, the median firm with a financing deficit has net debt issuance of 41.2%, 0.0%, and 68.5% of that deficit in the year before, year of, and year after the SEO. The comparable sequence for the top dividend payer group is 95.2%, 7.1%, and 90.9% versus 0.5%, 0.0%, and 24.4% for firms that have never paid dividends (with other dividend payers conforming closely to the top payers). In sum, while firms in our sample that have never paid dividends often issue equity when they raise capital, our dividend-paying firms typically issue debt, so that the latter firms' decisions to conduct an SEO are major departures from their ongoing practice. Except for such departures, the financing patterns for our sample conform to the familiar stereotype that growth firms tend to rely on equity financing, while mature firms tend to rely on debt.

### 4.4. Financing deficits and the SEO decision

Our finding (reported in Tables 6 and 7) that most sample issuers experience a near-term funding need around the time of the SEO led us to conduct an additional sensitivity check on Section 3's logit tests. In this analysis, we restrict attention to the subset of observations in which the firm has a financing deficit (as defined by Frank and Goyal, 2003) in the year in question. The intuition for restricting the analysis to firms with financing deficits is that firms that fund all outlays from internal cash flow are implausible candidates for selling stock, so that inclusion of such observations in the logit samples may lead to fitted coefficient values that show weaker-than-warranted support for market timing.[9]

The resultant estimations (details not tabulated) reveal a higher overall probability of an SEO, with logit intercepts markedly above those in Table 3, which is to be expected because we exclude observations with financing surpluses from this analysis. However, the slope coefficients conform closely to those reported in Table 3, as do the implied relative probability impact of timing and lifecycle effects. Consider, for example, the base case model results reported in Panel A of Table 5 which indicate that the SEO probability is 6.5% for a firm listed one year with poor timing opportunities, or 71% greater than the 3.8% probability for a firm listed 20 years with excellent timing opportunities. When the estimation excludes firms with financing surpluses, the SEO probabilities are 10.9% and 7.5%, with the former probability 45.3% greater than the latter. We also run this analysis using a number of nested logit specifications in which firms choose in the first stage whether to raise outside funds, and they choose in the second stage whether to sell stock or to use other forms of external financing. In some specifications, the estimation yields predicted SEO probabilities that are unreasonably high (details not tabulated). When the estimation converges to reasonable intercept values (i.e., intercepts that translate to reasonable SEO probabilities), the second stage slope coefficients for timing and lifecycle effects are close in magnitude to those reported in Table 3, thus are supportive of our earlier inferences.

## 5. Leverage, leverage rebalancing, and financial distress

Finally, we investigate the extent to which firms conduct SEOs to rebalance leverage and/or to reduce the probability of financial distress. Fama and French (2002), Flannery and Rangan (2006), Kayhan and Titman (2007), and Huang and Ritter (2009) find that firms tend to rebalance leverage toward a target optimum, although the adjustment process is slow, typically taking some three to seven years or more. Leary and Roberts (2005, p. 2610) find that, although firms generally tend to rebalance

[9] The literature on the debt-equity choice provides evidence that capital markets conditions influence this choice; see Marsh (1982), Bayless and Chaplinsky (1991), Jung, Kim, and Stulz (1996), Dittmar and Thakor (2007), Henderson, Jegadeesh, and Weisbach (2006), and Huang and Ritter (2009). Most of this literature does not, however, examine the relation between future stock returns and the issuance of equity instead of debt. In a recent paper, Huang and Ritter (2009) find that firms are more likely to issue equity instead of debt when their future returns are low. In an earlier paper, Jung, Kim and Stulz (1996) find no significant relation between future equity returns and the issuance of equity instead of debt.

toward a target leverage ratio, equity issuances are a prominent exception, thus they are anomalous for the trade-off theory of capital structure. Hovakimian, Opler, and Titman (2001) also report evidence of rebalancing, but they conclude that the evidence is markedly weaker when the capital structure change includes an equity issuance. Hovakimian (2004) reports some signs of systematic leverage rebalancing, but not for firms that issue equity. Alti (2006) finds that IPOs conducted during "hot issue" markets typically induce temporary deviations below target leverage that are fully reversed within two years.

We document that (i) issuers that have never paid dividends typically have low leverage before the SEO, (ii) firms in all sample partitions typically experience small leverage changes pre- and post-SEO, (iii) any systematic leverage rebalancing effect is small, and (iv) mature firms that conduct SEOs tend to have Altman *Z*-scores indicative of a serious risk of financial distress. The first three findings indicate that leverage rebalancing is not a first-order determinant of the SEO decision, although it could be an ancillary motivation for a subset of issuers. The fourth finding provides additional support for our earlier inference that a near-term cash shortfall underlies most firms' decisions to conduct an SEO.

Table 8 reports that, in the year before the SEO, the median top payer has a market-based ratio of total debt to total assets (TotD/MVA) of 0.270 and a book leverage ratio (TotD/TA) of 0.311, the median other payer has slightly lower leverage (TotD/MVA=0.191 and TotD/TA=0.290), and the median issuer that has never paid dividends has markedly lower leverage (TotD/MVA=0.057 and TotD/TA=0.158). (The rankings remain the same for market and book leverage ratios with numerators based on long-term debt or total liabilities and denominators based on total assets or total capital, details not reported.) The very low market leverage of issuers that have never paid dividends strongly supports the conclusions of Frank and Goyal (2003) and Fama and French (2005) that external equity is not the financing vehicle of last resort, as predicted by Myers and Majluf's (1984) pecking-order model.

Rows 3 and 4 of Table 8 show that the SEO proceeds are insufficient by themselves to effect a major leverage reduction for many issuers. Per Row 3, long-term debt (LTD) constitutes between 80% and 90% of total debt for the median issuer in each group and, per Row 4, the scale of LTD looms large or small relative to the SEO proceeds depending on the group. For the top payers, LTD is 5.27 times the issue proceeds at the median, which implies that most of the firm's debt would remain outstanding even had managers used all cash raised in the SEO to pay off debt. Although the median issuer in the never paid group could pay off its LTD with 84% of the issue proceeds left over (per Row 4), the resultant leverage reduction is modest because issuers in this group typically have low leverage to begin with (per Rows 1 and 2 of the table). The

**Table 8**
Pre-SEO leverage, leverage changes before and after SEOs, cross-sectional test for leverage rebalancing, and pre-SEO Altman *Z*-scores, for a sample of 4,291 SEOs conducted by CRSP/Compustat industrial firms, with the sample partitioned by the issuer's dividend history. Market leverage is total debt/total assets, with the market value of equity substituted for the book value of equity. Book leverage is total debt/total assets. In the cross-sectional leverage rebalancing regressions, the dependent variable is the change in leverage from the fiscal year-end immediately before the SEO to the fiscal year-end immediately after the SEO and the explanatory variable is the change in leverage over the five years prior to the SEO (and an intercept term). For brevity, we report only the results for market based leverage, but similar results obtain for book-based leverage (and for leverage measures based on long-term debt or total liabilities instead of total debt and for total capital instead of total assets). All other measures yield *t*-statistics on pre-SEO leverage change that are significant at high levels and coefficient estimates that fall in the range −0.067 to −0.222, i.e., all other approaches yield results that are qualitatively identical to those tabulated below. Top payers are firms ranked in the top five hundred of all industrials based on cumulative dividends as of the year before the SEO. Other payers are those ranked below the top five hundred.

| | Top payers | Other payers | Never paid dividends |
|---|---|---|---|
| 1. Market leverage the year before the SEO (TotD/MVA) | 0.270 | 0.191 | 0.057 |
| 2 Book leverage the year before the SEO (TotD/TA) | 0.311 | 0.290 | 0.158 |
| 3. Median pre-SEO Long-Term Debt/Total Debt (LTD/TotD) | 0.897 | 0.896 | 0.813 |
| 4. Median pre-SEO LTD/issue proceeds | 5.27 | 1.25 | 0.16 |
| 5. Median change over the five years before the SEO | | | |
| TotD/MVA | 0.019 | −0.022 | −0.003 |
| TotD/TA | 0.029 | 0.008 | −0.001 |
| 6. Median change from the year before to immediately after the SEO | | | |
| TotD/MVA | −0.034 | −0.035 | −0.005 |
| TotD/TA | −0.030 | −0.055 | −0.029 |
| 7. Cross-sectional leverage rebalancing tests (TotD/MVA) | | | |
| Intercept | −0.021 | −0.058 | −0.046 |
| (*t*-statistic) | (−4.92) | (−18.24) | (−12.60) |
| Pre-SEO leverage change | −0.222 | −0.114 | −0.158 |
| (*t*-statistic) | (−6.77) | (−6.20) | (−7.91) |
| Adjusted *R*-squared | 0.13 | 0.04 | 0.09 |
| Percent nonmissing observations | 93.4% | 64.7% | 26.1% |
| 8. Median Altman *Z*-score in the year before the SEO | 2.53 | 3.83 | 5.15 |
| 9. Percent of issuers with *Z*-score < 2.99 | 62.7% | 32.4% | 43.9% |
| 10. Percent of issuers with *Z*-score < 1.80 | 30.4% | 12.7% | 18.2% |

median issuer in the other payer group could come close to paying off its LTD with the issue proceeds but, as we discuss below, typically chooses not to do so.

Issuers show little sign of systematic exogenous leverage increases over the five years before the SEO that might motivate them to issue equity in order to rebalance leverage. For the top payers, the median pre-SEO changes in market and book leverage are only 0.019 and 0.029, respectively, while the corresponding changes for the other payers are either smaller or negative (0.008 or −0.022), and both changes are negative for the never paid group (−0.003 and −0.001). These small leverage changes are consistent with Korajczyk, Lucas, and McDonald's (1990) finding that issuers' leverage does not increase significantly in the two years before an SEO. In our sample, the median post-SEO leverage change is a reduction but, for reasons discussed above, it is typically not large, ranging from −0.005 to −0.055, depending on the group and particular leverage measure (Row 6 of Table 8). Masulis and Korwar (1986, p. 97) report comparably modest SEO-induced leverage changes for offerings conducted over 1963–1980.

To formally test for leverage rebalancing, we fit a cross-sectional regression in which the dependent variable is the leverage change in the year of the SEO and the explanatory variable is the leverage change over the prior five years. Because so many SEOs are conducted by firms that have been listed for just a short time (per Table 2), the tests in Row 7 of Table 8 are based on significantly reduced sample sizes, especially for issuers that have never paid dividends. Specifically, we lose 73.9% of the observations in the never paid group, 35.3% of the observations for the other payers, and 6.6% of those for the top payers. The significantly negative slope coefficients of −0.222, −0.114, and −0.158 (Row 7 of Table 8) indicate that the SEO-related leverage change typically offsets between 10% and 20% of the leverage change over the prior five years. We interpret these negative coefficients as weakly suggestive of a rebalancing motive for some issuers. Moreover, given the generally low ex ante leverage for the never paid dividends group (per Row 1 of Table 8), leverage rebalancing simply cannot be an important motive for most of these issuers, so that any rebalancing effect is not a sample-wide phenomenon.

Table 8 reports evidence that avoidance of financial distress and bankruptcy costs (as in trade-off theories of capital structure) may help explain Section 4's cash shortfall evidence for the mature issuers in our sample. Row 8 indicates that in the year before the SEO the median issuer in the top payer group has an Altman *Z*-score of 2.53, which falls below the 2.99 cutoff that identifies firms for which distress is a genuine risk, but above the 1.80 cutoff that identifies firms that will likely fail (Altman, 1968). In contrast, the median *Z*-scores are a respectable 3.83 and 5.15 for the other payer and never paid dividends groups, although a nontrivial minority of both groups has *Z*-scores that indicate mild or serious financial trouble (Rows 9 and 10). Relative to the other payer and never paid groups, a markedly higher proportion of issuers in the top payer group has *Z*-scores below 2.99 immediately before the SEO (62.7% versus 32.4% and 43.9% per Row 9) and below 1.80 (30.4% versus 12.7% and 18.2% per Row 10). The fact that many top payers exhibit attributes of mildly or seriously troubled firms in the year before the SEO suggests that their stock sales are motivated at least in part by a need to obtain financial breathing room.

## 6. Conclusion

Both a firm's market-timing opportunities and its corporate lifecycle stage exert statistically and economically significant influences on the probability that it conducts a seasoned equity offering (SEO), with the lifecycle effect empirically stronger. Large changes in market-timing opportunities or in the number of years listed translate to only modest absolute changes in the estimated probability that a firm conducts an SEO, but the marginal impact is large in relative terms because firms sell stock only infrequently. For example, the SEO probability is 176% greater for a firm whose market-timing opportunities are poor than for one whose timing opportunities are excellent. Similarly, the SEO probability for a firm listed for one year is 9%, which exceeds by 260% the 2.5% SEO probability for a firm listed for at least 20 years (timing opportunities constant). The relative importance of lifecycle versus timing is evident in our finding that the estimated SEO probability for a firm listed for one year with poor market-timing opportunities exceeds by 71% the SEO probability for a firm listed for at least 20 years with excellent timing opportunities (6.5% versus 3.8%). Leverage rebalancing could motivate some SEOs, but any such effect is small and, because many issuers have low leverage before the SEO, rebalancing cannot be a pervasively important motive for selling stock.

Although both lifecycle stage and market-timing opportunities significantly influence the decision to conduct an SEO, both motivations fall well short of providing a comprehensive explanation of observed SEO decisions. For the lifecycle theory, the empirical problem posed by our findings is that firms that are beyond the growth stage account for a surprisingly large fraction of both the number of SEOs and of the total proceeds from SEOs. Perhaps stock sales are not as rare as expected among mature firms because these firms typically distribute free cash flow as they generate it. While such distributions control agency problems, they also increase the likelihood that mature firms will need to raise outside capital, either because managers discover attractive new investment opportunities or because financial difficulties materialize (as Altman *Z*-scores indicate is the case for our typical mature issuer).

For market-timing theories, the empirical problem posed by our findings is that the vast majority of firms with attractive timing opportunities fail to issue stock. This empirical shortcoming is not readily apparent from the SEO stock returns literature because that literature focuses on the characteristics of firms that have chosen to issue stock. In contrast, our approach analyzes the determinants of the decision to issue or not issue stock

for the full population of industrial firms. Thus, we are able to observe whether firms with excellent market timing opportunities (as measured by market-to-book ratios and prior and future stock returns) do or do not take advantage of those opportunities by issuing stock.

Why do so many firms with attractive market-timing opportunities fail to take advantage of those opportunities? One possibility is that investor rationality forces managers to disguise (hence limit) attempts to sell overvalued shares. For example, managers' blatantly obvious and/or repeated attempts to sell overvalued equity tend to self-destruct because investors who perceive the ploy immediately reduce the price they are willing to pay for that firm's securities. Consistent with this conjecture, few firms repeatedly sell stock to the public. In our sample of 4,291 SEOs, a full 90.8% are conducted by firms that do three or fewer offerings over a 29-year period, a finding which strongly suggests that serial market timers are not an important economic phenomenon.

Another possible reason why managers may fail to exploit market-timing opportunities is that these individuals simply have little real ability to predict stock returns. This explanation seems especially compelling in light of recent events, with prominent financial institutions such as AIG, Bear Stearns, Citigroup, General Electric, Lehman Brothers, Merrill Lynch, Wachovia, and WAMU all repurchasing stock at high share prices shortly before the financial meltdown of 2008, only to find themselves in dire straights for equity capital and facing sharply reduced share prices as the crisis developed. This explanation begs the question of why managers believe they can time the stock market (Graham and Harvey, 2001). Perhaps the answer to that question lies in managerial hubris or overconfidence about their abilities to predict future returns (Roll, 1986; Heaton, 2002).

Overall, our evidence on cash balances and on the relative importance of timing and lifecycle effects supports theories in which economic fundamentals drive the decision to conduct an SEO, and market-timing considerations are influential only on the margin. Tellingly, without the offer proceeds, 62.6% of sample issuers would run out of cash and be forced to alter their operating and/or financing decisions in the year after the SEO, and 81.1% would have had subnormal cash balances in that year. For most issuers, the SEO proceeds help fund increased capital expenditures, but even had capital expenditures remained flat, absent the offer proceeds 40.3% of issuers would still run out of cash and 59.6% would have below normal cash balances the year after the SEO. These findings indicate that a desire to time the market cannot be the primary motive for selling stock. Rather, the foundational reason most firms conduct SEOs is to meet a near-term cash need and, conditional on such a need, SEO decisions reflect market-timing motives and the firm's lifecycle stage, with the lifecycle effect the empirically stronger of these two ancillary motivations.

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