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Strategic Financial Management: Evidence from Seasoned Equity Offerings

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Rational Financial Management: Evidence from Seasoned Equity Offerings*

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Abstract

Current theories of capital structure have difficulty explaining the aspects of financing behavior we document. In contrast to the tradeoff theory, seasoned equity offers frequently move firms away from their target leverage ratios. At odds with the pecking-order theory, SEO firms typically are financially healthy companies with low leverage, unused debt capacity and substantial cash balances. Inconsistent with the market-timing theory, SEOs appear to be driven by capital requirements associated with large investment projects rather than by market-timing considerations. Moreover, firms issue debt following SEOs, not only to finance investment, but to increase leverage toward its target level. Each of these theories assumes some degree of myopia among financial managers. We propose that CFOs manage their capital structures rationally rather than myopically. They consider the firm's current and target leverage, investment opportunities and long-term capital requirements, as well as the costs and benefits of alternative sequences of financing transactions. This framework, which we term rational financial management, better explains the financing and leverage behavior of SEO firms.

JEL classification: G32

Keywords: Capital structure, Seasoned Equity Offerings, Tradeoff, Pecking-order, Market-timing

1. Introduction

The extant literature offers several basic theories of financial management: the tradeoff theory, the pecking-order theory, and the market-timing theory. The tradeoff theory primarily focuses on the firm's economic balance sheet and its optimal stocks of debt and equity. According to this theory, managers weigh the costs and benefits of substituting debt for equity to arrive at a target leverage ratio that they then endeavor to attain. Tradeoff theory has been productive in explaining the levels of debt employed by firms across different industries as well as the general stability of the average leverage choices across industries over long periods of time. The pecking-order theory focuses primarily on the firm's economic income statement and the flows of new debt and equity required to address capital shortfalls. It posits that the costs of raising capital due to asymmetric information and adverse selection overwhelm other considerations and cause firms to raise funds through the lowest-cost alternative — internally generated funds first, then debt, and external equity only as a last resort (see Myers, 1984). The pecking-order has been constructed specifically to explain why firms access debt markets more frequently than equity markets. The market-timing theory argues that firms issue equity solely to exploit mispricing in securities markets; they do not subsequently adjust the resulting changes in capital structure (see Baker and Wurgler, 2002). Market timing has been offered to explain stock price increases preceding equity offers.

The profession generally has been unsuccessful in producing a unified theory that explains these various aspects of corporate financial management. Although these three theories generally concentrate on explaining different facets of financial management and hence are not logically mutually exclusive, some authors assume that they are. For example, under the market-timing theory and extreme versions of the pecking-order there is no optimal capital structure — a firm's observed leverage is simply the accumulation of a series of myopic decisions to access the most attractive available source of capital as the requirement or opportunity arises.

Overview of Empirical Results. We examine seasoned equity offerings in U.S. markets over the period 1970-2006. Our analysis of more than 5,500 SEO firms over a six-year window — three years before and three years after the SEO — documents the following empirical observations:

- Prior to an SEO, a firm's leverage is typically low and — due to increases in the firm's stock price — its economic leverage is falling;
- Leverage ratios fall further (mechanically) in the quarter of the SEO;
- Investment increases substantially in the SEO quarter and remains persistently high following the SEO;
- For the majority of issuers, the additional investment in the twelve quarters following the SEO exceeds the SEO proceeds;
- SEO firms issue substantial amounts of debt following the SEO; these subsequent debt issues typically increase leverage above pre-SEO levels;
- Following the SEO, firms for which leverage is further below target undertake larger debt issues;
- Average debt maturity lengthens following the SEO;
- There are systematic differences between growth-option and assets-in-place SEO firms — the former are more likely to have leverage below target levels and falling prior to the SEO and are more likely to lengthen debt maturity.

Implications for Financial Management Theory. Our evidence from SEOs is fundamentally inconsistent with important aspects of the current theories of financial management. For example, In contrast with the tradeoff theory, SEOs often move firms further away from, rather than closer to, their target leverage ratios. Firms do not exhaust other financing alternatives prior to accessing external equity markets, as suggested by the pecking-order theory. In fact, the typical SEO firm is financially robust with low leverage, unused debt capacity, and substantial cash balances. Moreover, information about new investment opportunities typically increases stock prices, thereby decreasing economic leverage prior to

SEOs. And in contrast with the market-timing theory, SEOs appear to be prompted by capital requirements associated with large investment projects rather than by market-timing considerations.

The standard tradeoff, pecking-order, and market-timing theories of financial management explicitly or implicitly assume that managers behave myopically in their implementation of corporate financial policy. Basic tradeoff theories, for example, assume that a firm's investment opportunities and cash flows are stationary, which implies that the firm's target leverage is constant. More sophisticated models of dynamic tradeoff theory incorporate adjustment costs and admit temporary deviations from the target. But within these models, managers are presumed to adjust capital structure toward a stationary target whenever the observed leverage ratio reaches a transaction-cost-determined bound; there is no consideration that a firm might issue equity when leverage is below its target. The pecking-order theory focuses little attention on the asset side of the balance sheet. Firms following the pecking order address their current financial deficits using the lowest-cost source of funds (see Myers and Majluf, 1984, and Shyam-Sunder and Myers, 1999).[1] And the market-timing theory presumes that a firm's current capital structure is simply the cumulative outcome of managers' attempts to time the equity market; Baker and Wurgler explicitly assume that CFOs are unconcerned about the resulting capital structure.

Rational Financial Management. In this paper, we offer a more integrated theory of financial management — one that we believe preserves the productive aspects of the extant theories, but avoids their major deficiencies. We presume that a CFO manages the firm's capital structure rationally. The CFO will evaluate the firm's long-term financing requirements as well as the costs and benefits of alternative sequences of financing transactions. For example, consider a firm undertaking a large investment project that, if financed entirely with debt, would require it to exceed its target leverage by an unacceptable margin. Rather than borrowing until its debt capacity is exhausted (as assumed by the pecking order) or choosing a financing package to move toward its target leverage (as presumed by the tradeoff theory), our

[1] An exception is Lemmon and Zender (2010) who suggest that firms might stockpile debt capacity. They amend the pecking-order to permit firms to recognize the costs of exceeding their debt capacity and adjust leverage to avoid these costs.

evidence suggests that firms typically sell equity in an early stage of the project. We document such equity sales even in cases where the firm currently is below its target leverage and hence this equity offer drives firm leverage further away from its target. The additional external financing required to complete the project is accomplished through subsequent debt issues that return the firm to its target leverage over succeeding quarters.

Our evidence indicates that firms routinely issue debt following SEOs; these debt issues both allow the firms to complete their investment projects and to rebalance leverage. We argue that major benefits of an equity sale early in the investment project are that it controls the underinvestment problem (Myers, 1977), thereby more effectively bonding the firm's commitment to complete the project. It also increases the tax-related benefits of the project (see Hennessy and Whited, 2005). Moreover, it better controls information asymmetry problems between the firm's managers and external investors.

Our argument that CFOs rationally manage their firms' capital structures extends recent dynamic tradeoff theories, in which firms optimally (but passively) tolerate deviations from their target leverage ratios. In these models, a firm adjusts leverage through equity offers infrequently, but such adjustments move the firm's leverage toward its target (although it may overshoot). Our analysis similarly implies deviations and infrequent adjustments, but we argue that a firm still may choose to issue equity even if its current leverage is below its target. Furthermore, we emphasize the interaction between firms' investment and financing decisions. Our evidence suggests that equity financing is generally triggered by the arrival of large investment opportunities; it is not solely a leverage-adjustment tool.[2]

In general, our evidence suggests that managers consider the firm's planned investment decisions as well as their associated capital requirements over the foreseeable future and rationally choose a

[2] Prompted in part by our results, Dudley (2009) examines the financing decision associated with large investment projects. His results are complementary to ours. Moreover, Sundaresan and Wang (2007) develop a model in which firms exercise growth options optimally over time and finance these investments by trading off the tax benefits of debt against both distress costs and the agency costs of debt. One prediction of their model is that when future growth options are anticipated, the firm optimally chooses its initial investment and leverage to mitigate the underinvestment problem. Our evidence thus provides support for this prediction of their model.

sequence of financing transactions that maximizes firm value. CFOs consider both their economic balance sheet and cash flow statement over a long horizon in managing corporate financial policy. A CFO rationally might issue equity when current leverage is low to commit the firm to a major project that requires investments over multiple periods. The CFO would plan to issue debt subsequently in order to complete the project. These subsequent debt issues thus are undertaken on more favorable terms due, in part, to the more effective control of the underinvestment problem.

Overview of Paper. The remainder of our paper is organized as follows. In Section 2 we describe the data used in our empirical analysis. We use data on investment and financing policies around the date of SEOs to test the predictions of the tradeoff, pecking-order, and market-timing theories in Section 3. We build on these empirical results in Section 4 in which we detail our proposition of rational financial management. Section 5 concludes.

2. Data

Our data on publicly announced SEOs are from the Securities Data Company (SDC) database and cover the period January 1970 to December 2006. Our sample ends in 2006 to allow for several years of post-issue data. We apply the following criteria to select our sample: (1) the stock is listed on the Center for Research in Security Prices (CRSP) monthly stock file at the time of the offering; (2) the issue involves only common stock; (3) the company is not a regulated utility (SIC code 4900-4999) or financial institution (SIC code 6000-6999); (4) newly issued shares are at least 5% of existing shares outstanding; and (5) the book value of assets and equity in the prior fiscal year are available in the Compustat annual file. Our base sample comprises 5,523 SEO observations. Figure 1 depicts the number of SEOs by calendar year. We observe substantial time-series variation in SEO volume (in a pattern similar to IPO volume) reflecting alternating "hot" and "cold" markets. The distribution of SEOs is also uneven across industries; in our sample the business services, electronic equipment, and pharmaceutical industries show the highest frequency of SEOs.

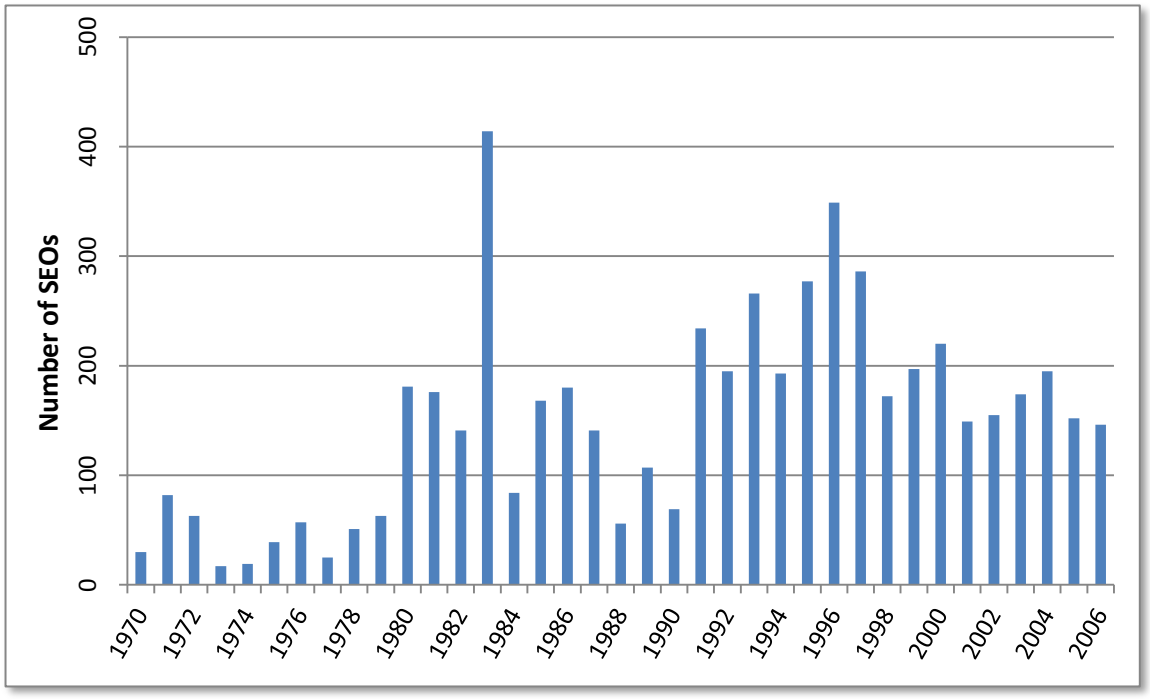

Figure 1: The frequency of SEOs by calendar year: 1970-2006

The base sample consists of 5,523 SEO observations during the period from January 1970 to December 2006. The raw sample is obtained from the SDC database. The following criteria are applied to select the sample: (1) the issue involves common stock only; (2) the company is not a regulated utility (SIC code 4900-4999) or a financial institution (SIC code 6000-6999); (3) the stock is listed on the CRSP monthly stock file at the time of the offering; (4) newly issued shares are at least 5% of the existing shares outstanding, and (5) the book value of assets and equity in the previous fiscal year are available in the Compustat fundamental annual file.

In Table 1 we report summary statistics on SEO firms. Mean SEO proceeds are substantial, representing 19% of the issuer's market value at the end of the year prior to the SEO. (We proxy market value by the book value of assets minus the book value of equity plus the market value of equity.) This magnitude of SEO proceeds also implies a material impact on the issuing firm's capital structure. The mean ratio of market asset value to book asset value is 2.81, suggesting that the typical SEO firm has substantial growth options. (However, this ratio also potential captures overvaluation of SEO stocks.) Relative to the median firm in the same industry (classified on the basis of two-digit SIC codes), SEO firms are larger as measured by the book value of assets in the year prior to the offer.

Table 1
Summary statistics of SEO proceeds and firm characteristics

NShr/Shrout is the number of new shares issued relative to the existing shares outstanding. SEO proceeds (*Proceeds*) are measured by multiplying the number of new shares by the offer price. V_{-1} is the market value of assets in the fiscal year prior to the offering, as measured by the book value of asset (A) minus the book value of equity (BE) plus the market value of equity. Book value of equity is Compustat's total assets, minus total liabilities, plus balance sheet deferred taxes and investment tax credit if available, minus (as available) liquidation, redemption, or carrying value of preferred stock. Market value of equity (ME) is obtained from CRSP's monthly stock return file, computed as the product of share price and shares outstanding. A_{-1} is the book value of assets in the fiscal year prior to the offering. A_{ind_med} represents the industry median book value of assets where industry is measured by the two-digit SIC code. The sample has 5,523 observations of SEO during 1970-2006.

Variables	Mean	Std. Dev.	Quartile 1	Median	Quartile 3
$NShr/Shrout$	0.21	0.22	0.11	0.17	0.25
$Proceeds/V_{-1}$	0.19	0.20	0.08	0.14	0.24
$Proceeds/A_{-1}$	0.67	4.89	0.13	0.30	0.65
$(V/A)_{-1}$	2.81	2.87	1.24	1.80	3.23
$(BE/ME)_{-1}$	0.47	0.42	0.19	0.36	0.62
$\left(A/A_{ind\_med}\right)_{-1}$	7.46	20.34	0.75	1.79	5.15

3. Empirical Evidence from SEOs

We first examine firms' financial condition surrounding an SEO. Our findings that these firms are financially robust are difficult to reconcile with standard versions of tradeoff, pecking-order and market timing theories. We then examine the time-series variation of the leverage ratios of SEO firms. We document a significant fall in leverage before the SEO followed by a significant reversal in leverage following the SEO.

3.1. Financial Condition of SEO Firms

Both the dynamic tradeoff and pecking-order theories predict that an SEO firm's leverage ratio should be high and its financial condition constrained at the time of the offering. The financial ratios we evaluate include the leverage ratio, interest-coverage ratio, current ratio, market-to-book ratio of assets, and Altman's Z-score. In Panel A of Table 2 we report the median ratios over the three years preceding

the offerings. We find no significant deterioration in financial condition of the typical SEO firm. On average, market leverage decreases prior to SEOs. The interest-coverage ratio is stable and always greater than three, which generally is regarded as strong (see Stickney and Weil, 2003, 274-275). The current ratio is greater than two and also is stable. The market-to-book ratio is greater than one and increases modestly over time. Finally, Altman Z-scores do not suggest that the typical SEO firm is financially distressed before the offer (firms generally are considered in a safe zone with Z-scores above 2.6). Although some SEO firms could be financially distressed (see Franks and Sanzhar, 2006, and Jostarndt, 2009), our evidence suggests this group is atypical, representing only a small fraction of SEO firms.

In Panel B, we compare these financial ratios of SEO firms in the year before the offers with their respective industry medians. SEO firms have lower leverage, higher interest-coverage ratios, higher current ratios, higher market-to-book ratios, and higher Altman Z-scores than their industry peers. Wilcoxon tests suggest that these differences are statistically significant. Hence, we conclude that the financial condition of the typical SEO firm is financially robust and stronger than its peers within the same industry.

The time-series and cross-sectional evidence of financial condition thus appears inconsistent with the central prediction of the pecking-order theory, that SEO firms have exhausted their debt capacities at the time of an SEO.[3] The fact that economic leverage of an SEO firm is falling and typically below its industry median prior to the SEO also is at odds with standard versions of the tradeoff theory, which suggest that a public equity issue should move leverage toward its target. Because an SEO mechanically reduces leverage, leverage is pushed further from the industry median for a firm whose pre-SEO leverage already is below the median.

[3] Based on different approaches, Frank and Goyal (2003), Fama and French (2005) and Leary and Roberts (2010) also argue that the power of the pecking-order theory in explaining firms' equity-financing behavior is quite limited.

Table 2
The financial condition of SEO firms prior to the offering

Panel A: The time-series median financial ratios of 5,523 SEO firms in three pre-issue years.

Year Relative to SEO	Market Leverage	Interest Coverage Ratio	Current Ratio	Market to Book Assets	Altman Z-Score
-3	0.18	2.84	2.04	1.41	3.52
-2	0.16	2.80	2.04	1.49	3.55
-1	0.14	3.18	2.11	1.80	3.90
0	0.10	3.97	2.57	1.73	4.32

Panel B: Tests of differences of financial ratios between 5,523 SEO firms and their respective industry median. Industry is classified by two-digit SIC codes.

	Market Leverage	Interest Coverage Ratio	Current Ratio	Market to Book Assets	Altman Z-Score
Median difference relative to industry median	-0.009	0.662	0.189	0.359	0.516
P-value (Wilcoxon test)	<0.001	<0.001	<0.001	<0.001	<0.001
Number of SEOs	5431	5231	5377	5517	5260

3.2. Investment Changes Surrounding SEOs

In Table 3, we report the investment patterns of SEO firms after the equity issues. The magnitude of post-SEO investment relative to firm value is significantly larger than that of the typical Compustat firm matched on market-to-book in the prior year.

Comparing SEO firms with control firms, the median annual excess investment during years 0 to 2 is 12% of book assets. For the median issuer, this represents an 80% increase in annual investment following the SEO. As a result of this substantial additional investment, the median SEO firm increases assets from the year prior to the SEO to two years following the SEO by 39% if measured by market values and 69% if measured by book values. These ratios are positively skewed – differences in means

are greater.[4] In the upper panel of Figure 2 we depict the time series of the ratio of investment to firm value.

3.3. Leverage Changes Surrounding SEOs

We next examine the time-series of leverage surrounding SEOs. We measure market (book) leverage as debt divided by the market (book) value of assets. Debt is the sum of long-term debt and short-term debt (debt in current liabilities). As is standard, we assume that the market value of debt equals its book value. (In our case, this also is justified by the robust financial condition of the issuing firms prior to the SEO.) We employ quarterly data from the CRSP and COMPUSTAT merged database. The event quarter (quarter 0) is the quarter in which new equity is issued. Table 4 reports the mean (median) market (book) leverage of SEO firms from 12 quarters before the offering to 12 quarters after the offering. In the lower panel of Figure 2, we depict the time series of market leverage.

Leverage changes prior to SEOs. Mean market leverage is reasonably stable, ranging from just above 21% to just below 20% until three quarters before the SEO, when it begins to decline. This decline reflects an increase in the denominator — the market value of assets. The stock price of the typical SEO firm increases significantly during the six months prior to the SEO; the cumulative average return for the stocks in our sample is 45.5 percent. (see also Asquith and Mullins, 1986; Loughran and Ritter, 1995). This increase in market value is consistent with announcements of substantial new growth opportunities (McConnell and Muscarella, 1985). Book leverage is quite stable during the 12 quarters before the SEO, averaging 26%.

[4] Our findings that SEOs are a response to greater expected investment are consistent with the findings of Kim and Weisbach (2008). They examine the uses of proceeds from a large sample of IPOs and SEOs in 38 countries and suggest that financing investment is the primary motivation for equity offers. Fu (2009) examines four potential uses of SEO proceeds: retire debt, increase cash holding, increase non-cash working capital, and increase investment. He concludes that although some SEO firms might use part of the proceeds for the other three purposes, increasing investment appears to dominate them in economic magnitude in explaining the use of SEO proceeds.

Table 3
The post-issue investment of SEO firms

The table presents the median post-issue investment of SEO firms. Investment (I_t) is the total investment at fiscal year t, which includes capital expenditure (CAPX), acquisition expense (AQC) and increase in investments (IVCH). In each year, we divide all Compustat firms into quintiles based on the V/A ratio in the previous fiscal year. Control firms are non-SEO firms in the same V/A quintile. The median investment ratios of the control firms are used as the benchmark for the SEO firm's investment ratios. In first two rows, investment is deflated by the book value of assets (A_{-1}) and the market value of the firm (V_{-1}) at the pre-issue year-end. The third row presents the net investment growth rate. The fourth and fifth rows present the net growth in total assets and market value during the three-year window.

Variables	1 (lowest V/A)		2		3		4		5 (highest V/A)		Excess Investment (SEO - Control)
	SEO Firms (N=219)	Control firms	SEO Firms (N=538)	Control firms	SEO Firms (N=1055)	Control firms	SEO Firms (N=1469)	Control firms	SEO Firms (N=2151)	Control firms	
$(1/3)\sum_{t=0}^{2} I_t \Big/ A_{-1}$	0.12	0.06	0.14	0.09	0.19	0.09	0.24	0.10	0.30	0.12	0.12 (p<0.001)
$(1/3)\sum_{t=0}^{2} I_t \Big/ V_{-1}$	0.14	0.08	0.14	0.09	0.15	0.08	0.14	0.06	0.09	0.03	0.06 (p<0.001)
$\left((1/3)\sum_{t=0}^{2} I_t - I_{-1}\right) \Big/ I_{-1}$	0.68	0.09	0.48	0.13	0.76	0.19	1.08	0.29	1.79	0.50	0.80 (p<0.001)
$(A_2 - A_{-1})/A_{-1}$	0.39	0.10	0.50	0.23	0.75	0.25	1.04	0.33	1.61	0.52	0.69 (p<0.001)
$(V_2 - V_{-1})/V_{-1}$	0.77	0.24	0.57	0.28	0.75	0.25	0.68	0.21	0.45	0.08	0.39 (p<0.001)
$Proceeds \Big/ \sum_{t=0}^{2} I_t$	0.28		0.21		0.26		0.35		0.67		

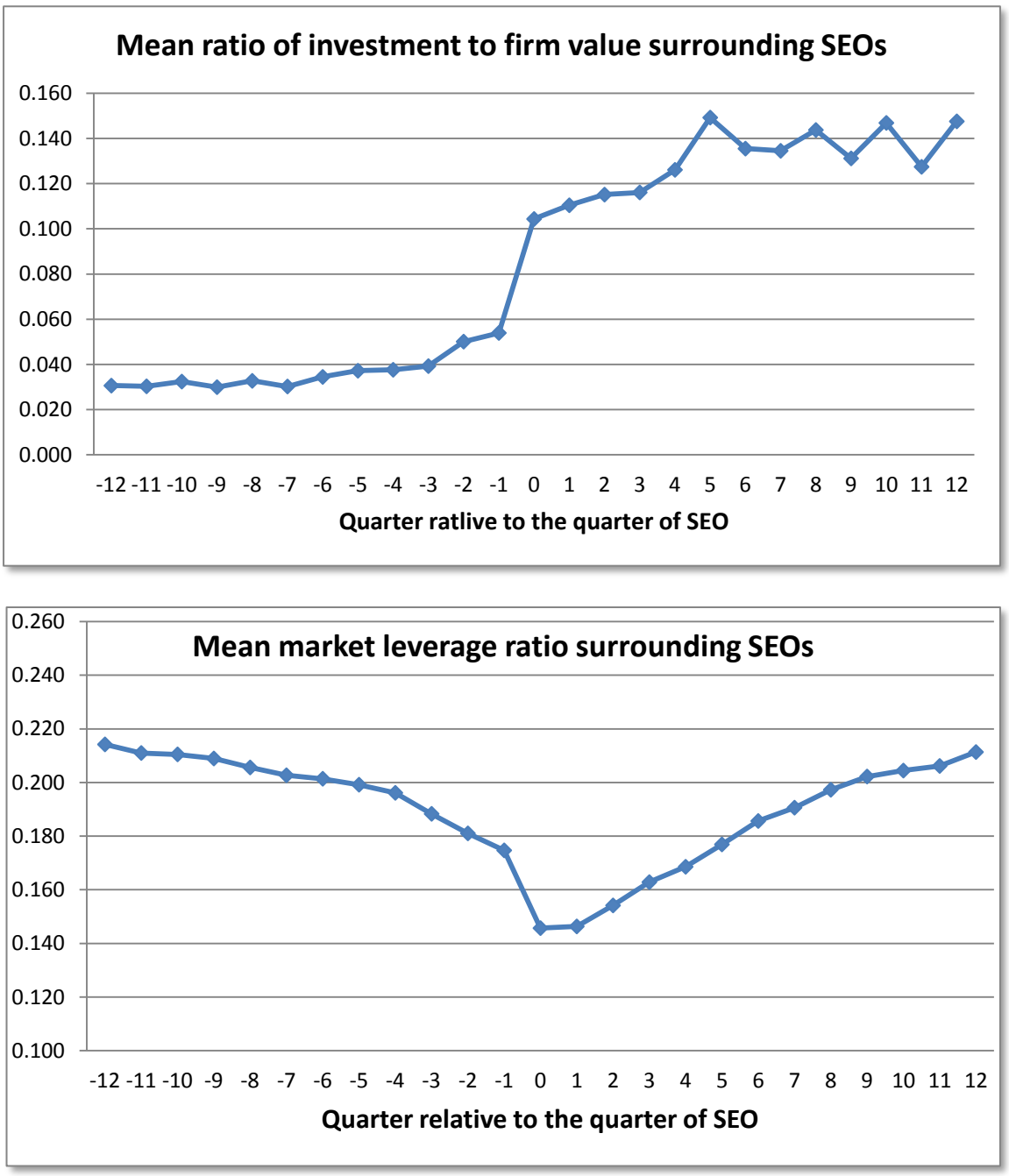

Figure 2: Time-variation in investment and leverage of SEO Firms

Two panels in this graph respectively show ratio of investment to firm value and the market leverage ratio from 12 quarters before the SEO to 12 quarters after the SEO. The quarter that SEOs take place is defined as quarter 0. Investment is the sum of capital expenditure, acquisition expenses, and increases in investment. The investment is deflated by the market value of the SEO firm at the beginning of quarter 0. Debt is the sum of the long-term debt and the short-term debt (debt in current liabilities).

Leverage Changes at SEOs. The leverage ratio drops substantially in quarter 0 due to the SEO. The mean market leverage drops from 17.5% in the quarter prior to the SEO to 14.7% by the end of the offering quarter; mean book leverage drops from 26.8% in the quarter prior to the SEO to 20.6% at the end of quarter 0. This is not surprising since SEOs increase the equity portion of the firm materially; on average, the number of newly issued shares is about one quarter of shares outstanding. This leverage drop in quarter 0 thus is largely mechanical. (Note that this fall in market leverage is despite the average fall in the stock price at the SEO, which is -2.44% over the three event days -1 to +1; we discuss stock returns around SEOs in more detail in Section 4.)

Leverage Changes Following the SEO. This decline in leverage is temporary. On average, leverage ratios revert to their pre-issue levels over the twelve quarters following an SEO. As we report in Table 4, the mean market leverage is 21.4% at the end of quarter 12 and continues to rise − the mean is 22.1% by quarter 20. Book leverage similarly reverts to a mean of 26.2% at the end of quarter 12.

Extant capital structure theories have limited predictions about post-SEO debt issues. The market-timing theory offers the most straightforward statement about post-SEO debt issues. Baker and Wurgler (2002, p. 29) characterize SEOs as market-timing attempts and argue that "there is no optimal capital structure, so market-timing financing decisions just accumulate over time into the capital structure outcome." They explicitly presume that managers are unconcerned about the resulting effects of market timing on capital structure and hence plan no subsequent debt offers. The pecking order and tradeoff theories are generally silent about debt issues following an SEO.

4. Rational Financial Management: Theory and Evidence

4.1. Target Capital Structure.

In our theory of rational financial management – as in the tradeoff theory – we argue that the CFO establishes the company's target leverage; this target leverage takes into consideration factors such as the company's investment opportunity set, its tax circumstances, and regulatory status.

Table 4
Leverage ratios surrounding SEOs in quarterly frequency

The table presents the mean and median leverage ratios of issuing firms from 12 quarters before the offering to 12 quarters after the offering. The quarter of equity offering is defined as quarter 0. The data is obtained from Compustat's fundamental quarterly file.

Quarter relative to SEO	Market Leverage		Book Leverage		N
	Mean	Median	Mean	Median	
-12	0.214	0.181	0.263	0.241	3205
-11	0.211	0.177	0.264	0.244	3339
-10	0.210	0.177	0.265	0.248	3530
-9	0.209	0.171	0.266	0.245	3651
-8	0.206	0.168	0.266	0.247	3836
-7	0.203	0.164	0.264	0.244	4035
-6	0.202	0.165	0.264	0.244	4319
-5	0.199	0.158	0.264	0.247	4490
-4	0.197	0.154	0.265	0.246	4621
-3	0.189	0.147	0.259	0.243	4751
-2	0.182	0.137	0.261	0.246	4847
-1	0.175	0.128	0.268	0.257	4894
0	0.147	0.088	0.206	0.166	4989
1	0.147	0.090	0.204	0.164	4945
2	0.155	0.100	0.215	0.178	4941
3	0.164	0.115	0.224	0.194	4902
4	0.170	0.122	0.225	0.196	4889
5	0.179	0.130	0.233	0.202	4803
6	0.187	0.141	0.241	0.216	4736
7	0.192	0.149	0.246	0.224	4663
8	0.200	0.158	0.252	0.232	4631
9	0.204	0.162	0.254	0.237	4537
10	0.206	0.163	0.256	0.234	4462
11	0.208	0.169	0.258	0.241	4386
12	0.214	0.177	0.262	0.245	4308
16	0.220	0.182	0.269	0.253	3971
20	0.221	0.185	0.269	0.252	3572

Smith and Watts (1992) show that investment opportunities have a significant impact on firms' choice of target leverage. Growth-option firms face more severe investment distortion problems associated with underinvestment and thus tend to employ less leverage than assets-in-place firms. Assets-in-place firms tend to have higher leverage because they have more collateral to support debt and greater incentive to use debt to control free cash flow problems. Barclay and Smith (1995) offer evidence that investment opportunities also affect the maturity structure of corporate debt: to control underinvestment problems, growth-option firms tend to employ less long-term debt in their capital structure than assets-in-place firms.

Leverage-adjusting Transactions. If the company currently is not at its target leverage, a rational CFO considers not only the benefits of moving toward the target, but also any associated adjustment costs. As a general principle, the CFO should adjust the firm's capital structure whenever the costs of adjustment are less than the opportunity costs of deviating from the target. Thus, our theory of rational financial management presumes (as do dynamic-tradeoff and pecking-order models) that the structure of these costs—including both information costs and out-of-pocket transactions costs—is an important consideration.[5]

The available evidence suggests that there is a substantial fixed component to these costs. The magnitude of such fixed costs varies materially among different types of securities. Equity issues have both the largest out-of-pocket transactions costs and the largest information costs. Long-term public debt

[5] For example, others also have noted the importance of these costs. Fisher, Heinkel, and Zechner (1989) show that fluctuations in asset values often move firm leverage away from its target level. They argue that leverage adjustments occur only when the costs of deviation outweigh recapitalization costs. As a result, firms do not always stay at their target leverage ratio; instead, they stay within an optimal range of leverage ratios. The importance of recapitalization costs in affecting firms' financing behavior is also discussed by Barclay and Smith (2005), Leary and Roberts (2005), and Strebulaev (2007).

issues are the next most costly. Short-term private debt or bank loans – especially debt available through an established line of credit – are the least costly[6].

Because CFOs weigh these adjustment costs against the expected benefits from moving closer to their target leverage. This fundamental tradeoff has several important implications: (1) Larger adjustment costs will lead to larger deviations from the target before the firm readjusts. Thus, seasoned equity offerings are relatively rare events, long-term debt issues are more common, and private debt offerings or bank loans occur with almost predictable regularity. (2) Because of these adjustment costs, most companies are also likely to spend considerable time away from their target capital structures. (3) Because of these scale economies in issuing new securities, small firms are likely to deviate further from their target leverage than larger firms.

Corporate Debt Capacity. Our discussion of target leverage and adjustment costs suggests a natural definition of a firm's debt capacity: the amount of debt a firm could issue before the opportunity cost of deviating from its target leverage exceeds the cost of adjusting. Therefore, even if the firm is above its target leverage, a debt issue still can be optional. Our model thus helps resolve the apparently anomalous results reported by Hovakimian (2004). He argues that the tradeoff model predicts that debt issues will always move the firm toward its target leverage, but his results show that the opposite is often the case. With our framework, these observations pose no anomaly so long as the debt issue does not exhaust the firm's debt capacity.

4.2. Sequencing Financing Choices

We consider a "large" investment project as one that would cause the firm's aggregate financial deficit to exceed its unused debt capacity over the period required to implement the project. Since the firm

[6] For example, Smith (1977) reports that percentage flotation costs fall with SEO proceeds. Altinkilic and Hansen (2003) also show that SEO discounting falls with offer size, suggesting the existence of economies of scale. Blackwell and Kidwell (1988) report fixed costs and scale economies for debt issues.

must raise both debt and equity to finance such an investment project, it thus faces a basic choice of how to sequence the offerings.

We presume the CFO will employ available information about the firm's future prospects, investment opportunities, capital requirements, financial commitments, and internally generated funds to make a rational forecast of external funding requirements on which to base decisions about financing alternatives. This includes the sequencing of these financing choices — whether equity followed by debt or *vice versa*.

SEOs and Underinvestment. To illustrate the importance of sequencing, consider a CFO facing a substantial investment project that would double the firm's assets over the next three years.[7] The pecking-order theory presumes that a firm will finance its current financial deficit using the least expensive available source of funds. Since our evidence indicates that the typical SEO firm has sufficient unused debt capacity to finance the initial stages of such a large investment project with debt, the pecking-order theory predicts that it initially would issue debt rather than equity. Yet adhering to this pecking order would impose potentially severe underinvestment costs. Because debt claims are senior to equity claims, in a highly levered firm, lenders can capture enough of the benefits of a positive net present value project that the flows to the equity holders are insufficient to provide a normal return on the capital committed for the level of risk assumed (Myers, 1977). Thus, if the firm issues debt first, it is more likely to walk away from a positive NPV project if either the value of the project or the value of the firm falls prior to the completion of the project.

By issuing equity first, the firm more effectively bonds the entire sequence of future investment expenditures. From the equity holders' perspective, more effective control of the underinvestment problem raises expected future net cash flows and hence current equity values. From the lenders' perspective, the debt is less risky and thus it is priced on more favorable terms.

[7] The median net increase in book assets for SEO firms from the year prior to the SEO to two years following the SEO is 99.8%. The median net increase in market value of assets is 58%.

Hennessy and Whited (2005) also presume that firms are rational in making current investment and financing decisions. In this analysis, they suggest that if a firm anticipates an equity issue in the next period, the marginal tax rate to induce debt issuance in the current period is higher and hence the firm is more reluctant to increase debt in this period than when the firm expects no equity issues. Therefore, their analysis also implies a sequencing of financing choices; based on tax considerations, debt issues preceding equity offerings should be rare.

Therefore, if a CFO is tasked with financing a large, multi-period investment project that will require both equity and debt issues, the value-maximizing financing sequence is likely to be equity first, then debt. In this situation, the firm will issue equity even if its current leverage is below target because the CFO knows that the equity offering will be followed by subsequent debt issues that will return the firm to its target capital structure.

Target Leverage Changes. The foregoing discussion presumes that target leverage is constant over time; this is frequently an oversimplification. As Myers (1977) argues, prospective investments can be characterized as growth options. Barclay, Morellec, and Smith (2006) provide evidence that the debt capacity of growth options is negative; hence, if firm value increases through the addition of a set of growth options, the firm's target leverage declines. In raising external capital to finance growth options, the CFO thus faces an additional incentive to issue equity first and use a portion of the proceeds to repay existing debt. As growth options are exercised, the firm's investment opportunity set morphs from one with more intangible growth options into one with more tangible assets in place. These additional assets in place increase the firm's target leverage, as well as extend its optimal debt maturity. Borrowing to complete the investment project moves the firm toward its new target capital structure.

Leverage Decreases Preceding SEOs. The observed relation between increasing stock prices and SEOs has been discussed by pecking-order advocates. Myers (1984, p. 586) notes that when firms seek external finance, “they are more likely to issue stock (rather than debt) after stock prices have risen than after stock prices have fallen. This fact is embarrassing to static-tradeoff advocates. If firm value rises, the

debt-to-value ratio falls, and firms ought to issue debt, not equity, to rebalance their capital structures." Our analysis implies that prior to the SEO, information about new investment opportunities cause stock prices to rise and hence leverage to fall; at the SEO leverage is typically below the firm's target. This characterization of SEOs, rather than an embarrassing fact, is particularly appropriate for firms with substantial new investment opportunities.

Leverage Increases Following SEOs. There are two potential mechanisms that might account for the post-SEO leverage increases we report in Table 4: decreases in equity and increases in debt.[8] Decreases in equity potentially occur through either equity repurchases or declines in equity value. But SEO firms rarely repurchase equity in the years immediately following an SEO — SEOs and equity repurchases are offsetting transactions, each involving substantial transaction costs. In fact, average shares outstanding rise slightly over the twelve quarters following the SEO (results available upon request). The cumulative average abnormal return over this period for our SEO sample is -18%. Although a decrease in the market value of equity could drive the observed reversal in market leverage, we also observe a significant reversal in book leverage, which is unaffected by changes in stock prices[9].

In Table 5 we report summary statistics on net debt issues following SEOs. We calculate net debt issues as the change in total debt. Net debt issues will be negative if the firm retires debt, that is, if the post-SEO debt amount is lower than the level at quarter 0. The numbers reported are deflated by the market value of assets at the end of the SEO quarter (V_0) so that our denominator is constant. During each of the three post-SEO years, the mean increase in debt by SEO firms is over 6% of V_0, totaling to 20% of V_0 over 12 quarters. For comparison purposes, the mean SEO proceeds are 12.7% of V_0. This substantial amount of debt issued following the SEO is not predicted by the

[8] Chen and Zhao (2007) and Chang and Dasgupta (2009) point out that leverage ratios mean revert mechanically and suggest that evidence of mean reversion in leverage ratios does not necessarily support the existence of target leverage. Their findings imply the importance of examinations on firms' actual financing decisions.

[9] This average abnormal return is also potentially biased: (1) The fall in leverage at the SEO reduces the risk of the firm's equity. (2) As the firm's growth options are exercised, the firm's asset risk falls.

Table 5
Summary statistics of net debt issues and target leverage deviation after SEOs

$(D_t - D_0)/V_0$ is the net debt issues (retirement) in *t* quarters after the equity offering deflated by the market value of assets at the end of the SEO quarter. $Proceeds/V_0$ is the SEO proceeds deflated by the market value of the issuing firm at the end of the SEO quarter. TGT stands for the target leverage, computed as the mean leverage from Quarter -12 to Quarter -5.

Variables	Mean	*t*-stat	Q1	Median	Q3	Std. Dev.	N
$(D_4 - D_0)/V_0$	0.062	23.87	-0.003	0.005	0.080	0.18	4897
$(D_8 - D_0)/V_0$	0.138	27.76	-0.001	0.034	0.179	0.34	4655
$(D_{12} - D_0)/V_0$	0.200	25.23	-0.000	0.056	0.252	0.52	4352
$Proceeds/V_0$	0.127	78.39	0.064	0.101	0.156	0.11	5029
$D_0/V_0 - TGT$	-0.046	-8.26	-0.101	-0.021	0.008	0.36	4207
$D_0/A_0 - TGT$	-0.061	-25.85	-0.135	-0.042	0.008	0.16	4728

market-timing theory. [10] (Others challenge Baker and Wurgler from different perspectives – see Hennessy and Whited, 2005; Liu, 2005; Alti, 2006; Hovakimiam, 2006; Kayhan and Titman, 2007; and DeAngelo, DeAngelo and Stulz, 2010).

[10]The leverage reversal following SEOs is inconsistent with the Baker and Wurgler (2002) claim that the effects of market timing on capital structure persist. To explore this issue further, we divide our sample SEO firms into market timers and others. Because the market-timing theory is not logically inconsistent with other financing motives, focusing on the firms most likely to be market timers within our sample SEO firms allows us to examine market-timing effects more directly. Following Alti (2006), who examines IPO issuers, we classify firms using two methods. First, we identify market timers as those firms whose market-adjusted returns for the 24 months following the SEO are below the median. Second, we designate market timers as those who issue the SEO in a "hot" market, with hot and cold months defined on the basis of the number of SEOs issued in that month. Accordingly, 50% and 79% of SEO firms are classified as market timers by these respective methods. The results (are available upon request) show that both market timers and other firms show similar patterns of pre-SEO leverage declines and post-SEO leverage increases. The post-SEO reversal is quicker and more pronounced for market timers than others. This evidence complements Alti's (2006) findings on IPOs and is inconsistent with the persistence argument offered by Baker and Wurgler (2002). Even if managers time the markets to issue equity, the resulting effects of market timing on capital structure are not persistent.

4.3. The Magnitude of Subsequent Debt Issues

Debt and equity are substitutes, however a rational CFO facing large capital requirements generally will adjust on both dimensions. A larger equity issue will move leverage further below target; hence subsequent debt issues must be correspondingly larger to return the firm to its target leverage. Our proposition of rational financial management suggests that SEO firms subsequently would issue debt to move leverage back toward its target. This suggests that the larger the negative deviation, the more debt a firm should issue.

We use the mean market leverage of the issuing firm during quarters -12 to -5 as a proxy for target leverage.[11] (We exclude the four quarters immediately before the SEO to limit the effects of any abnormal stock price changes on our estimate of target leverage, however, including these four quarters does not change our results.) Table 5 indicates that SEO firms are under-levered at the end of the offering quarter by 4.6%.

Since SEO firms' leverage is below the target after the offering, firms have incentives to increase debt to rebalance their capital structure. We run Fama-MacBeth regressions to examine whether the magnitude of post-SEO debt issue.[12] Our dependent variable ($(D_t - D_0)/V_0$) is the net debt issued during the four, eight, and twelve quarters following the SEO, deflated by market asset value at the end of quarter 0. The explanatory variable is the deviation between market leverage and target leverage

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[11] In principle, target leverage would be stationary – and thus well approximated by a time-series average – so long as the determinants of leverage (for example, the firm's investment opportunity set) are stationary. In some cases, this stationary presumption is violated. For example Barclay, Smith and Watts (1995) and Ovtchinnikov (2010) document that firms in industries experiencing material deregulation reduce their leverage. This effect is small within our sample. We exclude utilities and financials. Approximately 7% of our SEOs are by firms in the telecommunications, transportation, entertainment, petroleum and natural gas industries in the ten years surrounding deregulation.

[12] Fama and French (2002) point out that most prior studies of capital structure use either cross-sectional regressions or panel regressions and therefore ignore the correlation of regression residuals across firms. Cross-correlation causes the standard errors of average slopes to be understated and thereby significance is overstated. Since SEOs tend to cluster in certain periods, the cross-correlation is potentially a severe problem. The average slopes from Fama-MacBeth regressions are like the slopes from a pooled time-series cross-section regression that weights years equally and uses annual dummies to allow the average values of the variables to change over time. Fama-MacBeth standard errors account for the cross-correlation of residuals and thus are robust.

Table 6
Fama-MacBeth regressions of net debt issues on leverage deviation and SEO proceeds

The dependent variable is the change in debt during the *t* quarters following the SEO quarter deflated by the market value of assets at the end of the SEO quarter. The explanatory variables are the difference between the leverage at the end of the SEO quarter and the mean leverage from Quarter -12 to Quarter -5, and the SEO proceeds deflated by firm value at the end of the SEO quarter. Cross-section regressions are run for each year during 1970 – 2006. The table shows mean intercepts and slopes (across years) of the regressions. *t*-statistics for the means, defined as the time-series mean divided by its standard error, are in parentheses. N is the average number of observations in regressions and R^2 is the average R-squared of the regressions.

Panel A: deflated by market value

Dep. Var.	$(D_4 - D_0)/V_0$			$(D_8 - D_0)/V_0$			$(D_{12} - D_0)/V_0$		
Intercept	0.05 (10.76)	0.04 (6.93)	0.04 (6.07)	0.13 (12.49)	0.08 (5.96)	0.07 (4.65)	0.19 (10.61)	0.09 (5.54)	0.08 (3.92)
$D_0/V_0 - TGT$	-0.10 (-3.19)		-0.09 (-3.01)	-0.17 (-2.92)		-0.20 (-3.12)	-0.24 (-2.69)		-0.22 (-2.31)
$Proceeds/V_0$		0.26 (2.46)	0.22 (1.83)		0.46 (2.87)	0.54 (2.61)		0.66 (3.83)	0.79 (3.53)
N	119	136	119	114	128	114	106	120	106
R^2 (%)	5.40	5.73	9.99	6.12	6.81	13.77	5.98	12.07	18.64

Panel B: deflated by book value

Dep. Var.	$(D_4 - D_0)/A_0$			$(D_8 - D_0)/A_0$			$(D_{12} - D_0)/A_0$		
Intercept	0.08 (10.09)	0.09 (8.61)	0.08 (6.07)	0.19 (13.37)	0.17 (7.96)	0.14 (6.36)	0.29 (12.03)	0.19 (6.54)	0.16 (5.37)
$D_0/A_0 - TGT$	-0.10 (-0.60)		-0.22 (-4.36)	-0.33 (-1.36)		-0.54 (-5.81)	-0.53 (-2.03)		-0.65 (-3.27)
$Proceeds/A_0$		0.17 (1.64)	0.14 (1.32)		0.40 (2.27)	0.36 (1.95)		0.61 (3.59)	0.59 (3.41)
N	134	136	134	128	128	128	119	120	119
R^2 (%)	5.53	7.01	10.34	7.16	11.07	14.10	7.41	15.05	17.18

($D_0/V_0 - TGT$). Table 6 reports the Fama-MacBeth regression results. We find that the coefficients of the target deviation variables are negative and statistically significant in all three regressions. The

estimate is -0.10 for the regression of $(D_4 - D_0)/V_0$, -0.17 for the regression of $(D_8 - D_0)/V_0$, and -0.24 for the regression of $(D_{12} - D_0)/V_0$. The results are robust and appear stronger if book leverage is used in estimation, as shown in Panel B.[13] These estimated magnitudes imply that the net debt issued during the year following an SEO closes the deviation from target leverage by about 10%. This increases to 17% and 24% if we extend the horizon to two and three years, respectively.

In our Fama-MacBeth regressions of net debt issues we also include SEO proceeds deflated by the market value of assets at quarter 0. The coefficient estimate of the regressions is 0.26 for the first four quarters and increases to 0.46 and 0.66 if we extend the horizon to eight and 12 quarters, respectively. Each of these estimates is statistically significant at the 1% level. These estimates suggest that for every $1 of new equity raised, the typical SEO firm will raise 26 cents of debt in the year following the SEO and a total of 66 cents over the three years following the SEO.

Stock returns typically are negative following SEOs (in our sample, the average abnormal return is -18%; see also Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995), suggesting that market leverage increases. Even without a debt issue, this fall in stock prices also causes leverage to increase toward the target. Therefore, we underestimate the coefficients by deflating both the dependent variable and explanatory variables by the market value of the firm in quarter 0 (V_0). When we use the deviation from book leverage as an explanatory variable, and also deflate the dependent variable — net debt issues — by the book value of assets, the coefficient estimates of the deviation variable are -0.10, -0.33, and -0.53, respectively, for the four-, eight-, and twelve-quarter horizons.

Other considerations could delay an SEO firm's decision to issue additional debt subsequent to SEOs. Some SEO firms might raise more capital than immediately required through the equity offer and retain some of these funds in their cash balances for future uses. Since the firm does not require external

[13] These results are also robust to employing an alternative proxy for target leverage – the median leverage ratio of firms matched on industry and investment opportunities. Tabulated results are available upon request.

capital immediately, its incentive to issue debt is reduced. Nonetheless, our results suggest that the majority of the SEO firms issue debt after the SEO. Moreover, firms that are further from target leverage issue more debt to rebalance their capital structure.

Speed of Adjustment. Our theory of rational financial management has implications for the debate about the speed with which leverage is adjusted toward the target. These papers typically estimate a partial-adjustment model. For example, Fama and French (2002) estimate a speed of adjustment of 7%-18% per year, which they claim is too slow to be consistent with the tradeoff theory. In support of the tradeoff theory, Flannery and Rangan (2006) estimate an adjustment speed of about 35% per year. Using a new econometric technique to control for the fact that many firms are present for relatively brief periods in the data, Huang and Ritter (2009) suggest that firms adjust toward target leverage at a moderate speed — 17% per year for book leverage and 23.2% per year for market leverage.

This partial adjustment model presumes that if a firm's current leverage differs from its target leverage, that adjustment costs preclude the immediate adjustment of leverage to the target. The model assumes that the firm will adjust some fraction of the difference between current and target leverage. However, we have noted both incentives for and evidence of material deviations from such a partial adjustment strategy: (1) the fixed costs associated with public security offers imply that in many circumstances, actively adjusting leverage is not optimal; adjustment costs exceed the benefits of adjusting. (2) For the reasons we have discussed in 4.2, the firm may issue equity, thereby lowering leverage, even if current leverage is below target. (3) Given the fixed costs of public equity issues, a rational CFO will issue additional debt – even if the firm's current leverage is above target – so long as its financing will not exhaust the firm's debt capacity. Therefore our analysis suggests that managing the firm's capital structure is more complex than the partial-adjustment model presumes.

4.4. The Investment Opportunity Set and Rational Financial Management

A firm whose investment opportunity set consists primarily of assets in place will choose a higher target leverage than one that consists primarily of growth opportunities. For a growth-options firm,

underinvestment costs of debt are higher and the free cash flow benefits of debt are lower than for an assets-in-place firm. There is substantial empirical evidence consistent with this basic implication (see Smith and Watts, 1992, for example).[14]

As we have suggested above, for firms with substantial growth options in their investment opportunity sets, we expect leverage will be low and falling prior to the SEO. In contrast, assets-in-place firms typically have more internally generated cash, greater debt capacity, with relatively smaller investment projects undertaken on a more regular basis. More of their investments will be financed with debt or internal funds. Occasionally, however, an assets-in-place firm will face a situation in which its projected financial deficit caused by an incremental investment project exceeds its unused debt capacity. In these circumstances, the assets-in-place firm will issue equity. For such a firm, we expect that leverage is more likely to be above its target level prior to the SEO. Leverage will fall mechanically at the time of the SEO, but then will increase again after the SEO due to subsequent debt issues. Unlike growth-option firms whose SEOs primarily finance new investment, we expect that assets-in-place firms are more likely to use SEOs both to finance investment as well as to adjust their leverage after having neared the firm's debt capacity.

Investment Opportunities and Financing Choices. Our proposition of rational financial management suggests that if the purpose of the SEO is to raise capital for large investment projects by growth-option firms, then a rising stock price preceding the SEO and greater investment following the SEO will cause the leverage of growth-option firms to be low and falling prior to the SEO and to increase after the SEO as growth options are exercised and converted to assets-in-place, which support more debt.

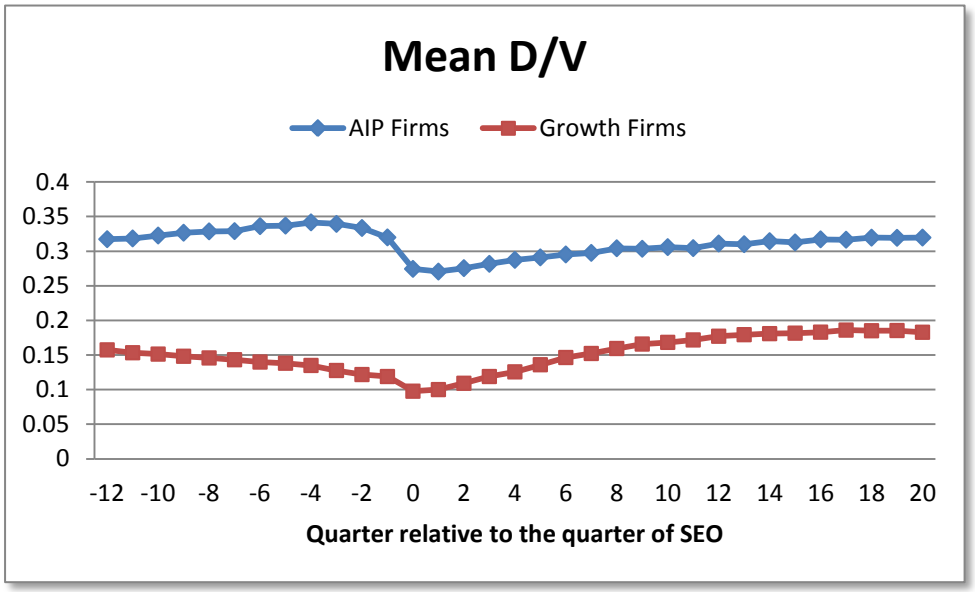
[14] This robust empirical relation is fundamentally inconsistent with the pecking-order theory. Consider a firm whose value primarily reflects assets in place. No matter what leverage such a firm initially has, under the pecking order it will evolve into an all equity firm. Such a firm generates substantial free cash flow and as outstanding debt matures, it will be paid off with internally generated cash — new debt (which by assumption is more expensive) will not be issued. And for a firm whose value primarily reflects growth options, the pecking order would predict at least some debt. Yet these firms are frequently financed exclusively with equity (see Agrawal and Nagarajan, 1990). The market-timing theory asserts that there is no target leverage; it thus offers no predication about cross-sectional variation with respect to leverage.

In contrast, assets-in-place firms, which have more internally generated cash, greater debt capacity, and smaller investment projects, are more likely to use SEO proceeds to pay down debt and restore debt capacity.

Our evidence is consistent with these predictions. For our sample of SEO firms, we characterize their investment opportunity sets based on the issuing firm's market-to-book value of assets at the end of the fiscal year prior to the offering: the firm is classified as a growth-option firm if its market-to-book ratio is greater than that of the median COMPUSTAT firm in the same year, otherwise it is an assets-in-place firm. On this basis, we categorize approximately 74**%** of our SEO firms as growth-option firms[15]. Growth-option SEO firms have significantly lower leverage ratios than their assets-in-place peers − for growth option firms 8 percent versus 33 percent for assets-in-place firms. In Figure 3, we depict the time series of leverage and investment for both assets-in-place and growth-option firms.

The leverage of growth-option firms decreases prior to the SEO, mechanically drops further at the SEO, quickly reverts to the pre-SEO level within several quarters, and finally exceeds its pre-SEO level. The leverage of assets-in-place firms increases before the SEO, drops substantially at the SEO, and increases only modestly thereafter. This evidence suggests that adjusting leverage is a more important motive for SEOs by assets-in-place firms; growth-option firms use SEOs primarily to raise investment capital. Consistent with this, the second panel shows that growth-option firms experience a larger increase in investment than assets-in-place firms. Results in Table 7 also confirm these patterns. We find that assets-in-place SEO firms tend to have weaker financial ratios than their respective industry medians prior to the SEO while growth-option SEO firms have stronger ratios. This is consistent with the typical asset-in-place firm being nearer its debt capacity at the time of the SEO than the typical growth option firm.

[15] DeAngelo, DeAngelo, and Stulz (2010) also examine SEOs focusing on life-cycle motives. They identify growth firms as those who have never paid a dividend (59% of their sample). They conclude that a primary motivation for SEOs is a near-term cash requirement. Our analysis raises questions about the importance of this motive: (1) We observe a significant increase in investments. (2) The majority of the SEO firms are not financially constrained at the offer date. (3) Fu (2010) observes an increase in cash at the SEO, but this increase is small in magnitude relative to the increase in investment and also temporary.



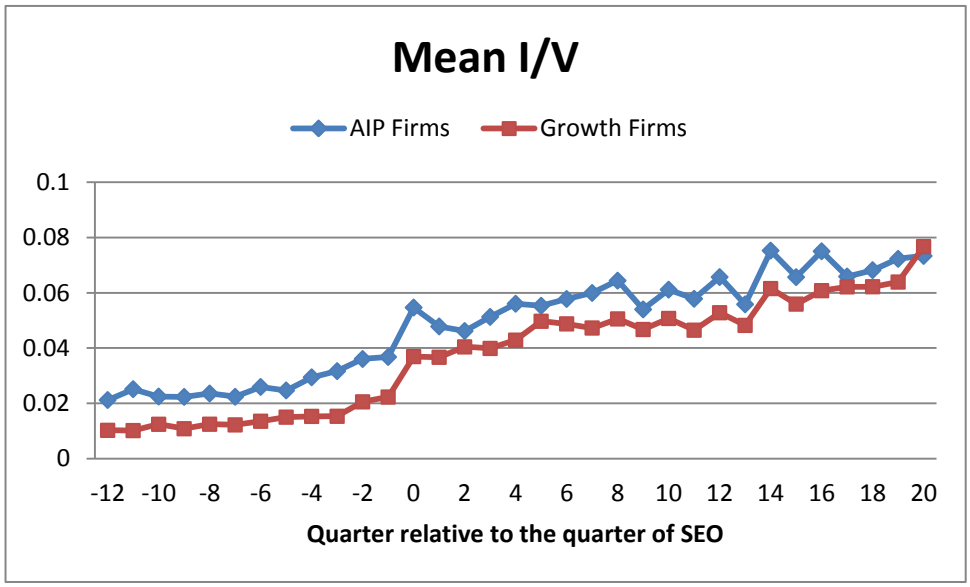


Figure 3: Market leverage and investment to firm value ratios of assets-in-place SEO firms and growth-option SEO firms

This graph shows the mean ratios of market leverage and investment to firm value from 12 quarters before the SEO to 20 quarters after the SEO. The quarter that SEOs take place is defined as quarter 0. The investment is deflated by the market value of the SEO firm at the beginning of quarter 0. The categorization of issuing firms into assets-in-place or growth-option firms is based on its market-to-book value of assets (*V/A*) in the fiscal year prior to the offering. In particular, if the *V/A* of an SEO firm is greater than the median of the firms in the Compustat universe of the same year, the firm is considered as a growth option firm, otherwise it is regarded as an assets-in-place firm. About 74% of the SEO firms are classified as growth-option firms following this procedure.

Moreover, the financial condition of assets-in-place firms is deteriorating over time prior to the offering, while the opposite pattern is observed for growth-option SEO firms. In addition, our data suggest that growth-option SEO firms invest more aggressively than assets-in-place firms following the SEO – in part, because they begin from a lower base.

Investment Opportunities, SEOs, and Debt Maturity. The distinction among firms' investment opportunities also has implications for the maturity structure of debt. Barclay and Smith (1995) show that assets-in-place firms have more long-term debt in their capital structure than growth-option firms. They interpret this evidence as supporting the contracting-cost hypothesis in that issuing debt with shorter maturity helps to control the underinvestment problem; this is particularly important for growth-option firms (Myers, 1977). Growth-option SEO firms conduct the SEO primarily to raise investment capital and then subsequently invest the proceeds, transforming the growth options into assets in place. We thus expect that these firms would issue debt with longer maturity after the SEO, increasing average debt maturity.[16] In contrast, for assets-in-place firms, the SEO is more likely prompted by the firm having exhausted its debt capacity; such firms are also more likely to have drawn down their bank credit lines prior to the SEO. After the SEO, they would use part of the SEO proceeds to pay down their credit lines. Since bank lines of credit are typically short term, we expect the average debt maturity to fall preceding the SEO and rebound following the SEO.

SEO firms are disproportionately young growing firms that issue equity to finance their growth options. But we do not rule out the possibility that some assets-in-place firms issue equity for other purposes. For instance, Rozeff (1982) and Easterbrook (1984) note that a policy of paying dividends increases the frequency with which the firm goes to capital markets to obtain new equity. This policy

[16] Not all growth option firms have non-stationary investment opportunity sets; for example, major pharmaceutical firms generate new growth options through their research and development process to replace the growth options that are exercised through commercialization.

Table 7
The financial condition of assets-in-place and growth-option SEO firms prior to the offering

Panel A reports the time-series median financial ratios of SEO firms before the offering. Panel B tests the differences of financial ratios between SEO firms and their respective industry median. The classification of firm type is based on SEO firms' market-to-book value of assets (*V/A*) in the fiscal year prior to the offering. In particular, if the *V/A* of an SEO firm is greater than the median of the firms in the Compustat universe of the same year, the firm is considered as a growth option (GO) firm (74%), otherwise it is regarded as an assets-in-place (AIP) firm (26%). Industry is classified by two-digit SIC codes. Financial ratios are defined in Table 2.

Panel A: The median financial ratios of SEO firms in three pre-issue years

Year Relative to SEO	Market Leverage		Interest Coverage Ratio		Current Ratio		Market to Book Assets		Altman Z-Score	
	AIP	GO	AIP	GO	AIP	GO	AIP	GO	AIP	GO
-3	0.30	0.11	2.38	3.30	1.74	2.21	1.06	1.72	2.62	4.22
-2	0.31	0.10	2.15	3.44	1.66	2.21	1.06	1.84	2.49	4.24
-1	0.33	0.08	2.24	4.19	1.65	2.30	1.07	2.33	2.33	4.84
0	0.25	0.05	2.61	5.17	1.85	2.99	1.22	2.07	2.61	5.26

Panel B: Tests of differences of financial ratios between SEO firms and their respective industry median

Year Relative to SEO	Market Leverage		Interest Coverage		Current Ratio		Market to Book Assets		Altman Z-Score	
	AIP	GO	AIP	GO	AIP	GO	AIP	GO	AIP	GO
Median difference relative to industry median	0.13	-0.03	-0.09	1.41	-0.03	0.34	-0.22	0.79	-0.47	1.39
P-value (Wilcoxon test)	< 0.001	< 0.001	0.017	< 0.001	0.122	< 0.001	< 0.001	< .001	< 0.001	< 0.001
N	1440	3991	1425	3806	1371	4006	1446	4071	1354	3906

subjects the firm more frequently to the intensive capital market monitoring that occurs when new equity is raised, thereby controlling agency problems between owners and managers.

Consistent with Barclay and Smith (1995), the results in Table 8 suggest that growth-option firms on average have significantly shorter debt maturity than assets-in-place firms. Debt maturity is measured by debt with a maturity of more than three years, as a percentage of total debt (see Barclay and Smith 1995). Growth-option firms use more long-term debt after the equity offering, which increases debt

Table 8
Debt maturity of SEO firms around the offerings

The table presents the median debt maturity of SEO firms from three years before to three years after the equity offerings. Debt maturity is defined as the proportion of debt that matures in more than three years relative to total debt (long-term debt plus debt in current liabilities). The results are based on 3,933 SEO firms with available data to compute debt maturity.

Fiscal year relative to the SEO	All SEO firms (3,933 firms)	Growth-option firms (3,102 firms)	Assets-in-place firms (831 firms)
-3	0.64	0.61	0.69
-2	0.64	0.62	0.67
-1	0.64	0.62	0.65
0	0.68	0.66	0.71
+1	0.69	0.68	0.72
+2	0.69	0.68	0.70
+3	0.70	0.69	0.71

maturity significantly. Long-term debt increases from 61% of total debt three years prior to the SEO to 69% three years after the SEO. The median debt maturity of assets-in-place firms also increases but by a smaller magnitude: long-term debt as a proportion of total debt increases from 68% to 71% during the same time period. More interestingly, in contrast to the monotonically increasing pattern of the growth-option SEO firms, debt maturity for assets-in-place SEO firms displays a U-shape — it declines over time before the SEO and rebounds after the SEO, suggesting that these firms are not only rebalancing leverage but also rebalancing their mix of short-term and long-term debt.

4.5. SEOs and Information Asymmetry

Both the market-timing and pecking-order theories presume that there is an information asymmetry between investors and managers. Both theories suggest that this information asymmetry provides managers with opportunities to exploit this informational advantage to the detriment of investors. We believe that these discussions suffer from a misplaced emphasis.

Studies of insider trading provide compelling evidence that there is a material information asymmetry between investors and managers (See Seyhun, 1986). But unlike share sales by insiders, SEOs are announced publicly prior to the offering. Consequently rational investors will reassess the value of the firm's shares conditional on the SEO announcement. Thus, in an efficient capital market, the logic of the market-timing hypothesis is difficult precisely for the reasons that Akerlof (1970) identifies.[17] Periods of high investment typically are preceded by positive news about the firm's investment opportunities and hence rising stock prices (see McConnell and Muscarella, 1985). In Table 9, we examine the stock market behavior around the announcements of these SEOs. In Panel A, we divide the growth option and asset-in-place firms into those with high versus low investment programs – those above versus below the median change in investment deflated by firm value. In Panel B, we report the cumulative average residuals for the six months preceding the announcement of the SEO. For the typical SEO firm, stock prices increase substantially over this six month window; the average CAR is 45.54%. Growth firms have larger average CARs than assets-in-place firms (49.29% versus 34.50%); firms with larger investment projects also have larger CARs (52.85% versus 38.73%).

In contrast to the market-timing theory — which argues that rising stock prices cause equity offerings — we suggest that it is the firm's new investment opportunities that both cause the stock price to rise and generate a demand for investment capital that results in an SEO. Therefore, we argue that the observed relation between prior stock price increases and SEO announcements is that of correlated dependent variables; it is not causal.

[17] If, for all the firms with overvalued shares, the average overvaluation were 2%, and all of these firms announced SEOs, then rational investors would lower their estimate of value by 2% at SEO announcement. But this price adjustment would eliminate the assumed motive for the SEO for the set of firms with the smallest overvaluation. And if the set of firms announcing SEOs is restricted to only those with greater overvaluation, the rational price revision at announcement is greater.

Table 9
CARs for SEO firms

The tables present the number of SEO firms divided among growth-option and assets-in-place firms as well as firms with high subsequent investment versus low in Panel A. Panel B reports the announcement CARs from event day -1 to +1 divided by investment opportunity set and subsequent investment expenditures. Panel C reports the CARs for the six months preceding the SEO also divided by investment opportunity set and subsequent investment expenditures.

Panel A: Number of SEO firms in each bin

	Growth-Option Firms	Asset-in-Place Firms	Total
$\left(\frac{\Delta I}{V}\right)_{high}$	1555	601	2156
$\left(\frac{\Delta I}{V}\right)_{low}$	1551	647	2198
Total	3106	1248	4354

Panel B: 6-month pre-SEO CAR

	Growth-Option Firms	Asset-in-Place Firms	Total
$\left(\frac{\Delta I}{V}\right)_{high}$	56.42	41.58	52.85
$\left(\frac{\Delta I}{V}\right)_{low}$	42.41	28.64	38.73
Total	49.29	34.50	45.54

Panel C: Announcement CAR [-1, +1]

	Growth-Option Firms	Asset-in-Place Firms	Total
$\left(\frac{\Delta I}{V}\right)_{high}$	-2.31	-1.80	-2.19
$\left(\frac{\Delta I}{V}\right)_{low}$	-2.71	-2.56	-2.69
Total	-2.51	-2.22	-2.44

By having SEO announcements coincide with the inception of large investment projects, the firm better controls the information asymmetry problem between managers and investors. The firm makes a more credible business case to potential investors that the purpose of the SEO is to fund the project – not

to exploit share overvaluation.[18] Nonetheless, CFOs facing a major investment project – one requiring raising equity prior to completion – still faces an important decision: They can either announce the SEO immediately or can wait. Given their private information, CFOs have incentives to delay the announcement of an equity offer until prices fully reflect their assessment of value.

Investors understand that managers have more precise information about the firm's prospects. Rational investors reason that given the managers private information the current share value might be the observed price, P, plus some additional value, A, if the manager's private information were favorable, or it might be P minus some additional value, B, if the manager's private information were unfavorable. But given the available public information, P is a reasonable assessment of share value. However if the CFO announces an SEO, rational investors will reason that the likelihood that the true value is P + A is reduced and the likelihood that the true value is P - B is increased. Thus, at announcement, the market price is expected to fall. In Panel C of Table 9 our evidence demonstrates that in the three days around the announcement of the SEO, the typical firm's stock price falls by 2.44%.

Consistent with the hypothesis that growth option firms have a greater information disparity than assets-in-place firms, growth option firms have more negative CARs than assets-in-place firms (-2.51% versus -2.22%). Finally firms with larger investment projects have less negative CARs (-2.19% versus -2.69%).[19].

5. Conclusion

[18] In their analysis of financing decisions when managers have information that investors do not, Myers and Majluf (1984) generally assume that managers act in the interests of the old shareholders. Although they state that they have no compelling theoretical justification for their assumption, they demonstrate that managers have a tendency to rely on internal sources of funds and prefer debt to equity if external financing is required given their assumption. We would argue that managers act in their self-interest, which in these cases tends to coincide with that of the old shareholders. Senior corporate executives have compensation packages that regularly include restricted stock, options, and accounting-based bonus plans. Selling over-valued equity would reduce dilution thereby increasing the value of manager's stock option restricted stock, and expected bonus awards.

[19] See also Jung, Kim and Stulz (1996) who also report that firms with larger investment opportunities have smaller negative announcement returns.

Although corporate financial managment research has been accumulating over more than half a century, the determinants of firm leverage and financing choices are still not clearly established. This paper examines the evidence from financing choices and investment behavior surrounding SEOs. Within the extant literature there are at least three potential, albeit not mutually exclusive, standard explanations for why firms conduct SEOs. The tradeoff theory suggests that the SEO firm's leverage is too high relative to its target before the offering; the firm issues new equity to bring its leverage toward the target. The pecking-order theory suggests that firms raise investment capital through SEOs only when the firm has its exhausted internal funds and debt capacity; equity issues are thus the last financing resort. Market-timing theory presumes that overvalued firms issue equity to exploit the overvaluation.

We find that the typical SEO firm experiences declining leverage and is in solid financial condition during the period preceding the SEO. Following the SEO, leverage increases as a result of subsequent debt issues. SEOs raise more capital than issuers' immediate needs. Many SEO firms run a financial surplus for an extended period following SEOs. Yet these firms still increase debt after the SEO. Thus, new debt issues are not completely explained by a firm's financial deficit. Moving capital structure toward the target leverage appears to be an important motivation for SEO firms to issue debt.

These findings are inconsistent with standard versions of the market-timing, pecking-order, and tradeoff theories. We propose instead a more comprehensive theory of rational financial management wherein the CFO takes into account the myriad considerations facing the firm — the costs and benefits of leverage associated with the firm's investment opportunities, tax, and regulatory status — to establish a target leverage. However, the CFO may actively deviate from that target if it makes sense to do so. This is frequently the case for firms that are considering large investment projects for which the value-maximizing financing policy involves a rational sequencing of equity and debt issues in order to bond the firm's completion of the project.

Our rational financial management framework incorporates several features that we believe are important and productive: (1) The prime driver of firm value is corporate investment policy. (2) There is

a target capital structure determined by balancing the costs and benefits of leverage – a major consideration involves establishing productive investment incentives. (3) In making financing decisions, corporate executives employ a long planning horizon. A rational CFO thus, considers the firm's investment opportunities, and financial circumstances in deciding on the sequence, timing and magnitude of various financing alternatives. These three features, although generally uncontroversial, are noteworthy specifically because they are not shared by the standard tradeoff, pecking-order, or market-timing theories.

The profession has attempted to enrich our understanding of financial management through the development of theories that have been designed specifically to explain particular aspects of observed financial management. We believe that rational financial management provides an integrated framework—one that explains the documented aspects of corporate financial management while resolving many of the observed anomalies that arise within the current complement of financial management theories.

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