THREE ESSAYS IN SEASONED EQUITY OFFERINGS

BY

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Abstract

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A significant body of empirical research suggests that indirect costs of equity financing are economically important to serve as a disincentive to issuing equity. There is also evidence indicating that firms engage in strategies to reduce the costs associated with equity financing. However, over the last 30 years, roughly 50 percent of firms raised equity through seasoned offerings more then once. The objective of this dissertation is to examine the connection between indirect costs of seasoned equity offerings (SEOs) and the corporate equity issuance behavior by focusing on the behavior of firms that issue equity frequently. The indirect issue costs are represented by the market reaction to equity issue announcements, offer discount, and the long-term abnormal return

In the first chapter I provide an overview of recent SEO literature. This chapter provides the context for the subsequent empirical work. In the second chapter I examine the causality between the frequency of seasoned equity issuing activity and indirect costs of equity issuance as measured by the market reaction to issue announcements and offer price discounts. The indirect costs of firms that access the equity market repeatedly decline with the sequence of issues at the sample level. However, the decline in indirect

costs is explained by cross-sectional differences in firm characteristics rather than by the frequency of past equity issuing activity. The decision to raise additional equity does not depend on past indirect costs either. In the third chapter, I find that average post-equity-issue long-term returns are unusually low only for the last issue in the sequence of issues by the same firm. The raw returns of the last issues are significantly negative, while the raw returns of non-last issues are significantly positive. Such differences cannot be explained by differences in risk levels. The difference between early and last issues in the sequence is not due to more aggressive use of discretionary accruals or more aggressive timing with respect to pre-issue market conditions. The results are most consistent with the hypothesis that managers use their private information to time equity issues.

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CHAPTER 1. LITERATURE REVIEW

A significant body of empirical work identifies several patterns in stock returns due to seasoned equity offerings. Over the last two decades, several papers document that the market reacts negatively, on average, to the announcements of seasoned equity issues. Researchers have also examined the long-run performance of firms following these events. The long-run performance evidence shows that long-run abnormal returns are also negative.

I. Announcement effects

Numerous studies of seasoned equity offerings have documented a negative average announcement effect. This negative reaction lowers the value of the outstanding equity, and, as such, represents a cost that existing shareholders have to bear. Studies that investigate the impact of new equity issues on stock price (e.g., Asquith and Mullins (1986), Masulis and Korwar (1986), Mikkelson and Partch (1986), Smith (1986), Jung, Kim, Stultz (1996)) find statistically significant negative returns that average around three percent. Bayless (1994) estimates the potential loss from the post-announcement decline in value to be as large as 13 percent of the issue proceeds, a number significant enough to act as a disincentive to issue equity for many firms. Asquith and Mullins (1986) calculate a measure of “offering dilution”, which they define as the ratio of the change in the equity value of the firm to the proceeds of the issue. They observe a 31 percent dilution for primary offerings and a 100 percent dilution for the combination and secondary offerings. According to Lucas and McDonald (1991), however, these costs may not be completely comparable to the direct issue costs, as this post-announcement decline may be recouped as investors learn the true value of the firm. Nevertheless, depressed equity prices at offering affect the amount of proceeds raised and, if stay low, may lead to additional costs to the firm.

Several studies document a less negative reaction to the announcements of secondary offerings in which large shareholders and insiders sell a portion of their stock holdings. Clarke, Dunbar and Kahle (2001) and Asquith and Mullins (1986) report the market reaction of around two percent at the announcement of secondary issues.

Explanations of announcement effects

The explanations of seasoned issue announcement effects are often based on asymmetric information models. The adverse selection model of Myers and Majluf (1984) appears to be cited in most papers studying announcement effect patterns. The model assumes that managers maximize the wealth of their existing passive shareholders in the long run. Sometimes, the firm's market price may diverge from the management's private estimate of the value of assets in place. If managers believe that the current market price is too low and faced with an investment opportunity, they will not issue undervalued stock to avoid diluting the fractional ownership of existing passive shareholders. If the managers believe that the current market prices are too high, they will issue equity. Assuming that the investors are rational and aware of this decision rule, an equity issue announcement will be perceived as bad news, and the stock price will drop. In other words, the equity issue decision conveys information about the future cash flows.

Miller and Rock (1985) propose yet another model assuming information asymmetry between managers and investors. In the model both the financing and investment policies are fixed and known to investors, but the unobservable cash flows have to be inferred from the management's actions. An unanticipated equity issue signals to the investors that the company has to compensate for smaller then expected cash flow. This smaller then expected cash flow translates into lower value of the company and a negative announcement reaction. The model does not discriminate between different types of financing in that any unexpected financing decision generates a negative reaction.

In the same theoretical line of literature, the signaling model by Leland and Pyle (1977) suggests that managers are likely to maintain high levels of fractional stock ownership if they are optimistic about the future cash flows relative to the current market price of the stock. Additional shares introduced in a seasoned equity issue decrease this fractional ownership and therefore convey negative information about the firm value, which results in negative returns.

The agency models of capital structure suggest that equity financing may intensify agency problems between shareholders and managers (Jensen (1986), Stultz (1990)). Debt with the possibility of bankruptcy acts as a hard budget constraint on managers and limits managerial control over the free cash flows. If the market is concerned that the newly raised equity funds will encourage the management's tendency to engage in empire building and be wasted, the reaction to the new offering will be negative. Jensen and Meckling (1976) show that the managers' consumption of perquisites and sub-optimal investment is inversely related to their fractional ownership in the firm. A new equity issue is likely to reduce this ownership stake triggering negative market reaction to the announcement.

The theory of optimal capital structure suggests that two other factors, namely taxes and financial distress costs, affect capital structure decisions and, hence, have implications for announcement effects. According to DeAngelo and Masulis (1980), decreases in leverage signal to the market that managers expect the volatility of future earnings to increase. As firms trade off the benefits of tax shields and costs of financial distress, for firms with volatile earnings, the costs of financial distress are greater then the value of tax shields. Consequently, these riskier firms will choose to keep leverage low. Therefore, a leverage-reducing change in capital structure such as a seasoned equity offering may indicate a change in either volatility or the level of earnings.

The price pressure hypothesis states that without perfect substitutes and given the down-sloping demand curve, the introduction of additional shares will reduce share prices (Kalay and Shimarat (1987)). Although, some studies find an inverse relation between offer size and announcement reaction (Asquith and Mullins (1986)), this empirical evidence may also be interpreted to support information signaling or agency models.

The interpretation of announcement effects may not be straightforward. Kothari and Warner (2005) and Ritter (2003) argue that if a firm increasing it outstanding shares by 20 percent, a two percent drop in the value of the existing shares is equivalent to the loss of 10 percent of the proceeds. If this two percent revaluation represents the cost of an equity issue, then external equity is very expensive. However, if the negative information contained in the issue announcement is incorporated into the stock price in some other manner then this two percent decline is not the cost of equity offering to the existing shareholders and only those shareholders who sell their shares after the equity issue announcement and before the negative news release incur this cost.

II. Long-run underperformance

Several studies provide evidence that equity offerings, on average, are not only associated with a negative abnormal market reaction around the announcement, but are also followed by significant negative abnormal returns over the subsequent five year period. These results are often interpreted as inconsistent with market efficiency as the market does not fully impound the information conveyed by a seasoned equity offering at the announcement into stock prices. Jegadeesh (2000) finds that the average 60-month, post-issue return for a sample of SEO firms ranges from –55.4 percent to -34.3 percent relative to multiple benchmarks. Loughran and Ritter (1995) find that the average annual post-issue return of equity issuers is about seven percent while the average annual return of comparable non-issuers matched on size is 15 percent. Issuers also underperform every one of their five market-index-based benchmarks. Spiess and Affleck-Graves (1995) examine a sample of seasoned equity issues from 1975 to 1989 and find that the median return in the five-year period following an SEO is 10 percent compared with a median five-year holding period return of 42.3 percent for non-issuing firms of similar size and in similar industries. Ritter (2003) demonstrates on a sample of 7760 SEOs from 1970 to 2000 that issuers under-perform a size-matched benchmark by 3.6 percent per year for five years. Most of these studies also report that the observed underperformance is not only significant relative to matched non-issuers, but also relative to the issuers' past performance.

Interestingly, poor performance is not observed immediately after an equity offering. Loughran and Ritter (1995) find no significant underperformance in the first six months following an issue, with the worst underperformance following about 18 months later.

The authors attribute this delay to both the momentum effects in stock returns and the possibility of subsequent lawsuits by the shareholders. This pattern is also consistent with the observation that negative earnings surprises immediately following an SEO are uncommon (Korajczyk, Lucas and McDonald (1991)). Jegadeesh, Weinstein and Welch (1993) report that the underperformance in years four and five declines to only three and one percent, respectively. This finding is supported by Loughran and Ritter (1997) who find no significant underperformance after year five.

Taken together, these studies indicate that the post-issue effects are significant and have a large economic impact on individual and institutional investment decisions. According to Loughran and Ritter (1995), an investor would have had to invest 44 percent more money in the issuers than in non-issuers of the same size to have the same wealth five years after the offering date.

Explanations of long-run underperformance

A number of explanations for the long-run performance of seasoned equity issuers has been advanced. Baker and Wurgler (2000) present evidence that managers are able to time the market by issuing equity prior to market downturns. They report that the fraction of external equity financing is a better predictor of the following year's stock market return than either the market dividend yield or market-to-book ratio. Surveys of practitioners support these conclusions. Graham and Harvey's (2001) survey of corporate executives indicates that perceived stock overvaluations and recent stock price run-ups are major factors in the decision to issue equity. Baker and Wurgler (2002) attempt to compensate for the lack of theoretical explanation of such corporate behavior with a "windows of opportunity" or market timing model of capital structure. They suggest that a firm's capital structure is strongly related to past market valuations and is a cumulative outcome of past attempts to time the market. In support of the timing hypothesis, Kadiyala and Rau (2003) present evidence that long-term abnormal returns may be more negative for the sub-samples of firms issuing after announcing negative prior information. Similarly, they find that long-run positive abnormal returns occur in sub-samples with prior positive information. Given that the post-issue abnormal returns are negative, on average, these results seem to contradict the findings of Korajczyk, Lucas and McDonald (1991), who find that seasoned equity offerings typically follow positive earnings announcements. This suggests that long-term abnormal returns should be positive, rather then negative.

Although some interpret post-equity-issue abnormal returns as evidence against market efficiency, several recent papers provide an efficient markets explanation for the managerial market timing ability. Schultz (2003) argues that underperformance can be observed even in efficient markets. He refers to this phenomenon as pseudo market timing. The idea behind the pseudo market-timing hypothesis is that equity issues tend to occur when equity prices are high even though markets are efficient and managers cannot predict future returns. Even though the reasons for issuing equity at high prices are irrelevant for the pseudo market timing explanation, issuing firms may need funding for additional investment opportunities. Ex-post, managers will seem to time the market because of more offerings at market peaks than at market troughs, even though they didn't know that prices were at a peak at the time of the issue. If prices had been increasing, more offerings would have taken place until prices eventually dropped. Pseudo market timing simulations show that the probability of observing long-run underperformance ex-post may far exceed 50 percent in event time, when each offering is weighed equally. To eliminate the pseudo-market timing bias, Schultz proposes that returns are calculated in calendar time so that each month is weighed equally.

Butler, Grullon and Weston (2005) show that the pseudo market timing can be extended from the firm level in event time to the aggregate level in calendar time. According to aggregate pseudo market timing, systematic changes in equity prices can create a spurious correlation between aggregate equity share in new issues and aggregate returns in ex-post analyses, but not in ex-ante analyses. This is because more equity issues take place around market peaks than market troughs ex-post. Consistent with pseudo market timing, the authors find that the aggregate equity share fails to predict future stock returns in the ex-ante tests. Interestingly, they also find the relation between equity share and future returns in ex-post tests is sensitive to the time period examined. Baker, Taliaferro, and Wurgler (2004) estimate the extent of aggregate pseudo market timing bias in studies relating managerial decisions to subsequent securities' returns and conclude that the bias is small enough to reject the conclusions of those studies.

Another explanation for post-issue underperformance comes out of an empirical finding that operating performance tends to decline subsequent to the equity issue. Loughran and Ritter (1997), observe a 23 percent and 50 percent drop in operating income-to-assets ratio and the profit margin, respectively, over four years after the equity issue. The cash flows of equity issuers also decrease so that the cash flow ratio is reduced by 20 percent over three years after the issue (McLaughlin, Safieddine and Vasudevan (1996)). Loughran and Ritter (1997) suggest that firms are more likely to issue equity during "windows of opportunity" or periods when they are overvalued. Many of the issuers then use the proceeds to continue with aggressive capital expenditures and expecting strong pre-issue performance to persist. Unfortunately many projects may no longer have positive NPV's, which leads to the subsequent deterioration of operating performance. In fact they find that issuers with more aggressive investment campaigns tend to experience worse post-issue returns.

The high volume of post-issue capital expenditures may be generated by the market's and management's excessive optimism about the issuer's prospects. Heaton (2002) finds that optimistic managers may invest in projects with negative NPVs. Several studies find that investors are surprised and disappointed by post-issue performance by examining market reaction to earnings announcements. Both Jegadeesh (2000) and Denis and Sarin (2001) find the post-issue quarterly earnings announcements, beginning a quarter after the issue, generate significant abnormal negative returns for three years.

Earnings overstatement may be one of the reasons for market's optimism about the issuer's prospects. Rangan (1998) and Teoh, Welch and Wong (1998) find the worst post-issue performance for equity issuers with high pre-issue discretionary accruals (i.e., accruals in excess of what is expected in a given industry for a given level of sales). Loughran and Ritter (1997) also suggest that some managers manipulate earnings to maximize the offer price.

All measures of post-issue abnormal performance are dependent on the model of expected or normal returns. Therefore, post-issue underperformance may be a result of a misspecified model of expected returns or the "bad model" problem (Fama (1998)). Some studies suggest that when the returns are measured properly, the evidence for long-run underperformance following equity issues disappears. Brav, Geczy and Gompers (2000) find that the asset pricing models commonly used to estimate expected returns does price small growth companies well. They also find that post-issue returns co-vary with returns of similar non-issuers and are due to systematic price movements of non-issuers trading on Amex and Nasdaq and not necessarily the equity issue itself. They conclude that the presence of these firms in the sample is the reason for post-issue 'underperformance'. Eckbo, Masulis and Norli (2000) argue that an equity issue reduces leverage and the risk associated with it is and increases liquidity. As a result of these changes in leverage and liquidity, equity issuers are less risky than similar firms. They claim that the 'new issue puzzle' is explained by that fact that the matched-firm technique does not properly control for risk and present a 6-factor asset-pricing model that can explain the performance of issuing firms. Despite this evidence, some authors remain skeptical about attributing low post-issue returns of equity issuers to low risk as these firms expose investors to high systematic risk (Ritter (2003)).

Other studies have examined the connection between post-issue returns and the level of capital expenditures of the issuers. Lyandres, Sun and Zhang (2005) claim that post-issue underperformance is due to aggressive capital investment of equity issuers relative to comparable non-issuers. It stems from negative relation between the level of capital investment and expected returns. The post-issue abnormal returns measured by the calendar-time approach are reduced 37-46 percent after the addition of a capital investment factor.

III. Measurement of underperformance

Traditionally, one of the main goals of a SEO event study is to compare the moments of cross-sectional distribution of returns around the issue to the moments of the distribution of expected returns. If the assumption of market efficiency holds and the benchmark expected returns are measured appropriately, on average, there should be no abnormal returns around a seasoned equity offer. Therefore, the most common hypothesis tested in these event studies is that the mean abnormal return equals zero. However, Loughran and Ritter (2000) warn that non-zero abnormal returns may not negate market efficiency, as any test of market efficiency is always a joint test of a theoretical asset-pricing model and abnormal returns. Since most studies construct a benchmark portfolio of non-issuers based on factors that are not theoretically motivated (i.e. market value of equity, book-to-market ratio, industry, past stock performance), these tests of abnormal returns do not translate into tests of market efficiency.

Abnormal returns are typically measured over a period of time relative to the event (i.e., offer date, announcement date). Therefore, for each seasoned equity issuer i, the actual stock return at time period t relative to the event (t=0), R_{it}, is:

$$R_{it} = E(R_{it}) + \varepsilon_{it} \tag{1}$$

where $E(R_{it})$ is the normal or expected return generated by a model of expected returns, and ε_{it} is the abnormal or unexpected portion of return. Therefore, the abnormal return, ε_{it}, is the difference between the actual return and the expected return:

$$\varepsilon_{it} = R_{it} - E(R_{it}) \tag{2}$$

From the point of view of an investor in the issuer's common stock, this abnormal return measure is the unexpected change in wealth brought on by the seasoned equity issue (Kothari and Warner (2005)).

The stock performance is measured over a time period, which length depends on the research question and may range from the fraction of a trading day to over a year. For example, if the offering is partially anticipated (i.e., inferred by the market or due to the inside information leakage), then the daily abnormal returns prior to the offering or its announcement may be observed. Abnormal returns measured over several months leading up to the issue may also indicate the degree of issue anticipation by the insiders (i.e., market timing) or investment opportunities available to the issuer. Once the information about the issue becomes available to the market, post-announcement daily, monthly, or annual returns may, for example, provide evidence on the speed of adjustment to new information or to test market-timing hypotheses.

When the abnormal returns are measured over several time periods, there are a number of approaches routinely used for time-series aggregation. One popular aggregation approach is the cumulative abnormal return (CAR), which sums each period's (i.e., day, month) abnormal performance. Another approach is the buy-and-hold abnormal return (BHAR), which compounds each period's abnormal returns. Both measures are then averaged across all issuers in the sample.

The choice of the expected or normal returns model is critical to the calculation of abnormal returns. Several expected return models have been used in seasoned equity issue event studies. Constant expected returns model, market model with constrained and unconstrained parameters and constant expected returns model, the three-factor (Fama and French (1993)) and four-factor (Carhart (1997)) as well as multiple empirically motivated characteristic-matched portfolios are the most common. The model of expected returns also dictates the need for an appropriate benchmark. The Center for

Research in Security Prices equal- or value-weighted index is a popular proxy for the market return, but the twenty-five Fama and French (1993) portfolios based on size and market-to-book ratio, or benchmark portfolios matched on size, book-to-market, industry or past returns are used as well. The model choice often lies in the tradeoff between the biases each model introduces in the properties of abnormal performance. The strengths and weaknesses of these approaches and models are discussed later.

Measurement of announcement effects

The abnormal returns are aggregated over two dimensions to draw inferences about the effect of a seasoned equity offering. Aggregation across time takes care of the multi-period time frame. When the research question deals with announcement reaction, the aggregation is done for several days before and/or after the announcement, often including the announcement day. Aggregation across the issuing firms is done to draw inferences about the announcement effects of SEO firms. Most studies assume that the abnormal returns and cumulative abnormal returns are independent in that the returns of issuers do not overlap in the event window. This assumption typically holds with respect to the announcement abnormal returns, which span only several days surrounding the event, but often becomes a problem with long-run returns.

To extract the announcement effect of a seasoned equity offering, the normal returns are typically estimated with the market model. This approach removes the effects of market factors on the individual firm's returns leaving the part attributable to the firm-specific factors. Therefore, stock return of issuing firm i can be viewed a sum of systematic and firm-specific parts:

$$R_{it}=\alpha_i+\beta_i R_{mt}+\varepsilon_{it} \tag{3}$$

where R_{it} and R_{mt} are, respectively, return of firm i and market return over time period t. The abnormal return containing the effect of the issue announcement is the difference between the actual stock return of the firm and the normal return during the event window.

$$\varepsilon_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (4)$$

The abnormal returns are then aggregated across time in the following manner:

$$CAR_i(t, T) = \Sigma_{t = 1 \text{ to } T} R_{it} - (\alpha_i + \beta_i R_{mt}) = \Sigma_{t = 1 \text{ to } T} \varepsilon_{it} \quad (5)$$

The model parameters are typically estimated over a period of 90-250 days ending 1-30 days before the event window. Although the choice of the event window varies depending on the researcher's hypothesis, its length affects power of the abnormal return tests. When the pre-event returns are not available, a constrained parameter version of the market model in which α_i=0 and β_i=1 can be used as well. This specification generates what is known as market-adjusted returns. MacKinlay (1997) recommends that this model should be used with caution.

Properties of announcement effects

The cross-sectional analysis of announcement returns and, more specifically, the interpretation of results may be complicated by violations of statistical assumptions underlying the analyses.

One bias can be introduced by non-synchronous trading or non-trading. It arises when returns are different from the assumed length or of non-uniform length. This, for example, may occur if closing prices are not recorded at the same time resulting in non-uniform daily returns. This non-trading effect biases the variances and covariances of individual stocks and, ultimately, the estimates of market model parameters. Brown and Warner (1985) find that even though the market model beta may be biased, it does not necessarily lead to the misspecification of the event study. However, there may be instances when the application of OLS can result in imprecise estimates of excess returns and low power tests. One potential solution is to use betas adjusted for non-trading. Scholes and Williams (1977) report a consistent estimator of beta with the non-trading bias, based on the assumption that returns are not clustered. They show that betas are biased downward by the non-trading effect and that corrected betas are about 10-20 percent higher than betas without the correction. Brown and Warner (1985) report that in their sample the Scholes-Williams procedure had no benefit.

The event day uncertainty presents another bias. Short-horizon methods are well-specified only if the event window contains abnormal performance. In many cases, the exact date of issue announcement is hard to determine. Even if the Wall Street Journal announcement date or the SEC registration date may be known with certainty, the market could have been informed at the close of the previous trading day. The common method of dealing with these challenges has been to expand the event window to capture several days around the announcement date and use cumulative returns as performance measure. Fortunately, the extended window does not appear to significantly affect the power properties of the tests (MacKinlay(1997)).

Additionally, most statistical procedures used to analyze announcement effects assume that returns are jointly normal and independently and identically distributed. Brown and Warner (1985), along with a host of other studies, show that daily excess returns violate the normality assumption, which allows for the exact finite sample results to hold. According to the Central Limit Theorem, if the cross-sectional excess returns are independent and identically distributed, the distribution of the sample mean tends to normality in large samples. Although, the independence of excess returns is questionable, in short-horizon tests the test statistic specification is not highly sensitive to the assumptions about the cross-sectional or time-series independence of abnormal returns (Brown and Warner (1985)). They show that the portfolio and the standardized t-tests have an empirical power comparable to the theoretical power obtained under the normality assumption.

Another problem, resulting in misspecification of test statistics, stems from the non-stationarity or increase in variance of abnormal returns around the seasoned offering. In some cases variance has been known to double. In empirical studies it leads to higher null hypothesis (i.e., excess returns are equal to zero) rejection rates. Brown and Warner (1985) recommend the use of cross sectional variance or sample partitioning as a solution to the problem.

In cross-sectional regression analyses, abnormal return may be related not only to exogenous variables through the valuation effects, but also the market's ability to anticipate the issue. If investors use firm characteristics to predict the equity issue then the linear relation between the announcement effects and firm characteristics may be obscured (McKinlay(1997)). The relation between the firm characteristics and the likelihood of the issue is also known as selection bias. In OLS applications it creates a correlation between the residual and regressors leading to inconsistent estimators. Several studies discuss this bias as well as the means of correction (Eckbo, Maksimovic and Williams (1990), Prabhala (1995)).

Measurement of long-run abnormal stock returns

The three commonly-used approaches to long-term abnormal return measurement are the cumulative abnormal return, the buy-and-hold abnormal return, and the calendar-time portfolio return also known as Jensen-alpha.

a. CAR approach

The CAR calculations for short event windows are discussed in section 3.2. In long-horizon performance studies, the CAR is calculated by summing up each sub-period's (i.e., day, month, year) abnormal returns into a multiyear measure.

b. BHAR approach

The BHAR is calculated by compounding each sub-period's return into a multiyear performance measure. BHAR has been the most popular method of abnormal return estimation in the event study literature (Ritter(1991), Ikenberry, Lakonishok, and Vermaelen (1995), Barber and Lyon (1997), Lyon, Barber, and Tsai (1999), Jegadeesh (2000)). The BHA return is essentially the excess multiyear return from holding (purchasing and eventually selling) a portfolio of SEO firms over the portfolio of similar non-issuing firms (Mitchell and Stafford (2000)).

There are multiple strategies to selecting a sample of similar non-issuers. It is common to select a non-issuing firm that is closest to the SEO firm on the basis of firm size, book-to-market ratio, and possibly past one-year return or industry (Lyon, Barber, and Tsai (1999), Carhart (1997), Jegadeesh (2000)). The implicit assumption underlying this method is that expected return model based on the matched characteristics describes the expected return on a security well. The T-month BHAR for issuing firm *i* relative to a portfolio of comparable non-issuers *c* can be computed as:

$$BHAR_i(t, T) = \Pi_{t = 1 \text{ to } T} (1 + R_{i,t}) - \Pi_{t = 1 \text{ to } T} (1 + R_{c,t}) \quad (6)$$

where R_{it} is the average issuing firm's return and $R_{c,t}$ is the return on the control (matched) non-issuing firm or portfolio of non-issuing firms. For the sample of issuing firms, the mean BHAR is calculated as the equal or value weighted average of the individual firm BHARs, depending on the hypothesis of interest. Loughran and Ritter (2000) and Brav, Geczy and Gompers (2000) discuss the use of equal-weighted and value-weighted means in studies of seasoned equity offerings. Brav, Geczy and Gompers (2000) illustrate the differences in inferences between both methods with a hypothetical sample consisting of 999 small firms with \$1 million market capitalization and one large firm with \$1,001 million market capitalization. The small firms all underperform by 50%, while the large firm overperforms by 50%. With equal weighting, the sample underperforms by about 50%, which contradicts market efficiency. The value-weighting scheme generates virtually no abnormal performance.

Both studies argue that if small stocks are likely to be mispriced more than large stocks, then equal weighting will ensure high power of the tests. Similarly, equal weighting is appropriate if one is studying managerial implications of potential stock market mispricing or simply trying to forecast abnormal returns following a random event. However, Brav, Geczy and Gompers (2000) maintain, if one is interested in post-event changes in investors' average wealth then value weighting is the correct method.

c. Calendar-time portfolio return

The calendar-time return is the intercept from an asset-pricing model. This approach to estimating risk-adjusted abnormal performance has become a popular alternative to the BHAR approach. Originally introduced by Fama and French (1993), it has gained significant support in several studies of long-term seasoned equity issue performance (Loughran and Ritter (1995), Mitchell and Stafford (2000)). The average monthly abnormal post-issue return can be computed in the following fashion. For each calendar month, a sample of firms with an equity issue in the past n months is constructed and either equal- or value-weighted average of individual monthly returns is computed. Since new firms enter and exit the portfolio every month, its composition will vary. The time-series monthly portfolio returns adjusted by the risk-free rate is then regressed either on the market factor, the three Fama-French (1993) factors, or the four Carhart (1997) factors. More formally, the calendar time return is estimated from the following multi-factor model, which includes all four factors:

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + m_i MOM_t + \varepsilon_{it} \qquad (7)$$

where R_{it} is the average monthly return on the portfolio of firms with equity issues in the past n months. R_{ft} is the risk-free rate. R_{mt} is the market return proxy. SMB_{it} is the size factor or the difference in the return on the portfolio of small stocks and big stocks. HML_{it} is the value factor or the difference in the return on the portfolio of high and low book-to-market stocks. MOM_{it} is the momentum factor or the difference between the return on the portfolio of high and low return stocks. Finally, α_i is the average monthly abnormal return or Jensen alpha on the portfolio of issuing firms over the n-month period. Abnormal performance is then inferred using α_i and its statistical significance.

Properties of long-run abnormal stock returns

The choice of the abnormal return estimation approach should be guided by the subsequent ability to make inferences about abnormal performance. The literature consensus is that the optimal methodology does not exist yet and misspecified test statistics (i.e., empirical rejection rates are higher then theoretical rejection rates) are still a problem. Several papers have studied the properties of abnormal return measures and made some diverging recommendations.

Barber and Lyon (1997) strongly advocate the use of BHARs over CARs. They consider the tradeoff between its strengths and weaknesses and conclude that its ability to more accurately capture investor experience outweighs its skewness and rebalancing biases (which can be alleviated if the reference portfolio is constructed based on market-to-book and size). They also demonstrate that the CAR is prone to the measurement bias as it ignores compounding, which makes it a biased predictor of the BHAR. Additionally, Lyon, Barber and Tsai (1999) make a contribution to the Barber and Lyon (1997) by evaluating two methodologies which eliminate misspecification arising from the survivor, rebalancing, and skewness biases. Although the methodology does not eliminate two other sources of misspecification (cross-correlation in sample observation and a bad asset pricing model), with carefully constructed reference portfolios, the BHAR yields well-specified statistics in random samples.

Fama (1998) suggests that from both the theoretical and statistical standpoints CARs or average abnormal returns (AARs) obtained by the calendar-time portfolio approach should be preferred to BHARs. Any test of market efficiency is also a test of the model of expected returns, which makes assumptions about the unit of time for return measurement. He argues that using a compounded return on a horizon of up to sixty months is inconsistent with the assumptions underlying most asset-pricing models, which were derived in a single-period setting. Additionally, monthly returns are more likely to be normally distributed than multi-year returns, which is an important assumption underlying the CAPM. Lastly, BHARs are likely to mask abnormal performance in that they tend to grow even if there is no abnormal performance after the first period. Aside from these theoretical considerations, statistical inferences using BHARs are more problematic (Barber and Lyon (1997), Mitchell and Stafford (2000) and Brav and Gompers (1997)).

Long-horizon buy-and-hold raw returns and even long-horizon BHARs tend to be right skewed, which biases the test statistics (Barber and Lyon, 1997). The skewness bias should decline with sample size if the individual BHARs are independent according to the Central Limit theorem. However, the right skew of the distribution of long-horizon abnormal returns on issuers portfolios is likely to be due to the lack of independence arising from overlapping long-horizon return observations in event portfolios rather than skewed firm-level buy-and-hold abnormal or raw returns (Brav (2000), Mitchell and Stafford (2000), Jegadeesh and Karceski (2004)).

Mitchell and Stafford (2000) favor the Jensen-alpha approach over the BHAR approach. Seasoned equity offerings often cluster in time and by industry, which results in overlapping returns. This cross-correlation violates the independence assumption underlying traditional parametric tests and increases with sample size. They suggest that the bias may be significant and if the BHAR horizon is three-to-five years, even a small amount of cross-correlation can inflate the test statistics twofold or more. One simple solution to the potential bias due to cross-correlation is to use the Jensen-alpha approach. Statistical significance of the alpha is based on the time-series variability of the portfolio return residuals and returns in an efficient market are serially uncorrelated. Although the Jensen alpha approach is useful in correcting the bias brought on by cross-correlation, Loughran and Ritter (2000) argue that it has low power to identify abnormal performance generated by behavioral timing. By weighting each period equally, it is less likely to detect abnormal returns if managers time equity offerings to periods of time-varying misvaluations.

Jensen's alpha is not the only way to deal with cross-correlation and Jegadeesh and Karceski (2004) propose a cross-correlation and heteroskedasticity-consistent test. These tests are robust and appear to perform well in both random and non-random industry samples.

IV. Conclusions

Much research to improve long-run performance measurement methods has been done during the last decade and a half. Although our understanding of the issue has improved the long-horizon methods still require improvement and the evidence on long-run underperformance as a test of market efficiency is still being debated. The analysis of long-run abnormal returns continues to be "treacherous" (Lyon, Barber, and Tsai (1999)).

Unlike long-run performance methods, short-horizon methods have been well studied and most problems have been resolved. The consensus appears to be that the results of short-run performance tests are more reliable than those of long-run performance tests.

CHAPTER 2. INDIRECT COSTS OF EQUITY ISSUANCE: EVIDENCE FROM REPEAT ISSUES

In this chapter I re-examine the connection between the indirect costs of seasoned equity offerings (SEOs) and the corporate equity issuance behavior. There is some evidence that the announcement effect becomes less negative as the issuers repeatedly access the public equity market. This finding may have implications for corporate financing decisions. However the design of those studies does not rule out the possibility that firms raising equity frequently may face low indirect issuance costs due to their firm characteristics. In this chapter I test the causality between indirect costs and equity issuance behavior by focusing on a sample of firms that access the equity market repeatedly and provide new evidence on the offer discounts of frequent issuers in addition to the announcement effect.

A significant body of empirical research suggests that indirect costs of equity financing are economically important. Asquith and Mullins (1986), Masulis and Korwar (1986), and Mikkelson and Partch (1986) report an average abnormal stock return around the issue announcement of negative three percent. Studies by Loughran and Mola (2004) and Corwin (2003) find that firms sell new shares at an average discount of two to three percent relative to the pre-offer stock price.

While these results indicate that the indirect costs are significant, an interesting research question is whether firms can reduce these costs by altering their behavior. Several studies generate indirect evidence indicating that firms engage in cost-reducing strategies. Shyam-Sunder and Myers (1999) find support for the pecking order hypothesis (Myers and Majluf (1984)) stating that firms prefer internal funds to external funds, and when firms use external funds, they chose debt over equity. This behavior stems from the adverse selection costs, which are incurred only when firms issue securities and are lower for debt than for equity. Other studies suggest that firms may be timing their equity issues to periods when the indirect issuance costs are expected to be low (Korajczyk, Lucas, and McDonald (1991), Bayless and Chaplinsky (1996), Choe, Masulis, and Nanda (1993)).

In a recent study of repeat equity issues, D'Mello, Tawatnuntachai, and Yaman (2003) find that negative market reaction to the announcement improves as firms repeatedly issue equity and becomes statistically indistinguishable from zero for the last two in the chronological sequence of equity issues. They conclude that, as investors learn more about the firm and its use of funds through multiple equity issuances, the information asymmetry declines, alleviating the adverse selection problem and making the reaction to equity issue announcements less negative.

McDaniel, Madura, and Akhigbe (1994) find that the market reaction to the announcements made by repeat issuers is significantly more favorable than the market reaction to the announcements made by one-time issuers. They also find that once firms gain reputation as repeat issuers, they experience no adverse announcement reaction in response to the offering. They conclude that firms issuing equity do so, in part, because of low indirect issuance costs. However, this conclusion remains untested in the paper since the authors do not attempt to examine the linkage between the indirect issuance costs and the probability of new equity issues.

The empirical design of these studies does not exclude the possibility that firms raising equity frequently may not be able to gradually lower issue costs but, instead, face low indirect issuance costs because of their firm characteristics. In this chapter I differentiate between these hypotheses to determine causality between indirect issue costs and equity issuance behavior by controlling for the entire issuing activity of firms in my sample. In addition to the announcement effects, I examine offer discounts of frequent issuers, which is also a new finding.

Consistent with other SEO studies, I find evidence of economically and statistically significant indirect costs. The market reaction to the announcement measured by the average three-day cumulative abnormal return around the announcement day (CAR(-1,1)) is -3.0 percent. The average offer discount is also -3.0 percent. Similar to the findings of prior studies of repeat issuers, the CAR(-1,1) become slightly less negative with each subsequent issue at the sample level. However, this pattern disappears when I control for the total number of issues made by a firm by the time it exits the sample. Furthermore, I find that offer discounts decline significantly over the sequence of issues at the total sample level, which is largely due to lower offer discounts of more frequent issuers. I calculate discount-adjusted CAR(-1,1) to allow for the possibility that the increase in raw CAR(-1,1) over the sequence of issues is not an independent phenomenon, but simply a reflection of the lower anticipated offer discount. I find no monotonic pattern of improvement in discount-adjusted CAR(-1,1) across the sequence of issues.

The multivariate robustness tests of the indirect issue costs yield several interesting results. First, the frequency of equity offers is not a statistically significant determinant of the indirect issue costs. Second, I find evidence in favor of indirect cost persistence in that firms that have previously experienced low indirect issue costs tend to have relatively low current indirect issue costs as well and vice versa. Finally, contrary to the findings in D'Mello, Tawatnuntachai, and Yaman (2003), idiosyncratic risk does not explain the CAR(-1,1) in my regressions, but is positively related to offer discounts.

I examine the effect of the past indirect equity issuance costs on the frequency of issuing activity from two perspectives. First, I focus on the firm's decision to return to the equity market while controlling for several other firm characteristics. The probability of an equity issue depends on the past issuing activity in that it increases with the number of past equity issues and declines with time from the previous issue, but not on the previous indirect issue costs. Second, I compare the differences in the characteristics of repeat issuers to those of one-time issuers using the same set of control variables. Firms that go on to become repeat issuers have higher R&D expenses and low discounts at the time of their first issue.

To summarize, the improvement in indirect costs is explained by cross-sectional differences in firm characteristics rather than the frequency of equity issuing activity by the firm. Firms that are frequent issuers do not experience lower indirect issuance costs, and these costs are not the reason for their returning to the market. The offer, firm, and industry specific characteristics that explain indirect issue costs are also significant determinants of equity issue decision.

I. Sample Selection and Variable Construction

In this section, I discuss the sources of data and explain the construction of the indirect cost and control variables. Subsection A covers the sample selection procedure. Subsection B provides the rationale for the use of cumulative abnormal announcement returns, offer discounts, discount-adjusted cumulative abnormal announcement returns, and control variables (as well as their construction).

Sample Selection

The initial sample of seasoned common equity offerings is obtained from the Securities Data Company (SDC) and covers the period from 1982 to 2001. To remain in my sample, each issuer has to have matching annual financial statements data in COMPUSTAT. To eliminate the confounding effects introduced by specific regulatory environments, I exclude financial firms (SIC codes 6000-6999) and utilities (SIC codes 4900-4999). I also exclude issues by non-US firms, pure secondary issues, rights issues, shelf registration issues, issues that were announced and then withdrawn or postponed, private placements, carve-outs, and unit offerings. Some firms conduct more than one offering within the same fiscal year. Given the annual frequency of the financial statements data, such issues cannot be distinguished from each other based on the characteristics of the issuing firm. Therefore, only the earliest issue is retained.[1]

The final sample contains 3,380 equity issues by 2,543 firms. Of these issues, 2,207 (65.3 percent) are issues by firms that issue equity only once, 742 (22.0 percent) are by firms that issue twice, 262 (7.8 percent) are by firms that issue three times, 121(3.6

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[1] I have also combined same-fiscal-year issues by constructing a weighted average (based on issue size) of the analysis variables. The analysis results remained qualitatively the same.

percent) are by firms that issue four times, and, finally, 48 (1.4 percent) are by firms that issue 5 times or more. Table 1.1 shows the distribution of seasoned equity offerings by year.

In some of my analyses, I compare these issues to two benchmark groups of observations drawn from COMPUSTAT. The first group consists of 21,914 firm-years in which my 2,543 issuers did not issue equity. The second group consists of all COMPUSTAT firms that did not issue seasoned equity during 1982-2001, excluding utilities and financial institutions. This control sample contains 65,223 firm-years.

Variables

This section discusses the construction of the indirect equity costs and control variables. The means describing my variable set are provided in Table 1.2. The first column of data describes firm-years containing equity issues. The second column contains the means for years with no equity issues by firms that have issued equity during my sample period. Finally, the third column describes the firms that have not issued equity during my sample period.

a. Cumulative Abnormal Announcement Returns

One key indirect cost is incurred around the seasoned issue announcement date. Several studies document a significant decline in market value at the announcement of a new equity issue. This negative reaction lowers the value of the outstanding equity and, as such, represents a cost that existing shareholders have to bear. Studies that investigate the impact of new common stock issues (Asquith and Mullins (1986), Masulis and Korwar (1986), Mikkelson and Partch (1986)) find, on average, a statistically-significant negative return around three percent. Bayless (1994) estimates the potential loss from the post-announcement decline in value to be as large as 13 percent of the issue proceeds, a number significant enough to act as a disincentive to issue equity for many firms. Asquith and Mullins (1986) calculate a measure of "offering dilution", which they define as the ratio of the change in the equity value of the firm to the proceeds of the issue. They observe a 31 percent dilution for primary offerings and a 100 percent dilution for combination and secondary offerings.

I use a standard event study methodology to assess the market reaction to common stock issues (McKinlay (1997)). The abnormal announcement returns are generated from the market model based on the CRSP value-weighted index and estimated over a 120-day period ending on day t_{-11} relative to the announcement day t_0. Following D'Mello, Tawatnuntachai, and Yaman (2003), I use the registration date as the announcement day.[2] The model estimates are used to calculate the cumulative abnormal announcement return over a three-day period from day t_{-1} to day t_1. I use a three-day period around the announcement day to capture any change in firm value resulting from a possible information leakage or the announcement day reporting error.

As can be seen in Panel A of Table 1.2, the average CAR(-1,1) for the sample of issuers is –3.0 percent, which is statistically and economically different from zero. Even though the announcement returns have been fluctuating annually, there is no trend underlying these changes as demonstrated in Panel B. The magnitude of the return is

[2] Several earlier studies use the Wall Street Journal (WSJ) announcement date, registration date or the earliest of these dates (Asquith and Mullins (1986), Masulis and Korwar (1986), Mikkelson and Partch (1986), Bayless and Chaplinsky (1996)). After 1984 the number of equity issue announcements in the WSJ has decreased and recent studies find the registration date to be a reliable proxy for the announcement date (D'Mello, Tawatnuntachai, and Yaman (2003)). Bayless and Chaplinsky (1996), who use WSJ announcement dates before 1984 and registration dates after, find that the choice of the guideline for setting the event date does not appear to affect the results.

consistent with the results of the early studies, which use the market-model to estimate three-day announcement returns (Choe, Masulis and Nanda (1993) and Denis (1994)), as well as more recent studies drawing their samples from SDC Platinum (Liu an Malatesta (2006)). I also calculate cumulative market-adjusted returns by subtracting the CRSP value-weighted index from the three-day announcement returns. The market-adjusted returns are somewhat lower at –2.1 percent, which is consistent with Purnanandam and Swaminthan (2005), who employ a similar sample, and Clarke, Dunbar and Kahle (2001).

b. Offer Discounts

Another indirect cost of issuing new seasoned equity is the offer discount, defined by the relative difference between the pre-offer closing market price and the offer price. Offer discounts have increased gradually overtime. Smith (1977) reports an average discount of only 0.5 percent from 1971 to 1975. Loderer, Sheehan, and Kadlec (1991) document a 1.41 percent discount during 1980-1984.

Several studies document a significant increase in offer discounts during the 1990s. Altinkilic and Hansen (2003) find that in the 1990s it averaged 3.2 percent, a number, which often exceeded half the underwriting syndicate's fee and aggregated to over $2.6 billion. Corwin (2003) documents the average SEO discount of 1.15 percent for offers from 1980 to 1989 that increased to 2.92 percent for offers from 1990 to 1998. He also reports that for the average seasoned offer in 1998, offer discount amounted to $1.95 million in lost proceeds or 21.7 percent of total direct and indirect issue costs. Loughran and Mola (2004) analyze SEO discounts during 1986-1999 and find that the average issue is priced at a discount of three percent. The average amount of money left on the table by issuing firms averaged only $0.5 million in 1986 compared to $7.1 million in 1999. They also find that this increase in indirect issuing costs was not offset by a decline in direct fees paid by the issuer, which remained fixed at approximately five percent throughout the period of their study.

Following these studies, I compute offer discount as the offer price less the pre-offer day close, divided by the pre-offer day close. Therefore, a negative number denotes an offer price set below the pre-offer day market price or offer discount. A positive number can be interpreted as offer premium. The average discount for the entire sample of issuers is –3.0 percent, which is both statistically and economically significant and consistent with results reported in other studies of offer discounts.

c. Discount-adjusted Cumulative Abnormal Announcement Returns

The cumulative abnormal announcement returns in Table 1.2 are not adjusted for potential dilution effects caused by discounted seasoned equity offer prices. It is possible that the observed CAR(-1,1) are not independent of the expected offer discount. The stock market's reaction to the announcement of an offering may be affected by the fact that offer prices are typically set below the market price of the stock on the pre-offer day, generating a wealth transfer from the existing shareholders to the new shareholders. Therefore, the negative market reaction to the equity issue announcement may, in part, be caused by the decline in the existing shareholders wealth. Altinkilic and Hansen (2003) decompose offer discounts into the expected and unexpected component and examine the relation between these components and stock returns. They find that expected discount is incorporated into stock prices on the SEO announcement date and that unexpected discount reflects issue placement and information gathering costs. Hull and Kerchner

(1996) also examine announcement returns and find that over 60 percent of the announcement day stock price drop is attributable to issue costs.

I separate the stock market reaction generated by this dilution effect from the impact of new information produced by the offer announcement following the approach in Hertzel and Smith (1993). This simple adjustment treats discounts as fully expected and is based on an assumption that investors incorporate the expected dilution cost from discounting into their reaction to the announcement of the new equity issue. The price reaction to the announcement will be more negative when the anticipated discount is larger.

To extract the discount effect component from the CAR(-1,1), I use the following formula for the discount-adjusted cumulative abnormal announcement return (DACAR(-1,1)):

$$DACAR(-1,1)=CAR(-1,1)*(1-\alpha)^{-1} - DISCOUNT*\alpha*(1-\alpha)^{-1} \quad (1)$$

where α is the ratio of new shares issued to the number of shares outstanding after the offering. DACAR(-1,1) can be viewed as the abnormal reaction to the announcement of an equity issue if the offer price were determined without a discount or premium. Therefore, the DACAR(-1,1) estimates the component of the cumulative abnormal announcement return that is generated by the new information about the firm's value conveyed by the announcement. After the cumulative abnormal announcement returns are adjusted for offer discounts or premia, the previously-obtained negative announcement reaction improves slightly. The average discount-adjusted cumulative abnormal announcement return in my sample is -2.9 percent (Table 1.2).

d. Control Variables

Several empirical studies report cross-sectional patterns in the indirect costs of equity issuance (Ritter (2003)) as well as the seasoned equity issue decisions (Helwege and Liang (1996), Hovakimian, Opler, and Titman (2001)). I model each of the indirect costs and the decision to issue equity as a function of past indirect costs controlling for other firm and issue characteristics, all of which are identified from previous empirical models. The construction and significance of these variables is described below while their averages are reported in Panel A of Table 1.2.

The key variable measuring the frequency of equity issues is a variable provided by the SDC and labeled offer after IPO. The SDC computes offer after IPO by numbering seasoned issues according to their chronological order after the firm's IPO. I believe that this is a better measure of issuing frequency than the measures used by D'Mello, Tawatnuntachai, and Yaman (2003) and McDaniel, Madura, and Akhigbe (1994) who order equity issues from the beginning of their sample period, which does not take into account all historical information. The total number of issues is set to the last offer after IPO in my sample period to measure the overall number of equity issues by a firm.

Following previous research (Corwin (2003) and Dierkens (1996)), I construct two proxies for uncertainty and asymmetric information. One is firm size, defined as the market value of equity. This measure reflects the fact that small firms are likely to be associated with more uncertainty and higher levels of asymmetric information than large firms. The second measure is idiosyncratic risk also employed by D'Mello, Tawatnuntachai, and Yaman (2003). It is computed as the standard deviation of the residuals from the market model of daily returns estimated over the last fiscal year (250 trading days) prior to the offer.

I also control for the size of the offer measured by the number of new shares relative to the number of shares outstanding prior to the offering. Some studies find that larger issues are associated with more negative announcement returns and are sold at larger discounts (Asquith and Mullins(1986), Masulis and Korwar(1986), Altinkilic and Hansen (2003), Corwin (2003)), possibly reflecting higher information costs. The amount of time (measured in years) between two consecutive issues is also one of the control variables. According to Korajczyk, Lucas, and McDonald (1991) and Dierkens (1991) the information released during the previous issue may reduce the asymmetry and affects the announcement reaction to the subsequent offer.

Several studies have documented a relation between offer discounts and pre-offer stock price. This relation may stem from the underwriting practice of rounding offer prices down to the nearest eighth or nearest integer (Loughran and Mola (2004)). The amount lost in this rounding scheme becomes a larger fraction of a lower price leading to a correlation between offer discount and pre-offer stock price. Therefore, firms that trade at lower prices before the offer are likely to be priced at a larger percent discount than offers of firms that trade at higher prices (Corwin (2003)). Additionally, marketing of lower priced stock may require more underwriter effort, translating into larger offer discounts (Altinkilic and Hansen (2003)). I use a natural log of the pre-offer price to control for this relation between the pre-offer price and offer discount.

I also borrow several variables from the recent capital structure literature as they have been shown to affect seasoned equity issuance decisions and, arguably, could be related to indirect issue costs. I include two measures of growth namely market-to-book ratio and research and development expense to measure growth opportunities, which have been shown to affect the equity issue decision.[3] The market-to-book ratio may also be interpreted as a measure of overvaluation, which is directly related to equity issuing activity. (Jindra (2000), Baker and Wurgler(2002)). I use the research and development expenses scaled by sales to capture future growth opportunities and product uniqueness that may not be captured by the market-to-book ratio. Additionally, this measure has a benefit of being relatively noise-free as it is not easily subject to accounting manipulations.

The trade-off theory argues that firms with higher leverage are more likely to issue equity if they seek to maintain a target leverage ratio.[4] Additionally, Dierkens (1991) finds a negative correlation between the leverage of the issuer and level of information asymmetry. She argues that high leverage reduces information asymmetry, as highly-levered firms are monitored by both creditors and shareholders. Therefore, highly-levered firms should experience smaller value declines at seasoned equity announcements and smaller offer discounts then less levered firms. Additionally, equity issues by highly-levered firms may be more predictable, which would reduce the magnitude of the announcement reaction.

Deviations from the industry market-to-book ratio and leverage are computed as the difference between the firm's market-to-book (leverage) and the average based on the

[3] The market-to-book ratio is defined as (total assets – book value of equity + market value of equity) divided by total assets, where market value of equity is share price multiplied by the number of outstanding shares and book value of equity is total assets less total debt.
[4] Leverage is defined as (long-term debt + debt in current liabilities) scaled by the book value of assets.

three-digit SIC code and year. These variables measure the degree of overvaluation relative to the industry peers and deviation from the what could be viewed as the target or optimal debt ratio.

Jung, Kim, and Stulz (1996) and Hovakimian, Opler and Titman (2001) study the debt-equity decision. They show that firms with lower operating income are more likely to issue equity. My measure of profitability is based on earnings before taxes, interest, depreciation and amortization divided by the previous year's book value of assets. Past profitability is measured by net operating loss carry-forwards scaled by the book value of assets. From the trade-off theory perspective, high carry-forwards may reduce the attractiveness of debt due to tax shields. However, equity may get expensive because of information asymmetries. I also include asset tangibility in my analyses, which may proxy for the difficulty of valuation and the level of information asymmetry. Alternatively, firms with significant tangible assets may use them as a collateral and obtain easier access to debt. Tangible assets are measured by the ratio of property plant and equipment to the book value of assets.

II. Indirect Costs of Equity and Sequence of Equity Issues

In this section, I examine the relation between the indirect issue costs and the sequence of equity offerings in order to determine whether the issue costs are affected by the frequency of equity financing or cross-sectional firm characteristics. In subsection A, I examine the relative magnitude and the behavior of indirect issue costs over a sequence of seasoned equity offerings. I then examine the idiosyncratic risk patterns over the sequence of equity offers in subsection B. Finally, in subsection C, I build a multivariate model of the determinants of indirect equity issue costs.

Relative Importance of Indirect Costs

a. Cumulative Abnormal Announcement Returns

Panel A of Table 1.3 presents cumulative abnormal announcement returns for groups of firms formed based on variables *Offer after IPO* (columns) and *Total Number of Issues* (rows). The intersection of any particular row and column provides the average CAR(-1,1) measured around a particular offer after IPO conditional on the total number of equity issues conducted by the issuing firms. To illustrate, the average CAR(-1,1) around the second equity issue of the firms with a total of four equity offerings is –0.029. The column totals in the bottom row of the panel provide the average CAR(-1,1) by offer after IPO. The row totals in the rightmost column provide the average CAR(-1,1) by the total number of equity offerings.

The pattern of cumulative abnormal announcement returns averaged over variable *Offer after IPO* (the last row of the panel) is similar to that found by D'Mello, Tawatnuntachai, and Yaman (2003). The announcement returns increase from –0.031 at the announcement of the first and second issues to –0.025 for the fifth and higher issues in the sequence. However, this improvement is subtle and the returns of the fifth or higher issues remain significantly negative. Although the difference between the first and the fifth or higher CAR(-1,1) in the sequence is not statistically significant, I do find the that the CAR(-1,1) of the first two issues is significantly lower than the CAR(-1,1) of all subsequent issues, consistent with D'Mello, Tawatnuntachai, and Yaman (2003).

The CAR(-1,1) for my sample of issuers are more negative than those reported for a sub-sample of industrial firms in D'Mello, Tawatnuntachai, and Yaman (2003). Aside from the small differences in the composition and the time-period covered by their sample I attribute this difference to two factors. First, they use market-adjusted returns computed by differencing the market return from the firm return around the announcement date, while I use the market model to adjust for systematic risk. Second, their measure of issue sequence orders equity offers from the beginning of their sample period, which underestimates the true historical sequence numbers.

Although it appears that the market reacts less negatively to the announcements of equity issues later in the sequence, the same pattern could emerge if some firms have experienced more negative CAR(-1,1) and consequently chosen not to return to the equity market. Others might have experienced less negative CAR(-1,1) and continued using the equity market to raise additional funds at low indirect costs.

To empirically differentiate between these hypotheses, I examine the pattern of cumulative abnormal announcement returns in each sequence defined by *Total Number of Issues*. If firms with lower indirect issue costs become frequent issuers, I should not observe an improvement in CAR(-1,1) in any sequence conditional on *Total Number of Issues* and would expect the average CAR(-1,1) to be less negative for firms with more equity issues. If indirect issue costs do decline as firms acquire reputation by issuing repeatedly, I should observe the reaction to the announcement of each subsequent equity issue to become less negative in each sequence resulting in the observed pattern of CAR(-1,1) averaged by *Offer after IPO*.

After controlling for the total number of offerings conducted by each firm, the monotonic pattern of improving CAR(-1,1) in each sequence disappears. Comparing the CAR(-1,1) of the first offer to that of the last offer in each of the sequences results in improvement in only two cases, neither one of which is statistically significant. More frequent issuers do not have a more favorable market reaction to their issue announcements than less frequent issuers either. Reported in the rightmost column of the panel, the average CAR(-1,1) of one-time issuers (–0.032) are slightly lower than the average CAR(-1,1) of firms with a total of two or more offerings (–0.030 and –0.028). In addition to that, I compare one-time issuers to firms with five or more issues and, then, to firms with at least two issues, for statistical significance. In both cases, the CAR(-1,1) of less frequent issuers are not statistically different from those of more frequent issuers. Overall, my results indicate that the cumulative abnormal announcement returns improve only at the total-sample level.

b. Offer Discounts

The offer discounts are reported in Panel B of Table 1.3. Averaged by *Offer after IPO* (last row of the panel), the discounts are improving, nearly monotonically, from –0.034 at the time of the first issue to –0.016 at the time of the fifth or later issue, resulting in a statistically significant decrease in magnitude of more than 50 percent. This decrease is remarkable given the prior evidence of an increase of discounts over time, which also holds for my sample. The discounts in the sample more than tripled during the time period studied as demonstrated in Panel B of Table 1.2. Nevertheless, the discounts remain large, both statistically and economically despite the decline from the first to the last issue in the sequence.

I examine offer discounts using the framework applied to CAR(-1,1). The improvement in discounts from the first to the last issue in each sequence defined by the *Total Number of Issues*, is only statistically significant for firms with three equity offerings.

The last column containing discounts averaged by the Total Number of Issues demonstrates that firms returning to the market repeatedly may, on average, have lower discounts than one-time issuers. The discounts decline from –0.035 for one-time issuers to -0.012 for firms with five or more equity offerings. The difference is statistically and economically significant. Additionally, frequent issuers experience lower discounts at their first seasoned offering. The first-time discount of firms that eventually return to the market two or three times is –0.031, which is less than the discount of one-time issuers (-0.035). The first time discount of four-time and five-or-more-time issuers is –0.019 and –0.012, respectively.

These results lead to two conclusions. First, the improvement in discounts by *Offer after IPO* observed at the sample-level, is mainly driven by the overall lower level of discounts of frequent equity issuers. Second, firms that started issuing equity at low discounts tend to return to the seasoned equity market.

c. Discount-adjusted Cumulative Abnormal Announcement Returns

Panel C of Table 1.3 reports average discount-adjusted announcement returns DACAR(-1,1). After adjusting CAR(-1,1) for the anticipated offer discount, the previously observed pattern of improvement in announcement reaction over the sequence of equity issues at the full sample-level disappears. Even though the first-issue DACAR(-1,1) is lower then the last-issue DACAR(-1,1) (-0.029 and –0.028, respectively), the difference is not statistically significant. When I control for the total number of issues, there are no patterns of decreasing DACAR(-1,1) within each sequence. The first issue DACAR(-1,1) within a sequence is not always lower than the last issue DACAR (-1,1). Moreover, these differences are not statistically or economically significant, which means that there is no improvement in DACAR(-1,1) conditional on the *Total Number of Issues.*

I then examine whether firms with more equity issues have lower DACAR(-1,1). The DACAR(-1,1) averaged across the *Total Number of Issues* are provided in the last column of the panel. There is no discernible pattern in the magnitude of these DACAR(-1,1) and the difference between the first and fifth or later issues, with the respective DACAR(-1,1) of –0.030 and –0.034, is not statistically significant. Thus, the DACAR(-1,1) of frequent issuers, on average, do not differ from those of less frequent issuers.

These results indicate that the increase in the cumulative abnormal announcement returns is attributable to the decrease in anticipated discounts. Also, the DACAR(-1,1) are unaffected by the prior or total issuing activity. This means that there is no strategy involving the issue frequency that a firm can employ to reduce the negative market reaction to their issue announcements since neither offer discounts nor discount-adjusted cumulative abnormal announcement returns improve with additional equity issues.

d. Effect of Asymmetric Information on Indirect Costs

D'Mello, Tawatnuntachai, and Yaman (2003) document a decreasing pattern in the level of information asymmetry with a sequence of equity issues. They hypothesize that each seasoned equity issue subsequent to the IPO provides the market with additional information about the issuer. They argue that this gradual decrease in the level of information asymmetry explains the observed pattern of abnormal returns.

A similar pattern of information asymmetry, measured here by idiosyncratic risk, over the sequence of issues holds for my sample as well. The results are provided in Panel A of Table 1.4. The layout of the table is identical to that of Table 1.3. The last row of the panel containing the averages of idiosyncratic risk by *Offer after IPO* demonstrates that the level of idiosyncratic risk declines with each subsequent issue from 0.38 at the time of the first offering to 0.24 at the time of the last offering. This change is statistically significant. The idiosyncratic risk also declines over each sequence of offers conditional on the *Total Number of Issues*. However the difference between the first and last issue in each sequence is statistically significant only for firms with two and three issues.

The last column containing the averages of idiosyncratic risk by the *Total Number of Issues* demonstrates that more frequent issuers experience lower levels of information asymmetry. The average idiosyncratic risk of one-time issuers is 0.38, which is significantly higher than the average idiosyncratic risk of firms with five or more offers (0.26). Thus far, the pattern of indirect costs is consistent with the decrease in the levels of idiosyncratic risk.

If each seasoned equity issue subsequent to the IPO provides the market with additional information about the issuer, which ultimately translated into lower indirect costs for subsequent issues then an equity issue should have a prolonged effect on information asymmetry. Panel B of Table 1.4 reports information asymmetry levels following an equity issue. Since the information asymmetry variable is lagged by one year, it appears to be low one year prior to an equity issue and the year of the issue than in the following three years. This finding maybe consistent with the view that firms time their equity issue to periods when the information asymmetry is lowered by favorable news releases (i.e., earnings announcements) as the information asymmetry declines prior to an equity issue and not as a result of it. Additionally, the levels of information asymmetry fluctuate significantly in years following the issue.

e. Performance Persistence

The subject of performance persistence has been popular in the managed funds literature (Grinblatt and Titman (1992), Brown and Goetzmann (1995) among others) and has recently been applied in the context of serial mergers and acquisitions (Croci (2005)). My results indicate that some equity issuers may consistently experience lower issue costs while others are able to do it at higher costs, i.e. demonstrate performance persistence in the context of seasoned equity offerings. This observation holds only weakly for announcement returns but is statistically significant for offer discounts. As another test of whether firms that experienced lower initial indirect costs continue issuing at low indirect costs, I relate the level of indirect costs at first issue to the indirect costs at subsequent issues. Table 1.5, Panel A shows CAR(-1,1) for firms conditional on the magnitude of CAR(-1,1) at their first issue. A firm is defined to have a high initial announcement return if its first-issue CAR(-1,1) exceeds the median first-issue CAR(-1,1) of other firms in my sample. My results indicate that firms, which experienced a high return at the announcement of their first seasoned issue, on average, experience a more positive reaction to the announcements of their next offering. Firms whose initial announcement returns are above the sample median average a significantly negative abnormal announcement return (–0.022). In contrast, firms with low initial announcement returns (below the sample median) continue to do worse (–0.042) at the announcement of their subsequent offering. Beyond the second offering, the differences are statistically insignificant even though the high group tends to dominate the low group in most cases.

I also compute and compare offer discounts for the offers subsequent to the first, conditioning them on the magnitude of the first issue discount. These numbers are reported in Panel B of Table 1.5. The second-issue offer discounts conditional on better first-offer performance (small discounts) tend to be smaller (-0.025) than discounts conditional on worse first-offer performance (-0.034). This difference is statistically significant. Overall, my results are consistent with the hypothesis that firms with low issuance costs at the time of their first issue continue to have relatively low indirect issue costs.

Effect of Issue Frequency on Indirect Costs

The univariate analyses in the previous subsections show the reduction in discounts over the sequence of equity offerings and the effect of expected discounts on the magnitude of CAR(-1,1). The goal of the multivariate analyses is to test the relation between the sequence of equity offerings and the indirect issuance costs for robustness while controlling for other important firm, industry, and issue characteristics that could also have affected these indirect costs. I test whether the sequence remains a predictor in the presence of other variables and indirect costs improve with increasing issuing activity. If this is not the case, then the repeat issuers face lower indirect costs that are driven by their cross-sectional characteristics.

To test this hypothesis I include several variables associated with previous equity issuing activity: *Offer after IPO* and the indirect costs incurred at the time of the most recent offer. The inclusion of the past indirect costs will allow me to test for their persistence. This test of performance persistence through the use of regression analysis, in which future performance is regressed against a measure of past performance, is similar to that employed by Grinblatt and Titman (1992).

I am also interested in testing the conjecture put forth in D'Mello, Tawatnuntachai, and Yaman (2003) about the connection between the declining level of information asymmetry and the declining pattern of CAR(-1,1) over a sequence of equity offerings, hence I include the idiosyncratic risk as one of the regressors. Other variables in the model provide controls for the firm, industry, and issue characteristics. Table 1.6 contains the results of two ordinary least squares regressions of indirect costs.

I find that after controlling for the firm and offer characteristics, the sequence of equity offers does not have an effect on CAR(-1,1) as demonstrated by a statistically insignificant coefficient on offer after IPO. The measures of information asymmetry, such as firm size and idiosyncratic risk also do not explain CAR(-1,1) and coefficients of both variables are statistically insignificant. However, it is possible that their effect is outweighed by other variables in the model (i.e., leverage and deviations from industry leverage) which may be associated with information asymmetry.

I also find additional support for the indirect cost persistence hypothesis. The coefficient on the previous offer's CAR(-1,1) is positive and significant at the five percent level. In this context, a significant and positive slope coefficient indicates performance persistence while a significantly negative slope coefficient indicates performance reversal. Firms with high market-to-book ratios do not receive a more positive market reaction to their issue announcements. This is consistent with Denis

(1994), who fails to find support for a monotonic relation between a firm's growth opportunities and the market's reaction to the announcement of SEO. He concludes that investment opportunities play a minor role in explaining the cross-sectional distribution of SEO announcement effects. However, I do find that firms with higher growth opportunities or, alternatively, more overvalued then their industry peers, as measured by the deviation from the industry market-to-book ratio, on average, are subject to more significant market correction.

I also find that the deviation from industry leverage ratios is inversely related to the magnitude of CAR(-1,1). High debt levels relative to the industry peers may suggest low levels of information asymmetry leading to less negative cumulative abnormal announcement returns. Additionally, low debt capacity of the industry peers relative to that of the issuing firm, may make an equity issue more predictable reducing the unanticipated portion of the announcement and resulting in less negative abnormal returns (Bayless (1994)).

Offer size does not have an effect on the magnitude of the market reaction. Studies relating the announcement effect to the size of the offer generate mixed results. Although Asquith and Mullins find that the size of the offering is statistically significant and negatively related to the announcement-day effect, Mikkelson and Partch (1986) do not find a significant relation. It is possible that the relation between issue size and CAR(-1,1) is obscured by the endogeneity of issue size. If the reaction to the issue announcement is worse than expected, the issuer may reduce the size of the offer before it is completed. Most empirical studies ignore this endogeneity of issue size and, therefore, may underestimate the effect of issue size on the market reaction to the announcement (Ritter (2003)).

The discount regression results also support the hypothesis that the univariate relation observed between indirect costs and a sequence of equity offers is due to other firm-specific characteristics as it does not survive in this multiple regression. The coefficient of the offer after IPO variable is insignificant. Similar to the CAR(-1,1) model, I find a positive significant coefficient on the previous offer's discount that provides further justification for the performance persistence hypothesis stating that firms with lower discounts continue issuing equity at low discounts.

There is a strong link between the level of idiosyncratic risk and offer discount. The coefficient of the idiosyncratic risk variable (–0.504) is significant at the one percent level. This result is consistent with conventional view that offers by firms with high levels of uncertainty are more discounted than other offers, all else equal. Less profitable firms have higher levels of offer discounts. Issues by firms with operational difficulties may be harder to price, which leads their offers to be more discounted. The issue size coefficient is positive and statistically significant suggesting that offer discount is increasing in offer size. This finding is consistent with Corwin (2003) who hypothesizes that the discount should be most pronounced for the largest offers. Since a seasoned offer causes a temporary liquidity shock that must be absorbed by the market, the discounted offer price is necessary to compensate investors for purchasing the additional shares.

Lastly, the amount of time between subsequent issues is a significant determinant of the offer discount. Shares of firms that return to the equity market sooner tend to be sold at smaller discounts. One explanation for this relation may be that the information released during the previous issue reduced the information asymmetry resulting in a quick subsequent offer (Korajczyk, Lucas, and McDonald (1991) and Dierkens (1991)). The reduced uncertainty of placing the issue translates in smaller offer discounts.

III. Effect of Indirect Costs on Issuance Behavior

In this section I explore the effects of indirect costs on the issuance behavior of firms while controlling for firm, industry, and issue characteristics. First, I measure the effects of indirect costs on the equity issuance decision in a given firm-year. In the next section, I will explore the characteristics of firms that develop into frequent equity issuers and compare them to those of one-time equity issuers.

Given the evidence that the level of indirect issuance costs is significant and persistent, one would expect that only the firms facing lower issuance costs would return to the equity market for additional financing. If so, I would observe a significant negative relation between the level of past indirect costs and the probability of a new equity issue. To test this hypothesis, I model the likelihood of an equity issue in a particular firm-year as a function of the same explanatory variables used in the indirect issue cost regressions. The results are presented in Table 1.7. The dependent variable is coded as one if a firm-year contains an equity issue and zero if it does not. Therefore a positive coefficient of an explanatory variable indicates that increases in that variable are associated with a higher probability of equity issue. The first model utilizes a sample that includes firms that have not issued equity during my sample period.

I find that firms are more likely to issue equity after an increase in market-to-book ratios consistent with a hypothesis that firms time equity issuance to those periods when their market-to-book ratios and stock returns are high, because managers believe that their shares are overvalued or that they issue equity following improvement in their investment opportunities. This result supports Loughran and Ritter's (1997) finding that equity issuers experience an increase in the their market-to-book ratios in the years preceding the issue.

Previous literature (Jung, Kim, and Stulz (1996), Hovakimian, Opler and Titman (2001), and McLaughlin, Safieddine and Vasudevan (1996)) identifies several factors that are significantly related to the decision to issue equity. Jung, Kim, and Stulz (1996) and Hovakimian, Opler and Titman (2001) study firms' debt-equity decision. They show that firms with lower operating income, higher Tobin's Q, and higher momentum are more likely to issue equity.

Issuers also tend to have much higher levels of R&D expenditures. The positive effect of R&D expenses is supporting the view that firms with high growth opportunities and product uniqueness should keep their leverage low to avoid debt overhang and maintain investment flexibility. The regression results imply that firms returning to the equity market in any given year tend to be more profitable firms as implied by the positive significant coefficient on profitability and the negative coefficient on loss carry forwards. This finding reflects the pre-issue increase in operating performance documented by Teoh, Welch and Wong (1998) and Loughran and Ritter (1997).

Equity issuers also have more debt than non-issuers. This result is consistent with the tradeoff theory, in that a leverage-reducing transaction may be needed to reduce the costs associated with debt. Equity issuers have lower levels of idiosyncratic risk than non-issuers. This finding supports the pecking order prediction that firms facing high levels of idiosyncratic risk should avoid issuing equity. Firm size is inversely related to the probability of an equity issue, although the magnitude of the coefficient is very small. Large and mature firms are more likely to have more internally generated cash flows and access to relatively cheap debt. These large firms may also have less valuable growth opportunities than smaller firms leading them to prefer debt financing. McLaughlin, Safieddine and Vasudevan (1996), who study equity issuance decision and document that leverage and firm size are also important determinants of the decision to issue in that smaller firms with higher leverage are more likely to issue equity. The positive coefficient on offer after IPO suggests that the probability of equity issue is higher for firms with more past equity issues, which may reflect these firms' preference for equity financing.

The results of the second equity issue model are presented in the last two columns of Table 1.7. The sample differs from the baseline model in Panel A in that it is restricted only to those firms that had at least one equity issue during my sample period. This allows me to include measures of indirect costs of previous issues and the amount of time lapsed since the most recent issue in my logistic regression model. The results imply that firms do not consider the indirect costs of equity issuance important enough to discourage them from returning to the equity market. The coefficients on both the past issue's CAR(-1,1) and discount are not statistically significant. This result is surprising given the persistence in the level of indirect costs and prior empirical findings suggesting that firms adjust their behavior to minimize or avoid these costs. Firms that have previously experienced low announcement returns and high discounts should be less likely to issue equity again if they find them to be economically significant. However, it is entirely possible that firms do consider direct issuance costs or other indirect costs of equity such as long-term underperformance in their decision to issue additional equity. It is also possible that firms dependent on external equity financing are the firms with high CAR(-1,1) and offer discounts (i.e., there may omitted factors affecting them both).

Time from previous issue is statistically significant meaning that the probability of an equity issue declines as more time passes after the previous offering. The decision to raise additional equity by these frequent issuers does not depend on the level of market-to-book ratio and firm or industry leverage. Historical profitability measured by the loss carry-forwards does affect the equity issue decision either.

IV. Single vs. Multiple Issues Prediction Models

I have found that the decision to issue additional equity is a function of several firm characteristics but not the past indirect costs. In this subsection I identify the characteristics of firms that are likely to become frequent equity issuers. I hypothesize that frequent issuers may be fundamentally different firms than one-time issuers and use two approaches in measuring the characteristics of frequent issuers.

The first approach bases the prediction on the levels of firm characteristics available at the time of the first equity issue as well as the indirect costs of the first seasoned offer. The second approach uses the time-series sample-period average of the same firm characteristics. Although the results of the models generated by the second approach do not necessary prove causality between the level of indirect costs and the frequency of issuing activity, they provide support for my other findings. The results of these regressions are provided in Table 1.8. The dependent variable in these logit models is set to zero if the firm has only one seasoned issue and to one if the firm has two or more offerings subsequent to the IPO.

When firm characteristics in the model are measured at the time of the first seasoned issue, only two variables are significant. Firms that go on to become repeat issuers tend to have high levels of R&D at the time of their first SEO. Additionally, the first issue discount significantly relates to the likelihood of a firm becoming a frequent issuer, indicating that offer discounts may affect issuance behavior. The discount here enters with a positive sign implying that firms, which sell their first seasoned issue at a smaller discount, are more likely to continue with at least one more subsequent equity offering.

However, the results in Table 1.7 combined with those of the time-series average model indicate that the first issue discount may proxy for some other phenomenon not captured by other variables in the model. When the indirect costs are measured by time-series averages, the CAR(-1,1) and discounts of repeat issuers are not significantly different from those of one-time issuers. One possibility may be that the first issue discount captures low levels of asymmetric information that are not captured by the idiosyncratic risk variable. Another possibility is omission of the reputation of the investment bank underwriting the firm's issues that has been shown to be positively related to the probability of subsequent equity offerings (Carter (1992)) and to be inversely related to offer discounts (Altinkilic and Hansen (2003)).

The results of the second model indicate that frequent issuers, on average, have higher R&D expenditures. Thy also tend to have lower levels of asymmetric information as proxied by idiosyncratic risk, issue size, and firm size. This is consistent with my results in Table 1.7. These frequent issuers also have had some losses along the way, possibly due to high R&D expense, as suggested by the positive and significant coefficient on the loss carry-forwards. Even though the firms in my sample tend to issue equity after a period of strong operating performance, frequent equity issuers, on average are less profitable than one-time issuers. Overall, these results indicate that R&D intensive firms are likely to develop a preference for equity financing.

V. Conclusions

The chapter examines the indirect costs of equity issuance of firms that repeatedly use the equity market with a specific focus on the cumulative abnormal announcement return and offer discount. Studies by McDaniel, Madura, and Akhigbe (1994) and D'Mello, Tawatnuntachai, and Yaman (2003) find an increasing pattern of announcement returns over a sequence of equity offerings conducted by a firm. Consistent with prior SEO studies, I find evidence of economically and statistically significant indirect costs and also observe a declining pattern in the indirect costs in the univariate analyses. This is a new finding with respect to offer discounts since, to my knowledge, no one has examined offer discounts of repeat equity issuers.

However, this pattern disappears when I control for the total number of issues made by a firm and, in the case of CAR(-1,1), correct for the expected offer discount. I find that the indirect costs are unaffected by the prior issuing activity. When I examine the effect of the offer sequence on these indirect costs for robustness in the multivariate analyses with adequate controls for firm, industry, and issue characteristics, it does not survive either. Therefore, there is no strategy involving the issue frequency that a firm can employ to reduce the indirect costs. Other interesting findings are the evidence of performance persistence of repeat equity issuers and the weakness of relation between the announcement return and idiosyncratic risk.

I also find that past indirect costs of equity offerings do not play a strong role in determining the likelihood of an equity offering in a given firm-year. There is limited evidence that offer discounts may affect subsequent issuing behavior, but, mostly, other firm characteristics are more significant determinants of a subsequent equity issue. Finally, I find that firms with greater R&D expenditures are more likely to become frequent issuers.

CHAPTER 3. THE LAST ISSUES PUZZLE

In finance literature, the new issues puzzle refers to the finding that stocks of firms that issue new equity are, on average, very poor investments. In two important concurrent studies, Loughran and Ritter (1995) and Affleck-Graves and Spiess (1995) find that issuing firms' stocks significantly underperform various benchmark returns for up to five years after public offerings of equity. These studies conclude that the underperformance is a result of firms taking advantage of "windows of opportunity" and selling overvalued equity to unsuspecting investors.

Such market timing may be possible if managers have access to information not available to the market (Lucas, and McDonald (1990)), if they are able to manipulate the market to become overoptimistic (Teoh, Welch and Wong (1998)), or if firms can take advantage of misvaluation by timing based on publicly available information (Baker and Wurgler (2002)). Consistent with these misvaluation hypotheses, a number of recent studies find that firms tend to issue new equity when their stock prices are unusually high.[5]

Schultz (2003) cautions, however, that if firms issue equity following periods of high returns then there will be ex-post appearance of underperformance even if ex-ante such underperformance cannot be predicted. He labels such behavior "pseudo market timing". Brav, Geczy, and Gompers (2000) and Eckbo, Masulis, and Norli (2000) also argue that there is only an appearance of underperformance by equity issuers and that the evidence of underperformance disappears after a more careful benchmarking on risk factors.

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[5] Hovakimian, Opler, and Titman (2001), for example, report that the probability of equity issuance vis-à-vis debt issuance increases with pre-issue market-to-book ratios and stock returns. An alternative interpretation of these results is that higher market-to-book ratios and higher returns reflect improvements in growth opportunities of issuing firms.

Loughran and Ritter (2000) counter that studies that reject underperformance use tests that have low power to identify abnormal returns because they underweight periods when mispricing is more likely, underweight subsamples of firms that are more likely to be subject to mispricing, and contaminate the benchmarks by including in these benchmarks the very firms that are the subject of the tests.

I test the hypothesis that firms issue equity when they believe their share prices are relatively rich by focusing on the timing behavior of firms that issue equity repeatedly. Specifically, I examine the differences in timing patterns between firms that issue equity different number of times as well as the differences between earlier and later equity issues by the same firm.

Consistent with earlier studies, I find strong evidence of poor performance following equity issuance, on average. However, this result is driven by the post-issue returns that are unusually low only for the last issue in the sequence. Poor post-issue performance is observed for the first issues of firms that issue only once, for the second issues of firms that issue twice, for the third issues of firms that issue three times, and so on. The post-issue returns for issues that are followed by other issues are either insignificantly different from benchmark returns or are significantly higher rather than lower than the benchmarks.[6] Furthermore, I show that the probability of equity issuance increases not only with the pre-current-issue return as earlier studies have shown, but also with the post-previous-issue return.

[6] It is important to note that in my identification of last issues I clearly use ex-post information not available to investors ex ante, and, therefore, not tradable upon. Nevertheless, the identification of the differences in post-issue performance of last issues and the analysis of the differences in firm characteristics and in market conditions associated with last and early issues is useful as it can shed additional light on the reasons behind the poor post-issue performance.

After checking that my results are not due to survivor bias, I examine whether they can be explained by various versions of the market-timing hypothesis. One possibility is that the post-last-issue returns are lower because these issues are timed more aggressively with respect to publicly observable pre-issue market conditions. My results do not support this hypothesis. Consistent with earlier studies, I do find strong evidence of timing relative to pre-issue market conditions. Firms tend to issue equity following periods of unusually high returns and unusually low book-to-market ratios. These patterns hold across firms issuing different number of times and across the sequence of issues by firms issuing repeatedly. However, I find that the pre-issue returns and book-to-market ratios of the last issues in the sequence are not significantly different from the corresponding characteristics of the earlier issues.

Prior research linked poor post-issue market performance to deterioration in operating performance (Loughran and Ritter (1997)), which in turn was linked to aggressive use of accruals (Teoh, Welch, and Wong (1998) and Rangan (1998)). Consistent with these studies, I find that equity issuers, on average, experience declines in post-issue operating income that are driven by declines in current accruals. However, I find no evidence of more aggressive use of accruals prior to the last issues in the sequence.

My results are most consistent with the hypothesis that managers with private information about the firm value time their equity issues in ways that benefit their existing shareholders, as in Lucas and McDonald (1990). Managers with positive information may postpone issuing equity until after the information becomes public.[7] Managers with negative information may issue equity before the information becomes

[7] Korajczyk, Lucas, and McDonald (1991) find that equity issues are preceded by unusually positive earnings releases.

public. If firms behave in this manner, then the probability of equity issuance should be higher following issues with better post-issue performance than following issues with poor performance, which is what I find. Furthermore, a firm that experiences a liquidity shock forcing it to raise equity before positive news is released to the market, may minimize the cost of issuing undervalued equity by raising the least amount necessary, fully expecting to return to the market for additional funds after the positive news is released. On the other hand, a firm that expects negative future news may raise enough funds so that it does not have to issue equity after the negative information becomes public. Consistent with this hypothesis, I find that, controlling for other factors affecting issue size, the average issue size is larger for the last issues in the sequence.

I also discuss alternative non-timing explanations. The main alternative to the market-timing hypothesis is the risk hypothesis. In all my tests, I follow the literature on post-equity-issue performance and use matching based on book-to-market and size to control for differences in risk. More importantly, however, my results imply that firms keep coming back to the market for additional rounds of new equity financing as long as the post-issue returns are not abnormally low and stop issuing equity when these long-run post-issue returns deteriorate. Therefore, the differences between the last and all other issues in the sequence cannot be simply shrugged off as due to misspecification of the benchmark as it appears that firms themselves consider the difference important enough to adjust their behavior. Furthermore, risk differences alone cannot explain my finding that the average post-last-issue raw return is negative while the average post-early-issue raw return is positive.

To ensure the robustness of my conclusions, I conduct several additional tests. Specifically, Eckbo, Masulis, and Norli (2000) argue that since equity issues reduce leverage, the sensitivity of issuers' stock returns to various risk factors declines leading to lower expected post-issue returns. However, I find no significant differences in either pre- or post-issue leverage ratios of last and non-last issues and conclude that the underperformance of last issues cannot be explained by lower leverage ratios.

In a recent paper, Lyandres, Sun, and Zhang (2005) argue that the seeming underperformance of equity issuers is due to their higher investment rates and the negative relation between expected return and investment. I, therefore, examine the pre- and post-issue differences in capital investment of last and non-last issues. I find no significant difference before the issue, but find that post-last-issue investment rates are significantly lower than the investment rates following non-last issues. I conclude that the inferior post-issue performance cannot be explained by a higher investment rate of last issues.

Finally, I consider the possibility that managers may view long-run underperformance as an implicit cost of issuing equity. If they also believe that poor post-current-issue performance increases the likelihood of poor post-future-issue performance, they may become more reluctant to issue equity in the future. However, I find no evidence that poor past post-issue performance is associated with poor future post-issue performance. In other words, there appears to be no compelling reason for managers to extrapolate the past underperformance and adjust their future issuing behavior.

The chapter is organized as follows. In Section I, I discuss my sample. In Section II, I present the patterns of post-issue market performance by number of issues and sequence of offers after IPO. In Section III, I examine the effect of post-issue market performance on subsequent equity issuance decision while controlling for other firm characteristics. In Section IV, I analyze whether the differences between early and last issues can be explained by various versions of the market-timing hypothesis. In Section V, I examine non-timing explanations. In Section VI, I summarize my findings.

I. Sample

My initial sample is drawn from Annual Compustat files covering the 1970 - 2003 period. The sample is then matched with stock return data from CRSP. To eliminate the confounding effects introduced by specific regulatory environments, I exclude financial (SIC codes 6000-6999) and utility (SIC codes 4900-4999) firms. To minimize the influence of outliers in my analysis, I also exclude firms with values of total assets or sales less than one million dollars and replace extreme observations of all ratio variables (those with the highest one percent and, for variables with negative values, lowest one percent of values) with missing values. The resulting sample consists of 168,128 firm-year observations.[8]

The sample of seasoned common equity offerings that took place over 1970 - 2003 time period is obtained from the Thomson Financial's SDC database. I exclude issues by non-US firms, private placements, pure secondary issues, rights issues, shelf registration issues, and unit offerings. To remain in my sample, each issuer has to have matching annual financial statements data in Compustat. Some firms conduct more than one offering within the same fiscal year. Given the annual frequency of the financial

[8] The number of usable observations varies by the analysis performed since certain variables have more missing values than others.

statements data, such issues cannot be distinguished from each other based on the characteristics of the issuing firm. Therefore, only the earliest issue is retained. The resulting sample contains 3,797 equity issues by 2,782 firms. The number of issues varies between 16 in 1974 and 292 in 1996. Of these issues, 1901 (50.1 percent) are issues by firms that issue equity only once, 996 (26.2 percent) are by firms that issue twice, 487 (12.8 percent) are by firms that issue three times, 413 (10.9 percent) are by firms that issue four times or more.

Table 2.1 shows the averages of several characteristics traditionally used to identify market timing. These averages are reported separately for firms in the equity issue and no-issue sub-samples. The table shows that stock returns measured over the preceding fiscal year are significantly higher for firms that issue equity (0.527) than for firms that do not issue equity (0.096). Similarly, the equity issuers' pre-issue book-to-market ratios (0.414) are significantly lower than the ratios of non-issuing firms (0.817).[9] Furthermore, the mean industry-adjusted book-to-market ratio is significantly negative (-0.275) for equity issuers, while it is significantly positive (0.008) for non-issuers.[10] In contrast, the post-equity-issue returns (-0.030) are significantly lower than the pre-issue returns or the returns of non-issuing firms.[11]

To see whether post-equity-issue returns are abnormally low, I calculate returns relative to benchmark non-issuers matched on book-to-market and size. My matching procedure follows Jegadeesh (2000). I match every issuer with a portfolio of non-issuers

[9] Book-to-market of equity is (book value of common equity (Item 60) / market value of equity (Item 199 × Item 25)).

[10] The industry book-to-market is computed as the two-digit industry mean.

[11] These average first-year post-issue returns are somewhat lower than in some of the earlier papers. This is primarily due to differences in the time periods covered and the inclusion of financial firms in these earlier studies. When I adjust for these differences in sample composition, my average post-issue returns become statistically insignificantly different from zero, consistent with earlier literature.

based on their size and book-to-market at the end of the fiscal year preceding the offer. First, I identify all non-issuers in the same size decile. Of those, I pick 10 with the closest book-to-market ratio. The benchmark returns are the average returns of these 10 firms. As is evident from Table 2.1, the post-equity-issue abnormal returns are significantly negative for one-year horizon as well as for four-year horizon.

To summarize, the results in Table 2.1 are consistent with earlier studies that find evidence of equity issue timing. Equity issuers' returns are unusually high prior to the issuance, while their post-issue returns are unusually low.

II. Post-issue market performance

In Panels A through E of Table 2.2, I examine several measures of post-equity-issue market performance conditional on *Number of Issues*, defined as the total number of times a firm has issued equity by the time it exited my sample and on *Offer after IPO*, defined as the sequential number of the issue in the series of issues by the same firm. This approach allows me to see whether there are differences in the post-issue returns across firms that issue different number of times and across the sequence of issues. Panel A of Table 2.2 reports raw post-equity issue returns. These returns are measured for the fiscal year immediately following the fiscal year in which equity was raised. Panel B reports the corresponding abnormal returns relative to non-issuing firms matched on size and book-to-market.

The results show that the average post-issue return and abnormal return are only negative for the last issue in the sequence. Poor post-issue performance is observed for the first issues by firms that issue only once, for the second issues by firms that issue twice, for the third issues by firms that issue three times, and so on. The post-issue abnormal returns for issues that are followed by other issues are either insignificantly different from zero or are significantly positive rather than negative.

The last row in each panel reports the differences in post-issue market performance of last and non-last issues, holding the *Offer after IPO* constant. The last column in each panel reports the differences in post-issue market performance of last and non-last issues, holding the *Number of Issues* constant. The results confirm that the post-issue performance of the last issue in the sequence is economically and statistically significantly lower than the performance of the earlier issues in the sequence. For example, for firms with three equity issues, the mean post-third-issue return is 25.5 percentage points lower than the post-earlier-issue returns. Similarly, the post-first-issue return of firms that issue equity only once is 30.1 percentage points lower than the post-first-issue returns of firms that issue multiple times.

Panels C and D contain four-year post issue raw and abnormal returns. Both of these variables demonstrate the same pattern as one-year returns. Several recent studies show that the underperformance following seasoned equity offering is reduced significantly under the calendar-time approach to abnormal return calculation (Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000)). To test my findings for robustness I compute monthly calendar returns over a 12-month horizon. The results, reported in Panel E reinforce the finding of poor performance following last equity issues.

Panel F summarizes the differences in first, second, third, and fourth year returns between the last and non-last issues in the sequence. In all cases, the post-last-issue returns are lower than the post-issue returns of non-last issues. The differences are significant in years one through three for both the raw and the abnormal returns.

Furthermore, the abnormal returns associated with last issues are all negative and statistically significant for the first three years, while the abnormal returns associated with non-last issues are significantly positive in year 1 and insignificant in subsequent years.

If most of my last issues are concentrated at the end of my sample period, the negative post-issue returns may be driven by the specific market conditions at that time. I, therefore, repeat my analysis excluding the last five and, alternatively, the last ten years of data. In each case, the results remain qualitatively the same. It is also possible that the results in Table 2.2 are driven by survivor bias. Firms experiencing negative returns after equity issuance could have a higher likelihood of dropping out of Compustat sample due to bankruptcy, takeover, or some other reason. I repeat my analysis for firms with at least five and, alternatively, with at least ten annual observations after the last instance of issuing equity. The results do not change.

These patterns in post-issue returns suggest that firms that underperform following issuance of equity are significantly less likely to return to the market for additional rounds of equity financing. I re-examine this finding using a different approach. Panel G of Table 2.2 provides return patterns of firms with and without a subsequent equity issue within one to five fiscal years of the previous issue. Several observations can be drawn from the results in Panel G. Firms with subsequent issues have higher returns than firms without subsequent issues, although the differences are not always statistically significant. However, firms with subsequent issues have significantly higher returns than non-issuers (both in statistical and economic sense) one year before the subsequent issue. In other words, relative to their non-issuing peers, firms that issue equity again in year one tend to have higher returns in year zero, firms that issue in year two have higher returns in year one, etc.

Additionally, the post-previous-issue returns of firms with subsequent issues are always significantly higher than the post-previous-issue returns of non-issuers. These differences are statistically and economically significant. Interestingly, firms that subsequently return to the market one or two years later, do not experience a decline in returns after the previous issue. Firms that choose to wait three to five years before returning to the market experience an initial drop in post-issue returns followed by a run up before the next issue.

To summarize, the previously documented evidence of abnormally low average long run post-equity-issue returns holds only for the last issue in the sequence. To put it differently, firms are reluctant to return to the market after poor post-issue performance.

III. Post-Issue Market Performance and Subsequent Equity Issues

The results in the previous section imply that firms are more likely to return to the market with additional equity issues if they experience strong post-previous-issue performance. However, the univariate results in Table 2.2 may simply reflect differences in firm and issue characteristics between earlier and later issues in the sequence. In this section, I re-examine the effect of post-equity issue market performance on subsequent equity issuance behavior while controlling for other factors.

Frequency of Equity Issuance by Post-Previous-Issue and Pre-Current-Issue Return Quintiles

First, I examine the effect of post-previous-issue return on the probability of subsequent equity issuance while controlling for the pre-current-issue stock market performance. It has been established in the earlier literature that the probability of equity issuance increases with pre-issue returns. It is possible that post-previous-issue return is important in univariate sense simply because it is positively correlated with pre-current-issue return. This may happen if subsequent issues quickly follow previous ones creating overlaps in the time periods over which the two returns are measured. Alternatively, the correlation may be due to momentum effects in stock returns.

Table 2.3 reports the probability of equity issuance for 25 firm-year groups based on a two-way sort into post-previous-issue (horizontal dimension) and pre-current-issue (vertical dimension) return quintiles. The sorting along these two dimensions is done independently. My hypothesis is that the probability of offering equity increases with both quintile assignments. In other words, I expect the bottom right corner to be probability-heavy. The results confirm my intuition as small probabilities are gathered in the upper left corner and large probabilities in the bottom right corner. Thus, holding the pre-current-offer return quintile fixed, the probabilities increase in post-previous-issue return and vice versa.

Logit Model of Probability of Equity Issuance

The results in the previous sub-section show that the positive effect of post-issue return on the probability of subsequent equity issuance survives when I control for pre-current-issue stock return. In this section, I re-examine the relation between post-previous-issue return and the probability of new equity issuance, while controlling for this and other cross-sectional differences between firms. I use a Logit regression to model the likelihood of equity issuance in a particular firm-year as a function of a comprehensive set of explanatory variables capturing crucial firm and industry characteristics suggested by theory and found important in prior studies.

The results presented in Table 2.4 are for the equity issue decision model, estimated on a sample restricted only to those firms that had at least one equity issue in their past. This allows me to include the post-previous-issue return in my model. The dependent variable is coded one if a firm issues equity during the year and zero if it does not. Therefore, a positive coefficient on an explanatory variable indicates that an increase in that variable is associated with a higher probability of equity issuance. The reported statistics reflect robust standard errors adjusted for heteroskedasticity and firm-level clustering.

The results show that the effect of post-previous-issue return on the probability of new equity issuance is not due to differences in other firm characteristics. The coefficient estimate on the post-previous-issue return is positive and statistically and economically significant, implying that firms that experience poor post-equity-issue performance are less likely to return to the market for additional rounds of equity financing than firms with high post-issue returns.

Consistent with the market timing evidence developed in earlier studies, the results also indicate that firms are more likely to issue equity when their book-to-market ratios are low, as well as following periods of high returns. The positive effect of industry book-to-market implies that, holding the book-to-market constant, the probability of equity issuance is higher for firms with book-to-market ratios that are low relative to the industry norm. In other words, firms that are valued at a premium relative to their industry peers are more likely to issue equity.

Consistent with prior literature, I also find that equity issuers tend to have higher leverage, higher research and development (R&D) intensity, and are smaller than non-issuers.[12] Other factors equal, higher leverage implies higher probability of being overlevered and is, therefore, expected to have a positive effect on the probability of equity issuance. On the other hand, the effect of industry average leverage, which I use as a proxy for target leverage, is insignificant. The positive effect of R&D is consistent with the view that firms with high growth opportunities and product uniqueness should keep their leverage low to avoid debt overhang and to maintain investment flexibility. Large and mature firms are more likely to have less volatile cash flows and enjoy access to relatively cheap debt.

The regression results also imply that firms issuing equity tend to be more profitable and have lower net loss carry-forwards.[13] This result is consistent with the view that firms issue during 'windows of opportunity', which they may create by manipulating accruals to inflate their measures of operating performance (Teoh, Welch, and Wong (1998)). Idiosyncratic risk and asset tangibility have no significant effect in this regression.[14] The positive coefficient on *Offer after IPO* suggests that the probability of equity issuance is higher for firms with a history of issuing equity frequently. This may reflect unobserved

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[12] Leverage is the sum of short-term (Item 34) and long-term debt (Item 9) scaled by total assets (Item 6). R&D intensity is Item 46, scaled by net sales (Item 12). Size is measured as the market value of equity.

[13] Profitability (ROA) is measured as EBITDA (Item 13)/ total assets (Item 6). Net operating loss carryforwards is Item 52/ total assets.

[14] Idiosyncratic risk is the residual from a market model regression of daily returns observed in the fiscal year (250 trading days) prior to the year of the issue. Asset tangibility is measured as net property, plant, and equipment (Item 8) / total assets.

heterogeneity between firms that show preference for external equity financing and those that do not.

To summarize, the results in this section confirm that the probability of equity issuance is higher if the returns following the previous instance of equity issuance are high. This result holds when I control for the pre-issue return as well as other firm and industry characteristics identified by earlier studies as important determinants of the equity issuance decision.

IV. Post-issue returns and market timing

Thus far, I have found that firms with poor post-issue performance avoid issuing additional equity. I now turn to the question of why the post-issue returns are so poor after the last issue in the sequence, but are significantly higher after the earlier issues.

The pattern of unusually high pre-issue stock returns followed by inferior post-issue returns has frequently been interpreted as consistent with the hypothesis that managers time the market. My analysis is guided by the hypotheses advanced by earlier research to explain this apparent market timing ability. Other possible explanations, such as risk, are examined in the next section of the chapter.

According to one hypothesis, managers manipulate the market into becoming overoptimistic about the firm’s prospects by managing earnings to look better than they actually are right before equity is issued (Teoh, Welch, and Wong (1998)). The market’s overoptimism, along with its failure to fully adjust for the information content of equity issue announcement, allows the firm to issue new equity at an inflated share price. Subsequently, the share price declines over time reflecting the market’s disappointment with declining operating performance.

Alternatively, managers may not manipulate the market but may simply exploit their informational advantage over investors if the inside information becomes public with delay (Lucas and McDonald (1990)). By delaying equity issues until after positive news is released and speeding up the issues before negative news is released to the public, the managers may be able to raise new equity at relatively high prices.

Finally, some researchers (e.g., Baker and Wurgler (2002)) suggest that managers may have no informational advantage, but may simply be timing the market based on publicly available information, taking advantage of patterns of mean-reversion in stock prices identified in earlier finance literature (see, e.g., Lakonishok, Shleifer, and Vishny (1994)). In this case, firm managers have no ability to forecast future return, but tend to issue following periods of high returns and declines in book-to-market ratios because they believe that stock returns tend to turn lower after such periods.

In what follows, I test these hypotheses by examining the differences between last and non-last issues in terms of issue size, pre-issue market conditions, and operating performance.

Issue Size

The hypothesis that equity issues are timed based on private information has implications for the issue size. A firm that experiences a liquidity shock that forces it to raise new equity would likely choose the issue size that minimizes the costs of issuing undervalued equity. Specifically, one could expect firms with favorable private information to issue the least amount possible, deferring the more discretionary portion of the financing for later issuance after the favorable information is released. In contrast, firms with unfavorable private information would increase the size of the issue so that they do not have to issue after the unfavorable information becomes public. Such a behavior would be consistent with my finding that the probability of equity issuance increases with the post-previous issue return. It would also imply that the last issues in the sequence should be larger than the earlier issues.

I test this hypothesis in Table 2.5 by estimating a regression of issue size on the set of exogenous variables used earlier to examine the factors that affect the probability of equity issuance.[15] To see whether the size of the last issue is larger than that of the earlier issues, I replace the *Offer after IPO* with the *Last Offer* indicator variable.[16] The results in Table 2.5 show that, controlling for other differences in firm characteristics, the last issue tends to be significantly larger than the earlier issues in the sequence, which is consistent with my timing hypothesis. The difference of 0.031 between last and non-last issue size is economically significant.

Pre-Issue Market Conditions

If the poor post-issue returns are observed because firms take advantage of patterns of long-run return reversals by timing their equity issues based on publicly observable indicators of market conditions, such as past stock returns and book-to-market ratios, then the differences in post-issue returns of last and non-last issues should be due to differences in these indicators. Specifically, the poor post-last-issue performance may be explained by more aggressive timing of these issues with respect to pre-issue return and book-to-market.

Table 2.6 presents three measures of pre-issue market performance of equity issuers. Panel A presents the one-year stock returns measured over the fiscal year preceding the

[15] The issue size is measured as the proceeds from the SEO scaled by the beginning-of-the-period total assets.

[16] I also drop the post-previous-issue return so that all equity issues can be used in the regression.

issuance. Panel B presents the book-to-market ratios measured at the beginning of the year of issuance. Panel C presents the industry-adjusted book-to-market ratios. As I did in Table 2.3, I present the results in Table 2.6 for groups of firms formed on the basis of a two-dimensional sort by the *Number of Issues* (vertical dimension) and by the *Offer after IPO* (horizontal dimension).

The results in Panel A are not consistent with the hypothesis that the differences in post-issue market performance are due to differences in pre-issue market timing. The last column in the table shows the differences in pre-issue returns of the last issues in the sequence and the earlier issues, holding the total number of issues by a firm constant. None of the differences are significantly positive. Similarly, the differences between last and non-last issues with the same sequential number (*Offer after IPO*) are all insignificant, as reported in the last row of Panel A.

In Panel B, holding the total number of issues constant, the differences between the book-to-market ratios of last and non-last issues reported in the last column are all statistically insignificant. As reported in the last row, holding the sequential number of the issue constant, the differences between last and non-last issues are also insignificant, except the book-to-market ratios of one-time issuers are significantly lower than the pre-first-issue ratios of multiple issuers. Similarly, in Panel C, the pre-last-issue industry-adjusted book-to-market ratios are all higher (mostly insignificantly) rather than lower than the ratios observed before non-last issues.

Overall, the results in Table 2.6 are not consistent with the hypothesis that the last issues are timed more aggressively with respect to publicly available indicators of market conditions.

Operating Performance

A number of prior studies link the sub-par stock price performance to the decline in firm operating performance observed after equity issuance (Loughran and Ritter (1997)). In this section, I examine whether the differences in post-equity-issue returns of last and earlier issues in the sequence can be traced to differences in patterns of operating performance.

Panel A of Table 2.7 shows the changes in the return on assets (ROA) between years –1 and +1 around the year of the issue in bivariate sorts by *Number of Issues* and *Offer after IPO*. The changes in ROA are negative for all groups of firms, albeit not always significantly so. More importantly, the differences in changes in ROA between last and non-last issues reported in the last column (holding the *Number of Issues* constant) and the last row (holding the *Offer after IPO* constant) of Panel A are all significantly negative, except for the fourth and later issues. The differences are significant economically as well. For example, for firms with two equity issues, the change in ROA around the first issue is –0.029, while the change in ROA around the second issue is –0.055.

Earlier research has found mean reversion as well as industry effects in operating performance. To control for these effects, I follow Teoh, Welch, and Wong (1998) and calculate the difference between the change in ROA of each equity issuer and the change in ROA of a non-issuing firm matched on industry and pre-event performance. The matching firms are obtained by selecting firms in the same two-digit SIC industry family, and then keeping the firm with the ROA closest to the issuer's. The ROA of the match has to be at least 80 percent of that of the issuer, as in Teoh, Welch, and Wong (1998).

The results, presented in Panel B, show that the excess change in ROA is significantly negative only for firms that issue once and for the second issues by firms that issue twice. Furthermore, although the excess change in ROA is always more negative for the last issue in the sequence, the difference is statistically significant only when firms that issue once or twice are considered.

Teoh, Welch, and Wong (1998) and Rangan (1998) show that the declines in operating performance of equity issuers are driven by changes in accruals. I adjust for the effect of current accruals by subtracting these from EBITDA and then scaling the difference by beginning of the year assets to obtain the cash flow return on assets, CFROA.[17] Panel C presents changes in CFROA. Panel D presents excess changes in CFROA relative to non-issuing firms matched based on past CFROA and industry affiliation. Consistent with Teoh, Welch, and Wong (1998) and Rangan (1998), the changes in CFROA and excess CFROA are mostly insignificant. In addition, the difference between the last and non-last issues is only statistically significant for firms with at least four equity issues.

Earnings Manipulation

Teoh, Welch, and Wong (1998) and Rangan (1998) find that the abnormally negative changes in operating performance of equity issuers are driven by the aggressive use of discretionary accruals. I follow these studies and decompose current accruals into its discretionary and non-discretionary components. For each year and two-digit SIC code, I estimate ordinary least squares regressions of current accruals scaled by beginning of the period total assets on the inverse of beginning assets and the change in sales scaled by

[17] I follow Teoh, Welch, and Wong (1998) and calculate the current accruals as the change in [(current assets (Item 4) – cash (Item1)) – (current liabilities (Item 5) – current maturity long-term debt (Item 44))].

beginning assets. The nondiscretionary component of current accruals is the predicted value of the accruals from this regression. The residual of the regression is the discretionary current accruals.

Table 2.8 presents the estimated levels of the discretionary and the non-discretionary components of current accruals by *Number of Issues* and *Offer after IPO*. The results in Panel A show no evidence of more aggressive use of discretionary accruals prior to the last issue in the sequence.[18] The differences in levels of discretionary current accruals of last and non-last issues are insignificant. In Panel B, I find that the last issues are associated with lower pre-issue nondiscretionary accruals than earlier issues of the same firm. The differences are significant for two-time and three-time issuers.

To summarize, while I find that equity issuers tend to have significantly positive levels of discretionary current accruals, I find no evidence that the discretionary accruals are significantly higher for the last issues. Therefore, it is unlikely that the difference in post-issue performance between last and non-last issues is driven by how aggressively firms manage their earnings using discretionary accruals.

Regression Analysis of Post-Issue Returns

In this section, I use regression analysis to examine directly whether post-equity-issue returns are affected by pre-issue market conditions, current accruals, and cash flow performance, and whether these factors explain away the difference in post-issue market performance of last and non-last issues. The regressions, reported in Tables 2.9 and 2.10, are estimated with controls for size and book-to-market effects.[19] The dependent variables in these regressions are the one-year ahead and the four-year ahead log returns.

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[18] Similar results are obtained when I examine the discretionary accruals in the year of the issue.

[19] Book-to-market (size) in these regressions is the natural log of book-to-market of equity (size) that was defined earlier in the paper.

The regressions include year and two-digit industry indicator variables. The reported robust t-statistics reflect standard errors adjusted for heteroskedasticity. The regressions in Table 2.9 are estimated on a sample of all available firm-years with and without equity issue. In these regressions, I focus on the effects of accruals and their interactions with the seasoned equity offering (SEO) indicator and the last SEO in the sequence (Last) indicator variables.

Consistent with Teoh, Welch, Wong (1998), my results show that both discretionary and non-discretionary accruals have significantly negative effects on subsequent one-year and four-year returns. The results also show that the effects of accruals for SEOs and for last SEOs are not significantly different from the effects of accruals in years without equity offerings. Finally, the results show that one-year returns following non-last equity issues are significantly higher (by 6.4 percent) than the returns of non-issuers. In contrast, the one-year returns following the last issues in the sequence are significantly lower (by 22.5 percent) than the post-issue returns of non-last issuers. In the four-year return regression, the post-early-issue returns are not significantly different from non-issuers' returns, while the last issuers' returns are significantly lower (by 34.1 percent) than non-last issuers' returns.

Table 2.10 presents coefficient estimates for regressions of one-year and four-year returns estimated on a sample of equity issuers only. Unlike regressions in Table 2.9, these regressions do not have any interacted terms, but include CFROA, pre-issue returns, and issue size as additional explanatory variables. The first two sets of results demonstrate that the inclusion of these additional controls does not change my basic result. The post-issue returns of last issues are significantly more negative than the post-issue returns of early issues in the sequence. The results also show that one-year and four-year returns are positively related to pre-issue level of CFROA and that four-year returns are negatively related to issue size.

The last two sets of results in Table 2.10 are for regressions estimated on the subsample of equity issuers that have issued equity in the past. These regressions also feature an additional right-hand-side variable measuring the one-year return experienced by these firms after the previous instance of equity issuance. The results show that the last issue effect is not explained by this variable either. The coefficient estimate for the last issue indicator remains statistically and economically significantly negative.

I check for the robustness of my results in tables 2.9 and 2.10 using two alternative estimation procedures. First, I follow Fama and MacBeth (1973) to estimate annual cross-sectional regressions and calculate the significance statistics based on the time-series of regression coefficient estimates. The results of Fama-McBeth regressions are reported in Panels B of Table 2.9 and Table 2.10. For regression models from Table 2.9, the effect of the Last SEO indicator is insignificant in the one-year return regressions but is significantly negative in the four-year return regressions. For three of the four specifications reported in Table 10, Fama-MacBeth regressions produce statistically significant negative coefficient estimates on the Last SEO indicator. Thus, although Fama-MacBeth results are somewhat weaker, they are overall consistent with the results reported in Tables 2.9 and 2.10. Furthermore, Fama-MacBeth regressions are likely to underestimate the last offer effect because it has an important time-series component, which is lost in cross-sectional Fama-MacBeth regressions.

As an additional robustness check, I use bootstrapped standard errors to obtain significance statistics. In all regressions, the effect of the Last SEO indicator is statistically significantly negative.

To summarize, the average post-equity-issue returns are significantly negative only for the last issue in the sequence of issues by the same firm. This result is obtained while controlling for book-to-market and size effects, as well as for the effects of pre-issue market timing, earnings management, issue size, and post-previous issue returns.

IV. Alternative hypotheses

The main hypothesis proposed in the earlier literature as an alternative to market timing is that the post-equity-issue underperformance is due to benchmark misspecification and low post-issue returns reflects lower risk of these stocks. However, my results cast doubt on the validity of risk explanation. The fact that firms consider the difference between the last and all other issues in the sequence important enough to adjust their behavior implies that this difference cannot be simply shrugged off as due to misspecification of the benchmark. Also, it is not clear why earlier issues by the same firm should be riskier than the last ones. However, the ex-post definition of 'last' issues makes statements about mispricing problematic. The problem is that the fact that ex post (after I learn that a particular issue was the last one) some returns were lower than others does not mean that ex ante (when I didn't know that the issue was going to be the last one) these shares were overpriced based on the information available before the issue. A proper test of mispricing requires one to examine an investment strategy based on the ex-ante definition of non-last/last equity issues.

I address this by examining one possible zero-investment strategy in two portfolios constructed based on the predicted likelihood of last issues. The likelihood scores are obtained from a logistic regression model predicting whether an equity issue is going to be last based on the pre-issue characteristics employed in my previous analyses. The dependent variable is coded one for last issues. The parameter estimates from this model are provided in Table 2.11. The likelihood scores are sorted on ascending order and then separated into two groups based on the median value. Issues in the second half are most likely to be last issues. Panel B of Table 2.11 demonstrates that by investing in the portfolio of first-quintile firms, which are least likely to be last, one may earn 4.2 percent in the year following the issue, which is significantly higher than the return on the second portfolio. The zero-investment strategy from taking a short position in one portfolio and long position in the other yields a statistically significant 4 percent return. Based on buy-and-hold abnormal returns this strategy generates a statistically significant return of 4.7 percent. My results in Table 2.11 confirm that it is possible to construct a feasible profitable strategy by trading firms in two groups based on predicted likelihood of 'last' issue. The availability of such profitable strategy based on the ex ante public information is indicative of mispricing.

To ensure the robustness of my conclusions, I conduct several additional tests. Specifically, Eckbo, Masulis, and Norli (2000) argue that since equity issues reduce leverage, the sensitivity of issuers' stock returns to various risk factors declines leading to lower expected post-issue returns. However, as reported in 2.12, I find no significant differences in either pre- or post-issue leverage ratios of last and non-last issues. I conclude that the underperformance of last issues cannot be explained by lower leverage ratios.

In a recent paper, Lyandres, Sun and Zhang (2005) argue that the seeming underperformance of equity issuers is due to their higher investment rates and the negative relation between the expected return and investment. In Table 2.12, I examine the one-year pre- and post-issue differences in capital investment[20] of last and non-last issues. I find no significant difference before the issue, but find that post-last-issue investment rates are significantly lower than the investment rates following non-last issues. This implies that the inferior post-issue performance cannot be explained by a higher investment rate of last issues.

Finally, I consider the possibility that managers may view long run underperformance as an implicit cost of issuing equity. If they also believe that poor post-current-issue performance increases the likelihood of poor post-future-issue performance, they may become reluctant to issue equity in the future. However, the negative coefficient estimate for the post-previous-issue return in Table 2.10 implies that poor past post-issue performance does not imply poor future post-issue performance. In other words, there appears to be no compelling reason for managers to extrapolate the past underperformance and adjust their issuing behavior.

V. Conclusions

Prior studies have found that firms conducting SEOs significantly underperform matched non-issuing firms in terms of long-term stock returns. Two explanations have

[20] Consistent with Lyandres, Sun, and Zhang (2005), I measure investment as change in net property plant and equipment/beginning of the year total assets.

been proposed. According to one group of studies, the post-equity-issue underpeformance is an illusion created by poor benchmarking of the returns on these stocks. Others argue that the evidence implies that firms time their equity issues to periods when their stock prices are unusually high and that the market fails to quickly and fully incorporate the value implications of SEO announcements.

My main finding that, on average, the post-equity-issue returns are unusually low only for the last issue in the sequence of issues by the same firm is more consistent with the market-timing hypothesis than the benchmark misspecification hypothesis. The difference between the last and all other issues in the sequence cannot be simply shrugged off as due to misspecification of the benchmark as it appears that firms themselves consider the difference important enough to adjust their behavior. Furthermore, the raw returns of the last issues are significantly negative, while the raw returns of non-last issues are significantly positive. Such differences cannot be explained by simple differences in risk levels.

The market timing literature has formulated three hypotheses about how managers time the market. According to one hypothesis, managers manipulate the market into becoming overoptimistic about the firm's prospects by managing the firm's earnings and, more specifically, its discretionary accruals. I find no evidence of more aggressive use of discretionary accruals prior to the last issue in the sequence.

According to another hypothesis, managers believe that the equity markets are inefficient and that stock prices follow predictable patterns of mean reversion. They act on these beliefs by issuing equity when their book-to-market ratios are low and after periods of high returns. My results are not consistent with this hypothesis either. I find no evidence that the last issues in the sequence are timed more aggressively to the pre-issue market conditions.

My results are most consistent with the hypothesis that managers use their private information to time their equity issues. Specifically, the patterns observed in this chapter could arise if managers with favorable private information and urgent exogenous need for financing issued only the minimum amount of equity necessary, hoping to raise more equity after this private information becomes public. On the other hand, managers with negative private information would prefer to raise enough equity so that they do not have to raise it again after the negative information is released.

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TABLES

Table 1.1. Frequency Distribution of Seasoned Equity Issues by Year

This table presents the distribution of 3,380 seasoned equity offerings by industrial firms for the period from 1982 to 2001. All firms with the two-digit SIC code 49 and one-digit SIC code 6 are classified as utilities and financial institutions, respectively, and are excluded form the analyses. Other notable exclusions include IPOs, issues by non-US firms, pure secondary offerings, private placements, rights issues, issues made under shelf registration, unit offerings, carve-outs, and withdrawn and postponed issues.

Year	Number of issues	Percent
1982	96	2.8%
1983	294	8.7%
1984	51	1.5%
1985	128	3.8%
1986	132	3.9%
1987	120	3.6%
1988	49	1.4%
1989	90	2.7%
1990	68	2.0%
1991	220	6.5%
1992	188	5.6%
1993	265	7.8%
1994	158	4.7%
1995	285	8.4%
1996	331	9.8%
1997	271	8.0%
1998	146	4.3%
1999	202	6.0%
2000	201	5.9%
2001	85	2.5%
Total	3,380	100%

Table 1.2. Summary Statistics for Seasoned Equity Issuers and Non-issuers

Columns 2 and 3 report averages for firm-years with and without equity issues of seasoned equity issuers. Column 4 reports averages for firm-years of firms with no seasoned equity issues in my sample period. CAR(-1,1) is a three-day cumulative abnormal return. Discount is the percent difference between offer price and the pre-issue closing price. DACAR(-1,1) is CAR(-1,1) adjusted for offer discount. Time from previous issue is measured in years. Previous issue CAR(-1,1) and discount are for the most recent issue. Offer after IPO is the chronological sequence number of the equity issue. Number of issues is the total number of equity issues by a firm. Pre-issue price is at the pre-issue day close. Issue size is new primary shares/shares outstanding before the issue. The market-to-book ratio is (total assets - book value of equity + market value of equity)/total assets. Leverage is (long-term debt + short-term debt)/total assets. Deviations from the industry market-to-book ratio (leverage) are the difference between the firm's market-to-book (leverage) and the average based on the three-digit SIC code. Profitability is EBITDA/total assets. Tangibility is net property, plant, and equipment / total assets. R&D intensity is research and development expenses /sales. Carry-forwards is net operating loss carry-forwards/ total assets. Firm size is the market value of equity. All financials are lagged one fiscal year unless specified otherwise. Idiosyncratic risk is the standard deviation of market model residuals estimated over one fiscal year before the announcement.

Panel A	Issuing Firms		Non-issuing Firms
	Years with Equity Issue	Years without Equity Issue	
Market-model CAR(-1,1)	-0.030	-	-
Market-adjusted CAR(-1,1)	-0.021	-	-
Discount	-0.030	-	-
DACAR(-1,1)	-0.029	-	-
Previous issue CAR(-1,1)	-0.029	-0.028	-
Previous issue discount	-0.026	-0.024	-
Offer after IPO	1.546	-	-
Number of issues	1.898	-	-
Time from previous issue	3.213	4.683	-
Issue size	0.193	-	-
Pre-issue price	24.602	-	-
Market-to-book	2.683	1.946	1.935
ΔMarket-to-book $_{t=-2,-1}$	0.340	-0.126	-0.098
Dev. from ind. market-to-book	0.557	-0.066	-0.028
Leverage	0.236	0.233	0.248
Dev. from ind. leverage	-0.003	-0.013	-0.002
Profitability	0.137	0.118	0.083
Tangibility	0.295	0.309	0.300
R&D	0.122	0.088	0.062
Carry-forwards	0.129	0.124	0.204
Firm size	369.845	536.240	330.245
Idiosyncratic risk	0.035	0.035	0.040
Observations	3,380	21,914	65,223

Panel B		
Year	CAR(-1,1)	Discount
1982	-0.032	-0.012
1983	-0.021	-0.013
1984	-0.032	-0.014
1985	-0.025	-0.006
1986	-0.019	-0.008
1987	-0.021	-0.015
1988	-0.032	-0.014
1989	-0.033	-0.014
1990	-0.028	-0.018
1991	-0.034	-0.031
1992	-0.043	-0.033
1993	-0.033	-0.034
1994	-0.043	-0.034
1995	-0.021	-0.034
1996	-0.027	-0.043
1997	-0.032	-0.036
1998	-0.032	-0.035
1999	-0.030	-0.040
2000	-0.041	-0.055
2001	-0.040	-0.039

Table 1.3. Average Indirect Costs of Seasoned Equity Issues

This table reports average indirect issue costs for my sample of 3,380 seasoned equity issuers. CAR(-1,1) is a three-day cumulative abnormal return at the issue announcement. Discount is the percent difference between offer price and the pre-issue closing price. DACAR(-1,1) is CAR(-1,1) adjusted for offer discount. Offer after IPO is the chronological sequence number of the equity issue. The Total Number of Issues variable is set to the last Offer After IPO in my sample period. Values significantly different from zero at 5% and 1% level are marked by * and ** respectively.

Total Number of Issues	Offer After IPO					
	1	2	3	4	5+	Total
Panel A: Market-model CAR(-1,1)						
1	-0.032**					-0.032**
2	-0.026**	-0.031**				-0.030**
3	-0.033**	-0.033**	-0.022**			-0.028**
4	-0.023*	-0.029**	-0.034**	-0.026**		-0.028**
5+	-0.033**	-0.022*	-0.054**	-0.025 **	-0.025**	-0.030**
Total	-0.031**	-0.031**	-0.027**	-0.026**	-0.025**	
Panel B: Market-adjusted CAR(-1,1)						
1	-0.023**					-0.023**
2	-0.018**	-0.022**				-0.021**
3	-0.023**	-0.023**	-0.014**			-0.019**
4	-0.012	-0.022*	-0.024**	-0.017**		-0.019**
5+	-0.010	-0.019*	-0.047**	-0.020*	-0.018**	-0.023**
Total	-0.022**	-0.022**	-0.019**	-0.018**	-0.018**	

Table1.3. Average Indirect Costs of Seasoned Equity Issues (continued)

Total Number of Issues	Offer After IPO					
	1	2	3	4	5+	Total
Panel C: Discount						
1	-0.035**					-0.035**
2	-0.031**	-0.027**				-0.029**
3	-0.031**	-0.030**	-0.020**			-0.026**
4	-0.019**	-0.017**	-0.021**	-0.016**		-0.018**
5+	-0.012**	-0.010	-0.007	-0.009*	-0.016**	-0.012**
Total	-0.034**	-0.026**	-0.019**	-0.015**	-0.016**	
Panel D: DACAR(-1,1)						
1	-0.030**					-0.030**
2	-0.025**	-0.031**				-0.029**
3	-0.030**	-0.036**	-0.022**			-0.028**
4	-0.024*	-0.034**	-0.036**	-0.027**		-0.030**
5+	-0.035*	-0.023*	-0.062**	-0.027**	-0.028**	-0.034**
Total	-0.029**	-0.032**	-0.028**	-0.027**	-0.028**	

Table 1.4. Average Measures of Idiosyncratic Risk for Seasoned Equity Issues

This table reports average measures of idiosyncratic risk for my sample of 3,380 seasoned equity issues. Idiosyncratic risk is the standard deviation of the market model residuals estimated over one fiscal year preceding the announcement. Offer after IPO is the chronological sequence number of the equity issue. The Total Number of Issues variable is set to the last Offer After IPO in my sample period. Values significantly different from zero at 5% and 1% level are marked by * and ** respectively.

Total Number of Issues	Offer After IPO					Total
	1	2	3	4	5+	
Panel A: Idiosyncratic Risk						
1	0.037**					0.037**
2	0.037**	0.034**				0.035**
3	0.038**	0.035**	0.033**			0.034**
4	0.031**	0.031**	0.031**	0.030**		0.031**
5+	0.033*	0.028**	0.028**	0.024**	0.024**	0.026**
Total	0.037**	0.034**	0.032**	0.029**	0.024**	

	Time from Previous Offer					
Panel B: Idiosyncratic Risk	0	1	2	3	4	5+
	0.035	0.035	0.036	0.036	0.037	0.035

Table 1.5. Average Indirect Costs of Seasoned Equity Issues Conditional on the Costs of the First Seasoned Issue

This table presents average indirect issue costs conditional on the indirect costs of the first issue for my sample of 3,380 equity issuers. Columns 2 through 6 provide average CAR(-1,1) and offer discount for subsequent issues based on whether the CAR(-1,1) or discount from the first seasoned issue was below or above sample median, mean or zero. CAR(-1,1) is a three-day cumulative abnormal return at the issue announcement. Offer discount is the difference in offer price relative to the pre-issue closing price. Offer after IPO is the chronological sequence number of the equity issue. Values significantly different from zero at 5% and 1% level are marked * and ** respectively. Differences in group means (i.e., above median/ below median) significantly different from zero at 5% and 1% level are marked b and a respectively.

First Issue Indirect Costs	Offer After IPO				
	2	3	4	5+	Total
Panel A: Subsequent CAR(-1,1)					
CAR(-1,1) Below Median	-0.042**[a]	-0.024**	-0.025	-0.032	-0.037**[a]
CAR(-1,1) Above Median	-0.022**	-0.022**	-0.030*	-0.014	-0.023**
Panel B: Subsequent Discount					
Discount Below Median	-0.034**[b]	-0.020**	-0.021**	-0.028	-0.031**[b]
Discount Above Median	-0.025**	-0.021**	-0.016	-0.020	-0.023**

Table 1.6. Determinants of Indirect Costs of Seasoned Equity Issue

This table contains the output of the ordinary least squares regression models of CAR(-1,1) and offer discount determinants. The market-to-book ratio is the (total assets - book value of equity + market value of equity)/total assets. Leverage is debt (long-term debt + short-term debt)/total assets. Profitability is EBITDA/total assets. Deviations from the industry market-to-book ratio and leverage are the difference between the firm's market-to-book (leverage) and the average based on the three-digit SIC code and year. Tangibility is measured as net property, plant, and equipment / total assets. R&D intensity is research and development expenses/ sales. Carry-forwards is net operating loss carry-forwards / total assets. Firm size is the market value of equity. All financials are for the fiscal year before the equity issue announcement unless noted otherwise. Idiosyncratic risk is the standard deviation of the market model residuals estimated over one fiscal year preceding the announcement. Issue size is new primary shares/shares outstanding before the issue. Offer after IPO is the chronological sequence number of the equity issue. CAR(-1,1) is a three-day cumulative abnormal return at the issue announcement. Discount is the percent difference between offer price and the pre-issue closing price. Time from previous issue is the number of years between two successive equity issue announcements. Previous issue CAR(-1,1) and discount are for the most recent equity issue. Pre-offer price is the natural log of the last closing price before the offer. t-statistics reflect Rogers standard errors clustered by firm. Values significantly different from zero at 5% and 1% level are marked by * and ** respectively.

	CAR(-1,1)		Discount	
	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.003	0.1	-0.013	-0.8
Market-to-book	-0.005	-0.2	-0.002	-0.7
ΔMarket-to-book $_{t=-2,-1}$	0.002	0.6	-0.002	-1.2
Dev. from ind. market-to-book	-0.010*	-2.1	0.003	1.0
Leverage	-0.062*	-2.1	0.024	1.6
Dev. from ind. leverage	0.072*	2.2	-0.013	-0.8
Profitability	0.026	1.4	0.025*	2.2
Tangibility	0.011	1.0	0.003	0.5
R&D	-0.001	-0.1	0.004	0.7
Carry-forwards	0.013	1.0	0.005	0.9
Firm size	-0.000	-0.0	0.000	0.2
Idiosyncratic risk	-0.393	-1.6	-0.504**	-3.5
Issue size	-0.007	-0.2	-0.025*	-2.0
Offer after IPO	0.000	0.1	0.001	0.6
Time from previous issue	0.000	0.5	-0.002**	-3.1
Previous issue CAR(-1,1)	0.095*	2.0	-0.017	-0.6
Previous issue discount	0.049	0.5	0.115*	2.0
Pre-offer price			0.003	1.2
R^2	0.053		0.181	
Observations	609		599	

Table 1.7. Determinants of Seasoned Equity Issue Decision

This table contains the estimates of the logit regressions for the combined sample of issuing and non-issuing firms and for the sample of firms with a previous seasoned equity issue. The dependent variable is defined as one if a company issues equity during that year and zero if it does not. The market-to-book ratio is the (total assets - book value of equity + market value of equity)/total assets. Leverage is debt (long-term debt + short-term debt)/total assets. Deviations from the industry market-to-book ratio and leverage are the difference between the firm's market-to-book (leverage) and the average based on the three-digit SIC code and year. Profitability is EBITDA/total assets. Tangibility is measured as net property, plant, and equipment / total assets. R&D intensity is research and development expenses/ sales. Carry-forwards is net operating loss carry-forwards/ total assets. Firm size is the market value of equity. All financials are for the fiscal year before the equity issue announcement unless noted otherwise. Idiosyncratic risk is the standard deviation of the market model residuals estimated over one fiscal year preceding the announcement. Issue size is new primary shares/shares outstanding before the issue. Offer after IPO is the chronological sequence number of the equity issue. CAR(-1,1) is a three-day cumulative abnormal return at the issue announcement. Discount is the percent difference between offer price and pre-issue closing price. Time from previous issue is the number of years between two successive equity issue announcements. Previous issue CAR(-1,1) and discount are for the most recent equity issue. z-statistics reflect Rogers standard errors clustered by firm. Values significantly different from zero at 5% and 1% level are marked by * and ** respectively.

	Equity Issue vs. No Equity Issue			
	Coefficient	z-statistic	Coefficient	z-statistic
Intercept	-4.330**	-29.2	-2.972**	-9.7
Market-to-book	0.203**	4.82	0.130	1.7
ΔMarket-to-book $_{t=-2,-1}$	0.192**	7.3	0.178**	3.7
Dev. from ind. market-to-book	-0.031	-0.7	0.046	0.6
Leverage	0.693*	2.15	0.490	0.6
Dev. from ind. leverage	0.664	1.9	0.605	1.0
Profitability	2.241**	11.4	1.072**	3.1
Tangibility	0.066	0.5	0.308	1.5
R&D	1.139**	12.6	0.610**	4.4
Carry-forwards	-0.236**	-3.2	-0.053	-0.5
Firm size	-0.324**	-6.6	-0.183**	-2.8
Idiosyncratic risk	-10.642**	-7.5	-8.472**	-2.7
Offer after IPO	0.381**	19.9	0.099*	2.5
Time from previous issue			-0.112**	-6.7
Previous issue CAR(-1,1)			-0.427	-0.6
Previous issue discount			0.794	0.6
Pseudo R^2	0.067		0.052	
Observations	55,024		11,405	

Table 1.8. Determinants of Single vs. Multiple Equity Issues

This table contains the estimates of the logit regressions for the sample of firms issuing seasoned equity during the sample period. The dependent variable is defined as one if a company has more than one seasoned equity issue after the IPO and zero if it does not. The first model uses the values of independent variables available at the time of the first seasoned equity issue. The second model uses the average of each independent variable over the total number of years in the sample period for which COMPUSTAT data is available. The market-to-book ratio is the (total assets - book value of equity + market value of equity)/total assets. Leverage is debt (long-term debt + short-term debt)/ total assets. Deviations from the industry market-to-book ratio and leverage are the difference between the firm's market-to-book (leverage) and the average based on the three-digit SIC code and year. Profitability is EBITDA/ total assets. Tangibility is measured as net property, plant, and equipment / total assets. R&D intensity is research and development expenses / sales. Carry-forwards is net operating loss carry-forwards/ total assets. Firm size is the market value of equity. All financials are for the fiscal year before the equity issue announcement. Idiosyncratic risk is the standard deviation of the market model residuals estimated over one fiscal year preceding the announcement. Issue size is new primary shares/shares outstanding before the issue. CAR(-1,1) is a three-day cumulative abnormal return at the issue announcement. Discount is the percent difference between offer price and pre-issue closing price. z-statistics reflect White standard errors. Values significantly different from zero at 5% and 1% level are marked by * and ** respectively.

	First Issue Characteristics				Firm-level Averages			
	Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	z-stat.
Intercept	-0.685	-1.5	-0.935	-1.9	0.473	1.3	0.475	1.3
Market-to-book	-0.246	-1.8	-0.164	-1.2	-0.022	-0.2	-0.034	-0.3
Dev. from ind. market-to-book	0.261	1.8	0.205	1.4	-0.022	-0.2	-0.037	-0.3
Leverage	-0.340	-0.3	-0.399	-0.4	-0.260	-0.4	0.157	0.2
Dev. from ind. leverage	-0.435	-0.4	-0.336	-0.3	0.276	0.4	0.046	0.1
Profitability	-0.075	-0.2	-0.044	-0.1	0.697	1.8	0.262	0.7
Tangibility	0.421	1.2	0.621	1.6	0.384	1.5	0.279	1.1
R&D	0.848**	3.2	0.971**	3.2	0.695**	3.9	0.637**	3.3
Carry-forwards	-0.099	-0.5	-0.042	-0.2	0.346*	2.5	0.349*	2.3
Firm size	-0.381	-1.2	-0.370	-1.0	0.000**	2.9	0.000**	2.8
Idiosyncratic risk	-2.510	-0.5	0.556	0.1	-35.065**	-8.6	-25.368**	-5.5
Issue size			0.170	0.3			-1.016**	-2.6
CAR(-1,1)			0.722	0.6			0.225	0.3
Discount			5.202*	2.2			1.956	1.4
Pseudo R^2	0.021		0.029		0.052		0.043	
Observations	1,072		992		2,285		2,004	

Table 2.1. Summary Statistics for Seasoned Equity Issuers and Non-issuers

The book-to-market ratio is book value of equity/market value of equity. Industry-adjusted book-to-market is book-to-market – two-digit SIC industry mean. Pre-issue return is the return in the fiscal year immediately preceding the year of the issue. Post-issue return is the return in the fiscal year immediately following the year of the issue. Abnormal returns are measured relative to book-to-market and size matched portfolios of non-issuing firms. Number of issues is the number of times the firm has issued equity after its IPO by the time it exits my sample. Firm size is number of shares outstanding times the share price at the beginning of the fiscal year of the issue. Values significantly different from zero at 5% and 1% level are marked * and ** respectively.

	Equity issues	No equity issues
Book-to-market	0.414**	0.817**[a]
Industry-adjusted book-to-market	-0.275**	0.008**[a]
Pre-issue return	0.527**	0.096**[a]
Post-issue return	-0.030**	0.126**[a]
Post-issue four-year return	0.267**	0.757**[a]
Abnormal post-issue return	-0.058**	
Abnormal post-issue four-year return	-0.136**	
Number of issues per firm	1.900	
Firm size (millions of $)	346.9**	398.1**[a]
Observations	3,797	164,331

Table 2.2. Post-issue Stock Market Performance by Number of Issues and Offer After IPO

Post-issue return is the return in the fiscal year immediately following the year of the issue. Abnormal returns are measured relative to book-to-market and size matched portfolios of non-issuing firms. Number of issues is the number of times the firm has issued equity after its IPO by the time it exits my sample. Offer after IPO is the chronological sequence number of the equity issue. Values significantly different from zero at 5% and 1% level are marked * and ** respectively.

Number of Issues	Offer After IPO				Last–Non-last Offers
	1	2	3	Last	
Panel A: Post-issue Return					
1	-0.128**				
2	0.180**	-0.063**			-0.243**
3	0.243**	0.123*	-0.071*		-0.255**
4+	0.017	0.116*	0.277**	-0.027	-0.176**
Last – Non-last Offers	-0.301**	-0.184**	-0.348**	-0.252*	
Panel B: Post-issue Abnormal Return					
1	-0.130**				
2	0.186**	-0.105**			-0.392**
3	0.177*	0.118*	-0.183**		-0.329**
4+	-0.005	0.002	0.161*	-0.106**	-0.168**
Last – Non-last Offers	-0.291**	-0.179**	-0.344**	-0.191	
Panel C: Post-issue 4-year Return					
1	0.081				
2	0.511**	0.231*			-0.280*
3	0.800**	0.165	0.471**		-0.016
4+	1.033**	0.669**	0.832**	0.222*	-0.665**
Last – non-last offers	-0.579**	-0.129	-0.361	-0.977	

Table 2.2. Post-issue Stock Market Performance by Number of Issues and Offer After IPO (continued)

Panel D: Post-issue Abnormal 4-year Return					
1	-0.142**				
2	0.172**	-0.119**			-0.292**
3	0.152*	0.125*	-0.189**		-0.327**
4+	-0.015	0.010	0.132*	-0.092*	-0.142**
Last – non-last offers	-0.287**	- 0.200**	- 0.322**	-0.155	
Panel E: One-year Average Abnormal Monthly Return					
1	-0.013**				
2	0.007	-0.013**			-0.020**
3	0.004	0.002	-0.008*		-0.011**
4+	0.008	-0.003	0.011*	-0.012**	-0.015**
	-0.020**	-0.013**	-0.019**	-0.016*	

Panel F: Summary of Annual Returns

	Post-issue Return			Post-issue Abnormal Return		
	Non-last	Last	Last – Non-last	Non-last	Last	Last – Non-last
Year 1	0.172**	-0.106**	-0.278**	0.135**	-0.128**	-0.263**
Year 2	0.120**	-0.008	-0.112**	0.004	-0.082**	-0.086**
Year 3	0.113**	0.060**	-0.054*	0.018	-0.057**	-0.075**
Year 4	0.164**	0.127**	-0.037	-0.008	-0.031	-0.023

Table 2.2. Post-issue Stock Market Performance by Number of Issues and Offer After IPO (continued)

	Issue in Fiscal Year (+1)		Issue in Fiscal Year (+2)		Issue in Fiscal Year (+3)		Issue in Fiscal Year (+4)		Issue in Fiscal Year (+5)	
Panel G	Non-Issuers	Issuers	Non-Issuers	Issuers	Non-Issuers	Issuers	Non-Issuers	Issuers	Non-Issuers	Issuers
Return $_{t=-1}$	0.547	0.459*	0.546	0.548	0.548	0.653	0.531	0.631	0.533	0.513
Return $_{t=0}$	0.348	0.808**	0.366	0.484*	0.354	0.454	0.376	0.358	0.370	0.512**
Return $_{t=1}$			-0.109	0.303**	-0.111	0.037**	-0.101	0.033*	-0.097	0.074**
Return $_{t=2}$					-0.002	0.491**	0.018	0.061	0.026	0.067
Return $_{t=3}$							0.035	0.407**	0.051	0.067
Return $_{t=4}$									0.104	0.611**
N	3,430	291	3,142	210	2,941	114	2,675	91	2,450	74

Table 2.3. Proportion of Equity Issues by Stock Return Quintiles

The table reports the probability of equity issuance for 25 firm-year groups based on a two-way independent sort into post-previous-issue (horizontal dimension) and pre-current-issue (vertical dimension) return quintiles. Pre-issue return is the return in the fiscal year immediately preceding the year of the issue. Post-previous-issue return is the return in the fiscal year immediately following the year of the previous equity issuance. Ranking in firm-years with issues over all firm-years of issuers.

Pre-issue Return	Post-previous-issue Return Quintiles					
Quintiles	Low	2	3	4	High	Total
Low	0.75%	2.27%	1.36%	1.33%	1.00%	1.33%
2	1.66%	1.97%	3.33%	1.72%	3.23%	2.47%
3	1.97%	1.77%	3.27%	6.05%	4.85%	3.97%
4	3.76%	5.04%	3.66%	5.06%	8.59%	5.51%
High	6.59%	7.19%	8.31%	9.04%	19.67%	11.06%
Total	2.59%	3.42%	3.90%	4.80%	8.73%	4.72%

Table 2.4. The Effect of Post-issue Returns on Subsequent Equity Issuance

The dependent variable is coded one if a firm issues equity during the year and zero if it does not. Pre-issue return is the return in the fiscal year immediately preceding the year of the issue. Post-previous-issue return is the return in the fiscal year immediately following the year of the previous equity issuance. Book-to-market is book value of equity/market value of equity. Leverage is (long-term debt + short-term debt)/total assets. Industry leverage (book-to-market) ratio is the mean leverage (book-to-market) for firms with the same two-digit SIC. ROA is EBITDA/total assets. Carry-forwards is net operating loss carry-forwards/total assets. R&D intensity is research and development expenses/sales. Tangibility is measured as net property, plant, and equipment/total assets. Idiosyncratic risk is the standard deviation of the market model residuals estimated over the fiscal year preceding the year of the issue. Size is the market value of equity. Offer after IPO is the chronological sequence number of the equity issue. All financials are for the fiscal year preceding the year of the issue. z-statistics reflect standard errors adjusted for heteroskedasticity and clustering. Values significantly different from zero at 5% and 1% level are marked * and ** respectively.

	Equity Issue vs. No Equity Issue	
	Coeff.	z-stat.
Intercept	-3.507**	-11.9
Post-previous-issue return	0.659**	7.3
Pre-issue return	0.728**	11.9
Book-to-market	-1.076**	-8.7
Industry book-to-market	0.337*	2.2
Leverage	1.102**	3.9
Industry leverage	0.476	0.6
ROA	0.868*	2.4
Carry-forwards	-0.549*	-2.1
R&D intensity	1.907**	6.3
Tangibility	0.212	0.9
Idiosyncratic risk	-6.464	-1.7
Size	-0.001**	-5.0
Offer after IPO	0.165**	3.5
Pseudo R^2	0.107	
Equity issues	617	
Observations	12,575	

Table 2.5. Determinants of Issue Size

The dependent variable is issue size, measured as proceeds from the issuance scaled by the beginning-of-the-period total assets. Last offer is an indicator variable set to one for the last issue in the sequence and zero otherwise. Pre-issue return is the return in the fiscal year immediately preceding the year of the issue. Book-to-market is book value of equity/market value of equity. Leverage is (long-term debt + short-term debt)/total assets. Industry leverage (book-to-market) ratio is the mean leverage (book-to-market) for firms with the same two-digit SIC. ROA is EBITDA/total assets. Carry-forwards is net operating loss carry-forwards/total assets. R&D intensity is research and development expenses/sales. Tangibility is measured as net property, plant, and equipment/total assets. Idiosyncratic risk is the standard deviation of the market model residuals estimated over the fiscal year preceding the year of the issue. Size is the market value of equity. All financials are for the fiscal year preceding the year of the issue. z-statistics reflect standard errors adjusted for heteroskedasticity and clustering. Values significantly different from zero at 5% and 1% level are marked * and ** respectively.

	Coeff.	t-stat.
Intercept	0.463**	7.3
Last offer	0.031*	2.1
Pre-issue return	0.000	0.0
Book-to-market	-0.235**	7.2
Industry book-to-market	-0.074**	2.6
Leverage	-0.518**	10.3
Industry leverage	-0.004	0.0
ROA	0.082	0.6
Carry-forwards	0.152*	2.2
R&D intensity	0.244*	2.5
Tangibility	-0.069*	2.1
Idiosyncratic risk	5.676**	6.6
Size	-0.000**	5.1
R-squared	0.308	
Observations	1,710	

Table 2.6. Timing with Respect to Pre-issue Market Conditions: By Number of Issues and Offer after IPO

Pre-issue return is the return in the fiscal year immediately preceding the year of the issue. Book-to-market is book value of equity/market value of equity. Industry-adjusted book-to-market is book-to-market – two-digit SIC industry mean. Number of issues is the number of times the firm has issued equity after its IPO by the time it exits my sample. Offer after IPO is the chronological sequence number of the equity issue. Values significantly different from zero at 5% and 1% level are marked * and ** respectively.

Number of Issues	Offer After IPO				Last – Non-last
	1	2	3	Last	Offers
Panel A: Pre-issue Return					
1	0.529**				
2	0.515**	0.524**			0.009
3	0.633**	0.613**	0.478**		-0.143*
4+	0.667**	0.570**	0.442**	0.494**	-0.013
Last – Non-last Offers	-0.033	-0.075	0.035	0.167	
Panel B: Book-to-market					
1	0.390**				
2	0.400**	0.408**			0.008
3	0.456**	0.432**	0.469**		0.026
4+	0.500**	0.500**	0.516**	0.463**	-0.042
Last – Non-last Offers	-0.035*	-0.049	-0.047	-0.042	
Panel C: Industry-adjusted Book-to-market					
1	-0.280**				
2	-0.312**	-0.265**			0.048*
3	-0.276**	-0.294**	-0.239**		0.047
4+	-0.260**	-0.254**	-0.278**	-0.210**	0.050
Last – Non-last Offers	0.018	0.014	0.040	0.019	

Table 2.7. Changes in Operating Performance

ROA is EBITDA/total assets. CFROA is (EBITDA – current accruals)/total assets. Current accruals is the change in [(current assets – cash) – (current liabilities – current maturity long-term debt)]. ΔROA (ΔCFROA) is the change in ROA (CFROA) between years –1 and +1 relative to the year of the issue. ΔEXROA (ΔEXCFROA) is the equity issuer's ΔROA (ΔCFROA) minus ΔROA (ΔCFROA) of a non-issuing firm matched on two-digit SIC industry group and pre-event performance. Number of issues is the number of times the firm has issued equity after its IPO by the time it exits my sample. Offer after IPO is the chronological sequence number of the equity issue. Values significantly different from zero at 5% and 1% level are marked * and ** respectively.

Number of Issues	Offer After IPO				Last – Non-last
	1	2	3	Last	Offers
Panel A: ΔROA					
1	-0.066**				
2	-0.029**	-0.055**			-0.026*
3	-0.008	-0.029*	-0.049**		-0.030*
4+	-0.037*	-0.020	-0.014	-0.006	0.014
Last – Non-last Offers	-0.041**	-0.029*	-0.035*	-0.002	
Panel B: ΔEXROA					
1	-0.022**				
2	0.035**	-0.023**			-0.058**
3	0.018	-0.007	-0.015		-0.020
4+	0.031	0.011	0.022	-0.001	-0.021
Last – Non-last Offers	-0.052**	-0.023	-0.038	-0.017	
Panel C: ΔCFROA					
1	-0.017**				
2	-0.025	-0.014			0.011
3	0.001	-0.019	-0.022		-0.013
4+	-0.027	-0.045*	0.005	0.046	0.067**
Last – Non-last Offers	0.002	0.014	-0.022	0.055*	
Panel D: ΔEXCFROA					
1	-0.004				
2	0.008	0.002			-0.005
3	0.002	-0.008	-0.017		-0.014
4+	-0.016	0.003	-0.002	0.057*	0.067*
Last – Non-last Offers	-0.008	0.006	-0.016	0.095*	

Table 2.8. Accruals

Current accruals is the change in [(current assets – cash) – (current liabilities – current maturity long-term debt)]. Discretionary current accruals, DCA, is the residual of the OLS regression of current accruals scaled by beginning of the period total assets on the inverse of beginning assets and the change in sales scaled by beginning assets, estimated separately for each year and two-digit SIC code. Non-discretionary current accruals, NDCA, is the predicted value of the accruals from this regression. Number of issues is the number of times the firm has issued equity after its IPO by the time it exits my sample. Offer after IPO is the chronological sequence number of the equity issue. Values significantly different from zero at 5% and 1% level are marked * and ** respectively.

Number of Issues	Offer After IPO				Last – Non-last
	1	2	3	Last	Offers
Panel A: Pre-issue DCA					
1	0.015**				
2	0.029**	0.021**			-0.007
3	0.014	0.028**	0.015		-0.006
4+	0.018	0.009	0.032*	0.032**	0.011
Last – Non-last Offers	-0.008	0.003	-0.017	0.005	
Panel B: Pre-issue NDCA					
1	0.044**				
2	0.055**	0.040**			-0.015*
3	0.038**	0.043**	0.028**		-0.013*
4+	0.025*	0.047**	0.032**	0.022**	-0.011
Last – Non-last Offers	-0.004	-0.005	-0.004	0.007	

Table 2.9. Determinants of One-year and Four-year Returns

One-year return is the return in the fiscal year immediately following the year of the issue. Four-year return is the buy-and-hold four-year return starting in the fiscal year immediately following the year of the issue. Current accruals is the change in [(current assets – cash) – (current liabilities – current maturity long-term debt)]. Discretionary current accruals, DCA, is the residual of the OLS regression of current accruals scaled by beginning of the period total assets on the inverse of beginning assets and the change in sales scaled by beginning assets, estimated separately for each year and two-digit SIC code. Non-discretionary current accruals, NDCA, is the predicted value of the accruals from this regression. SEO is an indicator variable for seasoned equity offerings. Last is an indicator variable for the last SEO in the sequence. B/M is book value of equity/market value of equity. Size is the market value of equity. The year and two-digit industry indicator variables are not reported. t-statistics reflect standard errors adjusted for heteroskedasticity. Standard errors are reported for bootstrapped results.Coefficient estimates significantly different from zero at 5% and 1% level are marked * and ** respectively.

Panel A	One-year Return		Four-year Return	
	Coeff.	t-stat.	Coeff.	t-stat.
Constant	-0.774**	-22.9	-1.544**	-19.3
DCA	-0.078**	-3.4	-0.306**	-6.2
NDCA	-0.372**	-7.8	-0.539**	-5.3
SEO	0.064**	2.9	-0.030	-0.6
DCA×SEO	0.139	0.9	0.317	1.0
NDCA×SEO	0.272	1.0	0.672	1.1
Last	-0.233**	-8.6	-0.343**	-5.9
DCA×Last	-0.267	-1.4	-0.483	-1.2
NDCA×Last	-0.523	-1.6	-0.506	-0.7
Log(B/M)	0.423**	22.9	1.074**	24.3
Log(Size)	0.018**	15.8	0.036**	15.0
Observations	86,858		56,513	
R-squared	0.106		0.146	

Table 2.9. Determinants of One-year and Four-year Returns (continued)

Panel B	One-year return		Four-year return	
	Coeff.	t-stat.	Coeff.	t-stat.
Constant	-0.587**	-5.13	-1.298 **	-5.31
DCA	-0.071**	-2.87	-0.310**	-4.81
NDCA	-0.378**	-4.51	-0.700**	-3.95
SEO	-0.067	-0.45	-0.072	-1.01
DCA×SEO	0.729	1.47	0.635	1.44
NDCA×SEO	4.696	0.97	1.591	1.38
Last	-0.096	-0.64	-0.227**	-2.89
DCA×Last	-0.820	-1.47	-0.625	-0.95
NDCA×Last	-5.038	-1.03	-3.1137*	-2.55
Log(B/M)	0.354 **	6.37	0.941**	7.13
Log(Size)	0.019**	4.10	0.038**	3.08
Observations	32		29	

Panel C	One-year Return		Four-year Return	
	Coeff.	St.error	Coeff.	St.error
Constant	-0.774**	-22.9	-1.544**	-19.3
DCA	-0.078**	-3.4	-0.306**	-6.2
NDCA	-0.372**	-7.8	-0.539**	-5.3
SEO	0.064**	2.9	-0.030	-0.6
DCA×SEO	0.139	0.9	0.317	1.0
NDCA×SEO	0.272	1.0	0.672	1.1
Last	-0.233**	-8.6	-0.343**	-5.9
DCA×Last	-0.267	-1.4	-0.483	-1.2
NDCA×Last	-0.523	-1.6	-0.506	-0.7
Log(B/M)	0.423**	22.9	1.074**	24.3
Log(Size)	0.018**	15.8	0.036**	15.0
Observations	86,858		56,513	
R-squared	0.106		0.146	

Table 2.10. Determinants of One-year and Four-year Returns: Repeat Issuer Sub-sample

One-year return is the return in the fiscal year immediately following the year of the issue. Four-year return is the buy-and-hold four-year return starting in the fiscal year immediately following the year of the issue. Last is an indicator variable for the last SEO in the sequence. Current accruals is the change in [(current assets – cash) – (current liabilities – current maturity long-term debt)]. Discretionary current accruals, DCA, is the residual of the OLS regression of current accruals scaled by beginning of the period total assets on the inverse of beginning assets and the change in sales scaled by beginning assets, estimated separately for each year and two-digit SIC code. Non-discretionary current accruals, NDCA, is the predicted value of the accruals from this regression. CFROA is (EBITDA – current accruals)/total assets. Issue size is the $ value of the issue scaled by the book value of assets. Pre-issue return is the return in the fiscal year immediately preceding the year of the issue. B/M is book value of equity/market value of equity. Size is the market value of equity. Post-previous-issue return is the return in the fiscal year immediately following the year of the previous instance of equity issuance. All financials are for the fiscal year preceding the year of the issue. The year and two-digit industry indicator variables are not reported. t-statistics reflect standard errors adjusted for heteroskedasticity. Standard errors are reported for bootstrapped results. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and ** respectively.

Panel A	One-year Return		Four-year Return		One-year Return		Four-year Return	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant	-0.933**	2.8	-1.383	1.8	-0.860	1.5	-1.683	1.2
Last	-0.231**	8.7	-0.331**	6.3	-0.276**	6.6	-0.353**	4.0
DCA	0.029	0.2	0.066	0.2	-0.130	0.6	-0.046	0.1
NDCA	-0.060	0.2	-0.239	0.5	-0.326	0.8	-0.027	0.0
CFROA	0.197	2.0	0.766**	3.7	0.086	0.5	1.065**	3.1
Issue size	-0.048	1.1	-0.184**	2.9	-0.062	0.7	-0.192	1.4
Pre-issue return	-0.017	0.5	-0.163*	2.5	0.025	0.4	-0.014	0.1
Log(B/M)	0.585**	3.0	0.826	1.8	0.438	1.3	1.055	1.2
Log(Size)	0.039**	3.6	0.012	0.5	0.041*	2.0	0.052	1.3
Post-previous-issue return					-0.080	1.8	-0.225*	2.6
Observations	1964		1377		753		545	
R-squared	0.178		0.174		0.218		0.246	

Table 2.10. Determinants of One-year and Four-year Returns: Repeat Issuer Sub-sample (continued)

Panel B	One-year return		Four-year return		One-year return		Four-year return	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant	0.543	0.7	-1.182	-0.7	-0.635	-1.3	1.680	0.7
Last	-0.195*	-2.7	-0.077	-0.3	-0.229**	-5.7	-0.300**	-2.8
DCA	-0.410	-1.5	-1.231	-0.9	-0.082	-0.3	-1.381	-1.5
NDCA	-1.670	-2.0	-3.457	-1.3	0.209	0.6	-0.949	-0.7
CFROA	-0.033	-0.2	0.072	0.1	0.185	1.2	-1.082	-0.9
Issue size	-0.195	-1.4	-0.207	-0.4	-0.255	-1.7	0.293	0.6
Pre-issue return	-0.182	-1.4	-0.132	-0.4	-0.062	-1.1	-0.058	-0.4
Log(B/M)	-0.158	-0.4	0.991	1.0	0.471	1.4	-0.825	-0.6
Log(Size)	-0.025	-0.4	-0.024	-0.2	0.012	0.8	-0.001	-0.0
Post-previous-issue return	0.025	0.3	-0.761	-1.4				
Observations	32		28		32		29	

Table 2.11. Investment in Last Equity Issues

One-year return is the return in the fiscal year immediately following the year of the issue. Four-year return is the buy-and-hold four-year return starting in the fiscal year immediately following the year of the issue. Current accruals is the change in [(current assets – cash) – (current liabilities – current maturity long-term debt)]. Discretionary current accruals, DCA, is the residual of the OLS regression of current accruals scaled by beginning of the period total assets on the inverse of beginning assets and the change in sales scaled by beginning assets, estimated separately for each year and two-digit SIC code. Non-discretionary current accruals, NDCA, is the predicted value of the accruals from this regression. SEO is an indicator variable for seasoned equity offerings. Last is an indicator variable for the last SEO in the sequence. B/M is book value of equity/market value of equity. Size is the market value of equity. The year and two-digit industry indicator variables are not reported. t-statistics reflect standard errors adjusted for heteroskedasticity. Coefficient estimates significantly different from zero at 5% and 1% level are marked * and ** respectively.

Panel A	Non-Last Issue vs. Last Issue	
	Coeff.	z-stat.
Intercept	1.616**	4.6
Pre-issue return	-0.149	1.9
Issue year return	-0.385**	-5.1
Book-to-market	0.076	0.4
Industry book-to-market	-0.492*	-2.5
Leverage	0.328	1.0
Industry leverage	-0.958	-1.2
ROA	0.118	0.3
R&D intensity	-0.606	-1.6
Tangibility	-0.661**	-2.7
Idiosyncratic risk	8.645	-1.6
Size	0.000*	2.2
Pseudo R^2	0.027	
Observations	2028	

Panel B

	1	2	1-2
Post-issue return	0.042**	0.002	0.040*
Post-issue abnormal return	-0.019	-0.066**	0.047*

Table 2.12. Leverage and Investment Around Equity Issues

The one-year leverage and investment in years –1 and +1 relative to the year of the issue are reported separately for the last and non-last issues in the sequence of issues by the same firm. Leverage is (long-term debt + short-term debt)/total assets. Investment is change in net property plant and equipment scaled by the beginning total assets. Values significantly different from zero at 5% and 1% level are marked * and ** respectively.

	Pre-issue			Post-issue		
	Non-last	Last	Last – Non-last	Non-last	Last	Last – Non-last
Leverage	0.251	0.249	-0.002	0.212	0.222	0.009
Investment	0.164	0.156	-0.008	0.147	0.083	-0.064**