The Timing of Initial Public Offerings and the Role of Investment Banks

by

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(Abstract)

This study comprises an investigation of the timing of initial public offerings (IPOs) and the role therein, of investment banks, in taking firms public. Most prior studies of IPOs and seasoned equity offerings (SEOs) investigate timing with respect to firm-specific or economy-wide conditions. Also, the vast majority of prior studies have apparently ignored the role of market timing often ascribed to underwriters by practitioners. The analysis in this study elucidates the matter of the long-run post-issue performance of IPOs documented in the literature. Evidence is provided here about the timing of IPO firms relative to market conditions before and after their offerings. It is shown that firms are, on average, more likely to go public when the market valuation of comparable stocks in

the same industry is at its peak relative to the entire market. No evidence is found of a pattern of IPO firms timing their offerings with respect to market-wide conditions. Further, this study shows that IPO timing is a function of the reputation of investment banks who have expertise in the financial market. It is found that the more reputable investment banks possess a greater proficiency than their lesser known counterparts, in taking companies public when the market valuation of comparable stocks in the same industry is high. These results are found to be invariant with regard to several statistical tests and alternative explanations.

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I. Introduction

This dissertation examines the proposition that initial public offerings (IPOs) are timed to occur at periods of high valuation, or what are called market windows. Of particular interest is whether underwriters play a significant role in this timing.

The successful timing of an IPO can provide significant benefit. Taking companies public at propitious market windows makes it possible to raise more funds, that is, it allows firms to obtain capital when their cost of capital is low. Successful timing also minimizes the dilution of the entrepreneur's ownership stake, and increases the payoff from an exit strategy to venture capitalists and others who provided seed capital during firms' early stages. Moreover, successful timing of IPOs may enhance the reputation of investment banks, increasing their access to future IPOs.

The importance of IPO timing is often emphasized by practitioners. Consider, for example, the following quote by Foerster (1990), made while he was a managing director of PaineWebber Incorporated:

> " The managing underwriter's aim is to time the IPO so that it occurs during an upmarket and positive industry cycle, to find the market window, and launch the IPO before the window closes (this task is anything but easy considering that the process of mounting an IPO

ordinarily takes six to nine months from start to finish). If the window should close before the IPO has taken place, the issuer and underwriter may decide, quite properly, to wait for a more propitious time to offer the stock, however painful this decision may be in the short run. Proceeding when the market does not want an issue is an open invitation to damage, perhaps permanently, the issuer's reputation in the market and thereby restrict or eliminate future financing alternatives." (pp. 72)

Another example of this timing proposition is provided by Arkebauer (1991) who has been involved with taking companies public for over 20 years:

" The timing of an IPO should be well calculated. All too often a company is in position to go public, but for any number of reasons market conditions may not be receptive at that particular time. Proceeding with it as planned could easily jeopardize a good IPO.

Every market analyst and expert alive will tell you that even if your company is chafing at the bit to go public, if the market isn't gungho at the time, wait! Market makers, analysts, and economist have learned from hard experience over the last couple of decades that the market has been prone to take sudden reversals and leave underwriters and companies high and dry. So it's worth playing it safe, and let the conditions of the time dictate whether or not you should proceed with your offering.

It may seem that we protest too much. But by doing so, we may help you, the entrepreneur, keep intact your dream of going public and subsequently making those marketplace millions. It's important to remember the old adage, "There's a time and place for everything." So it goes with an IPO.

When the timing is right, the company should also be prepared to jump in as soon as the situation changes from bad times to good times and the IPO market starts to take off. The underwriter must be ready to put the IPO out quickly to take advantage of a booming market, as the value of an IPO stock may shoot up dramatically.-------A company's successful entry in the market depends on many uncontrollable factors.-------It also depends on whether the company is engaged in a hot industry, one that's in favor at the moment.-------The goal is to have every thing ready, when the magic words are spoken and the market windows open. For most major business decisions, timing is critical. For an IPO, however, the

timing is absolutely crucial to its success or failure, and that's a fact!" (pp. 25-pp. 32)

Despite the importance practitioners place on the timing of IPOs, surprisingly little attention is given to it by academicians.[1] Lerner (1994) is one exception. He examines the timing of 136 IPOs of venture-capitalist backed firms in the biotechnology industry between 1978 and 1992. He shows that these firms go public when the valuation of industry stocks is high, and that seasoned venture capitalists appear to be particularly proficient at taking companies public when industry stock prices reach their peak. More specifically, Lerner studies the performance of raw returns of an industry index in the three months before and after the offering date. His industry index is composed of

[1] Unlike IPOs, the timing of seasoned equity offerings (SEOs) is documented in the existing literature in some detail [among others, see Taggart (1977), Marsh (1982), Asquith and Mullins (1986), and Masulis and Kowar (1986)]. In general, they show that SEOs are more likely to occur after a rise in own stock price and when general stock market conditions are good. However, the decision to issue SEOs appears to be related more to the performance of a firm's stock price relative to the market than to the performance of the market as a whole. Choe, Masulis and Nanda (1990) study the relation of business cycle and SEOs and show that SEOs tend to take place when general business conditions are good. Korajczyk, Lucas and Mcdonald (1990) study the effect of information releases on the timing of SEOs and show that SEOs tend to follow firms' earnings releases. Ritter (1991), and Loughran and Ritter (1991) document the long-run underperformance of IPO firms and suggest that this may be due, in part, to their concentration around market peaks. However, they do not provide evidence on whether IPO firms time their offerings. A more detailed review of the literature can be obtained in Chapter II.

thirteen "comparable" companies that he identified from the 1977 business press. He shows that, on average, there is a 9.9% increase in the industry index in the event window [day -60, day -1], and a decrease of 4.6% in the event window [day +1, day +60]. Since Lerner investigates the performance of raw returns of the industry index, it is not clear to what extent his findings are driven by industry or market-wide conditions. He also suggests that for IPOs in other industries, the demand for capital and the adjustment for oversight by active investors may be more important for the decision to go public than market conditions. However, the question is left unresolved whether IPOs are, in general, timed at favorable market windows.

The first issue addressed in this study is whether IPOs are, in general, sold when they are highly valued. IPO timing is measured by relying on the performance of an index composed of publicly owned companies engaged in the same or similar business. It is a difficult task to determine the market value of firms prior to their IPO, both because they do not have a market price and because some issuing firms have little or no operating history. One starting point for determining the market value of IPO firms is the comparison of their operational and financial performance and status with that of publicly owned companies in the same or similar industry.[2] Thus, an important assumption in this study is that the timing decision of IPO firms is governed by the current market valuation of comparable firms in the same industry.

[2] For a detailed explanation of this practice, see Malone (1991, pp. 17-pp. 22).

This study examines empirically how the market valuation of the comparable firms in the same industry affects IPO timing decisions. Moreover, it is investigated whether IPOs are timed with respect to market-wide conditions, as opposed to industry conditions. To the best of my knowledge, this is the first attempt to examine IPO timing beyond Lerner's biotechnology firms. It is also the first to look at the timing of new stocks with respect to industry conditions. Unlike this study, most prior studies of IPOs and seasoned equity offerings (SEOs) investigate timing with respect to firm-specific or economy-wide conditions.

The analysis of this study on the timing pattern of IPO firms may also shed new light on the issue of the long-run post-issue underperformance of IPOs documented by Ritter (1991) and Loughran and Ritter (1995). They show that IPOs significantly underperform the market over the five years after going public, and that the poor performance is not a risk effect nor a long-term return reversal. They call this long-term pricing abnormality the "new issue puzzle". One possible explanation they offer to resolve this puzzle is that firms take advantage of transitory windows of opportunity by issuing equity when, on average, they are substantially overvalued. However, they do not show direct evidence on whether IPO firms time their offerings. In contrast to prior studies, this study provides evidence on whether IPO firms time their offerings relative to market conditions *before and after* the IPO.

The second issue addressed in this study is whether underwriters play a role in the timing of IPOs. The existing literature on the role of underwriters has concentrated on

underwriter certification [Booth and Smith (1986)], monitoring [Easterbrook (1984) and Hansen and Torregrosa (1992)] and marketing [Kraus and Stoll (1972), Hansen and Pinkerton (1982) and Merton (1987)]. However, prior studies have apparently ignored the market timing role often ascribed to underwriters by practitioners.

This study adopts the view that IPO timing is a function of the reputation of underwriters who have expertise in the financial market. In their advisory role, underwriters advise their client firms on offer timing, in addition to pricing decisions and, ultimately, distributing the shares to investors. Unlike auditors, lawyers and engineers, who are responsible only for specific elements of registration statements, underwriters are responsible for the timing decision, relying on information from all parties to the offering, knowledge of the issuer's industry performance, and expertise gained in continuous market participation. Investment banks spend significant resources analyzing individual stocks, industries and overall markets. The more reputable underwriters have a comparative advantage in analyzing financial markets, because of scale economies in information acquisition and in search, than their less reputable counterparts. The more reputable investment banks are able to search more efficiently because of superior expertise in the new issue market gained from extensive experience, and because of a more extensive customer base. Because of the benefits from successful timing and the costs of poor timing advice, investment banks' reputation and, thus, value will depend in part on how well they time IPOs. To address underwriters' role, it is examined whether the more reputable underwriters possess a greater proficiency in timing IPOs. This study

employs proxies for bank reputation developed in the literature and new alternative proxies.

The outline of this study is as follows. Chapter II reviews the current literature about the timing of common stock offerings and the role of underwriters. Chapter III describes research questions. Chapter IV provides a description of the sample IPOs and methodology. Chapter V presents empirical results related to the timing pattern of IPOs and offers tests of the robustness of those results. Chapter VI provides evidence on the timing role of underwriters and consider other possible explanations for the findings. Chapter VII concludes the study.

II. Review of Literature

While there are many stories relating timing aspects of new issues, with the exception of Lerner (1994), there are no studies that investigate the relation between the performance of industry stocks and the timing of new stock issues. Section A of this chapter reviews these studies. Section B reviews the existing literature on the functions of underwriters.

A. The Timing of New Issues

A.1. The Timing of IPOs

Lerner (1994) examines IPOs and private financings, and the ability of venture capitalists to time these offerings. Using a sample of 350 privately held, venture-backed biotechnology IPOs between 1978 and 1992, he shows that these firms go public when equity valuations are high and employ private financing when values are lower. He

studies the performance of raw returns of an industry index in the three months before and after the offering date. His *ad hoc* industry index is composed of thirteen comparable companies identified in the 1977 business press. He shows that there is an average of 9.9% (raw return) increase in the value of the industry index in the event window [day -60, day -1], and an average decrease of 4.6% (raw return) in the event window [day +1, day +60]. He concludes that seasoned venture capitalists are proficient at taking companies public near the peaks of the stock prices of the comparable firms in the same industry. Since Lerner examines timing using raw returns, instead of market-adjusted returns, we do not know to what extent his findings are driven by industry conditions or market-wide conditions.

Ritter (1991) and Loughran and Ritter (1995) show that IPO firms have been poor long-run investments for investors. Loughran and Ritter show that the traditional measure of risk, beta, can not explain the lower returns of issuing firms. They show that the poor performance of issuers is not merely proxying for long-term return reversals, and that book-to-market effects can explain only a modest portion of raw returns. While it is possible that some as yet unidentified risk factors can explain some or all of the low returns, one possible reason suggested by them is that firms take advantage of transitory windows of opportunity by issuing equity when, on average, they are substantially overvalued. However, they do not show direct evidence on whether IPO firms time their offerings.

A.2. The Timing of SEOs

The literature contains several discussions on various timing aspects of SEOs. Myers and Majluf (1984) develop a two-period adverse selection model of the financing decisions of traded firms. Their model assumes that managers know more about the value of the firm's assets in place and prospective new investment opportunities than potential new investors. In their model, the new investment opportunities are permanently lost, if not taken on. Since managers act in the interest of existing shareholders they have incentive to sell new equity when it is overvalued. Thus, selling seasoned equity conveys negative information about the firm on average, and the stock price drops at the equity issue announcement. In effect, their model contains an element of timing, in that managers make a timing decision of whether or not to sell securities.

Lucas and McDonald (1990) extend Myers and Majluf's model, allowing infinite horizon and the ability to delay investment. They too assume that managers of the firms know the value of the firm and outside investors do not. Under their model, the managers of undervalued firms expect the market to revise upward its estimate of firms' value over time, hence, there is an incentive to time the equity issue to coincide with a higher stock price. For overvalued firms, on the other hand, managers issue equity as soon as the opportunity arises. The issue policy for the two types of firms implies that, on average, equity issues will be preceded by positive abnormal returns. Moreover, because an above

average number of firms issue seasoned equity following the market rise, their model predicts that clustering of SEOs follows a general market rise.

Asquith and Mullins (1986) explore abnormal common stock returns around SEOs. They show that average cumulative returns for the period from two years until ten days preceding the issue are 41.8% for combined primary and secondary issues. This evidence suggests that SEOs are timed to follow a period in which their stocks outperform the market. They also show that market returns are positive in the two years preceding the announcement of the issue. However, the evidence that equity is sold following an increase in the general level of stock prices, does not confirm an ability by sellers to time the market, since the general level of stock prices continues to rise in the two years following the equity issue. Masulis and Korwar (1986) also show evidence that industrial firms issue common stock following significant abnormal increases in their stock prices. They report an average daily return for industrials over the 60-day pre-announcement period of 0.31%, in contrast to 0.06% for the 60-day post-announcement period. They also show that an average market daily return for industrials is 0.17% over the 60-day pre-announcement period and 0.04% over the 60-day post-announcement period. This evidence is also consistent with evidence found by Taggart (1977) and Marsh (1982).

Choe, Masulis and Nanda (1993) study another timing element of SEOs based on an adaptation of the Myers-Majluf model. They argue that in periods with generally more promising investment opportunities, firms financing investments through seasoned

equity issues will face a relatively lower adverse selection cost than during periods of less promising opportunities. Empirically, they show that in expansionary phases of the business cycle more firms issue SEOs and the proportion of total external financing accounted for by equity is substantially higher. The adverse selection cost, measured by the negative price reactions to SEO announcements, are shown to be significantly lower in these periods. These results suggest a timing link may exist between SEOs and general business conditions. However, they do not provide evidence about the firm's ability to time the market.

Korajczyk, Lucas and Mcdonald (1991) argue that with time-varying adverse selection in the market for SEOs, firms will prefer to issue equity when the market is most informed about firm quality. This implies that SEOs should follow credible information releases. In addition, if asymmetric information increases in time between information releases, the price drop at the announcement of an equity issue should increase in the time since the last information release, *certis paribus*. Using firms' earnings announcements as a proxy for informative events, they show that firms do tend to issue equity earlier within the first quarter after earnings announcements, rather than later, and are least likely to issue at the end of the fourth quarter. They also present evidence that the stock price decline at the announcement of an issue is increasing with the time since the last information release and the stock price decline at issue is increasing in the time since issue announcement.

In sum, while these studies suggest that there are some timing elements to SEOs, they report no test of market timing. Moreover, they pay no attention to the role that underwriters may play in timing SEOs.

B. Functions of Underwriters

Prior studies suggest that investment banks provide certification, monitoring and marketing services for capital-raising companies. Booth and Smith (1986) develop a model based upon the assumption of asymmetric information between insiders who are shareholders and outsiders who are prospective subscribers to new issues They suggest that issuing firms may be viewed as effectively "leasing" the brand name of an investment banker to certify that the issue price reflects available inside information. Consistent with this, Carter and Manaster (1990) show that the issuer's choice of underwriter reputation/quality is inversely related to short-run underpricing of IPOs.[3]

[3] The argument that underwriters certify the fairness of offer price is based upon the certification hypothesis. This theory derives from the literature on the use of reputational capital to guarantee product quality. According to this hypothesis, the third party with reputational capital such as underwriters, lawyers, auditors, and venture capitalists certifies the quality of offering firms in the world of information asymmetry. Generally, the current literature concludes that underwriters, auditors, lawyers and venture capitalists certify the fairness of offer price individually or collectively.

Easterbrook (1984) and Hansen and Torregrosa (1992) propose that there is a monitoring role for the investment bank. They argue that firms may use underwriters to obtain monitoring of the firm. Hansen and Torregrosa suggest that lead bank monitoring improves corporate performance and reduces agency costs, thereby raising the company's intrinsic value. The lead bank obtains reputational capital for effective monitoring. Top managers demand this lead bank monitoring because it adds value. The behavior of their demand reflects that lead bank monitoring substitutes for other monitoring and that managers would like to avoid monitoring out of self-interest. However, Hansen and Torregrosa argue that monitoring avoidance is publicly observed and may subject managers to potentially greater penalties than those that might be meted out as a result of lead bank monitoring.

Prior studies also suggest that investment banks provide marketing services for capital-raising companies. Marketing services include searching the primary market, compensating buyers for their costs of providing funds and persuading investors to buy new securities [Kraus and Stoll (1972) and Hansen and Pinkerton (1982)]. Merton (1987) also suggests that if the firm undertakes an underwriting through an investment bank with broad distribution capabilities, then the firm can use the underwriting to both raise new capital and increase its investor base. If the underwriter succeeds in inducing new investors to purchase and follow the firm's stock, then the benefits to the issuing firm can exceed simply the placement of the new securities. For example, this may lower the firm's cost of capital.

III. Research Questions

A. The Timing of IPOs

An important assumption in this study is that the timing decision of IPO firms is governed by the current market valuation of comparable firms in the same industry. It is a difficult task to determine the market value of firms prior to their IPO, both because they do not have a market price and because some issuing firms have little or no operating history. Thus, the market value of IPO firms would, to a large extent, be determined by the comparison of their operational and financial performance and status with that of publicly owned companies in the same or similar industry. If IPO firms and investment banks have ability (or, private knowledge) to predict the movements of industry stocks, firms are more likely to go public when the market value of firms in the same industry is high. There are two possible sources of this timing ability.

A.1. Rational Explanations

Some authors argue that there is rational time variation in required returns for holding risky securities and this variation is predictable (Among others, Fama and French, 1989). This is consistent with firms timing their IPOs to exploit rational variations over time in required returns on industry stocks.

A.2. Investor Sentiment

Another source of timing ability may be investor sentiment. Investors might have a propensity to overpay for the stocks of certain industries at times. Under this story, firms would time their offerings to exploit temporary overvaluation of their shares. This is also consistent with herding theories to the extent that investors suspend individual assessments of value in favor of a collective assessment of value.[4]

A.3. Research Questions

This study first examines empirically how the market valuation of the comparable firms in the same industry affects IPO timing decisions. IPO timing is measured by

[4] To my knowledge, there is no specific model of herding behavior which explains security issuance. However, general ideas can be found in Welch (1992).

relying on the performance of the size-and-industry-matched index surrounding IPOs. This index is composed of seasoned firms in the same industry which are close in terms of market capitalization. It is also investigated whether IPOs are timed with respect to market-wide conditions, as opposed to industry conditions.

This study examines the robustness of the timing pattern of IPOs with respect to the prices of stocks in the same industry. The following questions are addressed:

(1) Is the timing pattern of canceled IPOs different from that of successful ones?

(2) Is the observed timing pattern concentrated in particular industries?

(3) Is the observed timing pattern concentrated in some periods?

(4) Is the observed timing pattern sensitive to the particular index selected?

B. Underwriters and Timing

The second issue of this study is assessing whether the more reputable underwriters possess a greater proficiency in timing of IPOs than their less reputable counterparts.. In their advisory role, underwriters advise their client firms on offer timing, in addition to pricing decisions and, ultimately, distributing the shares to

investors. Unlike auditors, lawyers and engineers, who are responsible only for specific elements of registration statements, underwriters are responsible for the timing decision, relying on information from all parties to the offering, knowledge of the issuer's industry performance, and expertise gained in continuous market participation. Investment banks spend significant resources analyzing individual stocks, industries and overall markets. The more reputable underwriters have a comparative advantage in analyzing financial markets, because of scale economies in information acquisition and in search, than their less reputable counterparts. The more reputable investment banks are able to search more efficiently because of superior expertise in the new issue market gained from extensive experience.

An important assumption here is that an IPO is timed well if the market valuation of industry stocks appreciates during the waiting period. For underwriter classification, a two-tier system is employed. The top 50% of underwriters are referred to as the first-tier investment bank group, and the bottom 50%, as the second-tier investment bank group. The relative timing performance of IPOs underwritten by different investment banks is studied using the excess return on the size-and-industry-matched index over the waiting period. This study tests whether IPOs underwritten by the first-tier investment bank group take place when industry conditions during the waiting period are more favorable. However, changes in market-adjusted returns during the waiting period may have alternative explanations. Thus, it is necessary to ascertain the validity of these alternative explanations. The following hypotheses are examined:

(1) The difference in observed patterns during the waiting period may indicate that the more reputable underwriters have a greater proclivity to cancel their offerings during the waiting period, if their timing turns out to be wrong.

(2) It may be due to a difference in the length of the waiting period.

(3) It may be due to dissimilar time patterns of capital needs of different firms.

(4) It may be an artifice of the underwriter ranking system used.

(5) It may be the case that it is managers of firms who control timing of offerings, as opposed to underwriters.

IV. Sample and Methodology

This chapter discusses the sample of IPOs and the methodology employed to measure performance.

A. Sample

The primary sample consists of IPO firms that went public between 1980 and 1991. These companies are identified through the semiannual editions of the Investment Dealer's Digest: Corporate Financing Directory. The offering date and lead underwriter's name is obtained from this source. Information about the filing date is retrieved from weekly editions of the Investment Dealer's Digest. The Standard Industrial Classification (SIC) codes for both IPO and seasoned firms, as well as other information about seasoned firms, are obtained from the Center for Research in Security Prices (CRSP) files. The following criteria are used for inclusion in the IPO sample:

(1) Regulation A offerings and unit offerings are excluded.

(2) IPO firms are listed in the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), or the National Association of Securities Dealers Automated Quotation System (NASDAQ).

(3) The offering is made through a firm commitment underwriting arrangement.

(4) IPOs of financial institutions (SIC code 600-699) are excluded; also, foreign companies and American Depository Receipts (ADRs) are omitted.[5]

The resulting sample contains 2,154 IPOs which are drawn from 247 different (three digit SIC code) industries. Table I presents the distribution of IPOs by the 15 major industries that occupy about 50% of the sample. These 15 industries are ranked in terms of the number of IPOs brought to market in the sample period. Panel A shows the number of IPO firms coming to the market in the 1980-1991 period and their industry descriptions. 1983 has the highest representation (18%), 1986 the second highest (14%), and 1987 the third (12%). There are high levels of industry concentration among IPO firms. About 25 % of IPOs are in four high-technology industries: computer and data processing services, computer and office equipment, medicinal and biological products,

[5] To ensure the validity of the data, the data is cross-checked with the SEC's Registered Offerings Statistics (ROS) tape and Going Public: The IPO Reporter. It is found that there is some discrepancy between the ROS tape and the other sources, especially in filing dates. When there is any discrepancy, the information in the Investment Dealer's Digest is utilized.

and electronic equipment. An additional 25 % of the IPOs are drawn from 11 industries such as medical instruments, communication, and food and beverage outlets.

Panel B shows the annual number of firms coming to market, by year and industry. It reveals that the number of IPOs is not evenly distributed across industries over the sample period. In the computer and data processing industry (SIC code 737), there is a clustering of IPOs in 1983, 1986 and 1991. In the computer and office equipment industry (SIC code 357), there is a clustering of issues in 1983. In the communication industry (SIC code 366), there is a clustering of IPOs in 1983. However, in industries with fewer IPOs, the observed pattern of clustering in industries with high IPO volume is less noticeable.

B. Methodology: Market and Industry Indices and Return Measurement

B.1. Market and Industry indices

To evaluate the timing pattern of IPOs with respect to market and industry conditions, the following market and industry indices are employed:

(1) The equally-weighted NASDAQ CRSP market index

(2) The value-weighted NASDAQ CRSP market index

(3) The size-and-industry-matched index

(4) The industry-matched index

Of the 2,154 sample IPOs, 1,950 (91%) were initially traded on the NASDAQ, and the rest on the NYSE or AMEX. Since the vast majority of the IPOs trade on the NASDAQ, it is more appropriate to use NASDAQ firms to construct the indices.[6] The first two market indices allow investigation of the timing of IPOs with respect to market-wide conditions, while the second two are utilized to examine IPO timing with respect to industry conditions. For these two industry indices, this study employs firms which are in the same industry (three-digit SIC code) as IPO firms that are listed on the NASDAQ for at least three years prior to the filing date of an IPO.[7] This avoids including young IPOs in the industry indices. The size-and-industry-matched index is composed of seasoned firms in the same industry which are close in terms of market capitalization. More precisely, CRSP provides a year-end market capitalization for each issue in every year. The size-and-industry index comprises seasoned firms in the same industry, with

[6] Using a sample of NASDAQ firms ensures the comparability of IPOs with publicly traded firms. Chan and Chen (1991) and Loughran (1993) show that there is a divergence between NASDAQ and NYSE firms in regard to basic characteristics, which accounts for differences in performance.

[7] It might be more appropriate to use four-digit SIC codes for industry classification because they would more closely match IPO firms. In fact, CRSP uses four-digit SIC codes. However, CRSP assigns 0 to fourth digit of SIC codes for many firms, especially, NASDAQ firms. These firms are actually classified at the three-digit level. Because of this limitation of CRSP, three-digit SIC codes are adopted in this study.

sizes lying within a range five times larger than, and one fifth as large as, an IPO firm, in the offering year (20% * the size of an IPO firm - 500% * the size of an IPO firm). On the other hand, the industry-matched index is composed of all seasoned NASDAQ firms that are in the same industry as IPO firms.

For the industry indices, this study utilizes not only raw returns, but also excess returns which are raw returns adjusted for the NASDAQ market returns. These excess returns reflect the performance of stocks in the same industry relative to the market as a whole.

B.2. Measurement

B.2.1. Raw Returns on the Industry Indices

Raw returns on the two industry indices are computed as follows:

For each IPO, the geometrically compounded (buy-and-hold) return is first calculated for matching firms of the relevant industry index during the specified period of time, then an equally-weighted average across these matching firms is computed. Each IPO has a corresponding industry portfolio return over the period (a to b):

$$R_{i(a\,to\,b)} = \frac{\sum_{j=1}^{M}\left[\prod_{t=a}^{b}\left(1+R_{jt}\right)\right]-1}{M} \qquad (1)$$

where R_{jt} = the daily return of matching firm j in the same industry as an IPO firm

j = 1,2,3,...,M (matching firms in the same industry as an IPO firm)

t = a (the beginning of a period),...,b (the end of a period)

The cross-sectional average of these returns is computed across all IPOs for the specified period of time. This procedure yields the raw return on an industry index for the period (a to b):

$$R_{(a\,to\,b)} = \frac{\sum_{i=1}^{N} R_{i(a\,to\,b)}}{N} \qquad (2)$$

where i = 1,2,3,...,N (IPO firms)

B.2.2. Return on the Market Indices

The market index returns, equally-weighted and value-weighted, are computed as follows:

For each IPO, the return on the relevant market index is calculated for the specified period of time. Each IPO has a corresponding market portfolio return over the period (a to b):

$$M_{i(a\,to\,b)} = \left[\prod_{t=a}^{b}(1 + M_{it})\right] - 1 \qquad (3)$$

where M_{it} = the daily return on a CRSP market index

i = 1,2,3,...,N (IPO firms)

t = a (the beginning of a period),...,b (the end of a period)

Then, the cross-sectional average market return across all IPO firms is computed over the period (a to b):

$$M_{(a\,to\,b)} = \frac{\sum_{i=1}^{N} M_{i(a\,to\,b)}}{N} \qquad (4)$$

where i = 1,2,3,.....N (IPO firms)

t = a (the beginning of a period),...,b (the end of a period)

B.2.3. Excess Return on the Industry Indices

To compute excess returns on an industry index, the following procedure is employed:

For each IPO, the return on a market index is subtracted from the raw return on an industry index. Each IPO has a corresponding portfolio return over the period (a to b):

$$ER_{i(a\,to\,b)} = R_{i(a\,to\,b)} - M_{i(a\,to\,b)} \tag{5}$$

Then, the cross-sectional average of excess returns across all IPOs is computed over the period (a to b):

$$ER_{(a\,to\,b)} = \frac{\sum_{i=1}^{N} ER_{i(a\,to\,b)}}{N} \tag{6}$$

where i = 1,2,3,..., N (IPO firms)

This study employs the geometrically compounded (buy-and-hold) return to compute raw returns on the industry indices, because Roll (1983), Blume and Stambaugh (1983), and Conrad and Kaul (1993) show that there is a statistical bias due to measurement errors in accumulated single-period returns over long-event periods.

For market returns, the equally-weighted NASDAQ market index as well as the value-weighted NASDAQ market index is utilized in this study. Canina et al. (1995) suggest that using an equally-weighted market index may impart upward bias to a benchmark index due to the auto-correlation of the portfolio and individual securities, the bid-ask bounce effect, and the level of stock price. Without this kind of rebalancing bias, it might be more appropriate to use the equally-weighted NASDAQ market index, since the value-weighted NASDAQ index does not fully account for the return of the small cap stocks. For clarity and ease of exposition, this study primarily reports results using the value-weighted NASDAQ market index as the market index. The size-and-industry-matched index, and not the industry-matched index, is mainly employed as the industry index for the same reason.

All reported tests of significance are based on the t-tests and the signed tests.[8] These tests assume that the observations are independent. There is a possibility that, due to clustering of observations in specific time periods, there is a positive correlation

[8] In addition, the signed-rank test is conducted. Since the results are qualitatively similar, they are not reported here.

between observations, which would lead to somewhat overstated significance levels. Thus, if dependence exists, the statistical tests reported in the study provide upper bounds for the true significance levels. The impact of potential dependence between observations on the statistical tests are assessed through an examination of the robustness of the findings.

V. Market and Industry Performance surrounding IPOs

In what follows, Period 0 represents the time period between the filing date and the offering date. This period, often referred to as the waiting period or cooling period, is particularly important to the investigation of the issue of timing since the formal decision to go public occurs through registration with the Securities and Exchange Commission (SEC) and actual entry in the market occurs at the offering date. During the waiting period, underwriters' preselling activity takes place. Pre-filing months are defined relative to the filing date, and post-offering months are defined relative to the offering date, where months are defined as successive 21-trading-day periods. For example, month -1 refers to 21-trading-days before the filing date, and month +1 refers to 21-trading-days after the offering date. Thus, the period (-1, 0) refers to the period starting 21-trading-days and concluding one-trading-day, before the filing date. Again, the period (0, +1) represents the period beginning one-trading-day and ending 21-trading-days, after the offering date.

A. Market and Industry Performance

A.1. Market Performance

Columns 2 and 3 of Table II, and Figure 1 present the performance of the equally-weighted market index surrounding IPOs for various time windows from one year before the filing date until one year after the offering date. The average market return for the 12-month period preceding the filing date is 35.08%. For the shorter intervals [period (-11, 0) through period (-1, 0)], the change in average market returns suggests that the market-wide level of stock prices rises continuously until the filing date. The average market return during the waiting period is also positive (2.50%). The average market return is still positive in the 12 months after the offering date (13.86%), even though the magnitude is smaller than before the filing date. The behavior of average market returns for shorter intervals [period (0, +1) through period (0, +11)] indicates that the general level of stock prices registers a continuous increase after the offering date.

A similar picture emerges when the performance of the value-weighted market index is examined, as reported in Columns 3 and 4 of Table II, and Figure 1. The one-year average market return for the 12-month period preceding the filing date is 28.45%. The increments in average market returns for shorter intervals [period (-11, 0) through

period (-1, 0)] suggest that IPOs are preceded by positive market return performance. The average market return during the waiting period is also positive (1.71%). The average market return is still positive in the 12 months after the offering date (5.86%). Examination of average market returns for shorter intervals [period (0, +1) through period (0, +11)] reveals that IPOs are followed by positive market return performance.

These results suggest that, despite the fact that IPOs are sold following an increase in the general level of stock prices, IPO firms do not appear to time the market. This is due to a continuos rise in the general level of stock prices in both the one-year periods preceding and following IPOs.

This timing pattern of IPOs in relation to the performance of the market indices is somewhat comparable to that of SEOs documented by Asquith and Mullins (1986). Even though their sample period is different from that of this study, the result is similar in terms of the direction of the stock market as a whole. More specifically, they study the timing pattern of SEOs issued during the period 1963-1981 and find that the average market return is positive in the two years preceding the announcement of the issue and remains positive in the two years following the issue. In the (day -240, announcement day) window, which is approximately comparable to the (-12, 0) window of this study, the cumulative average value-weighted market return is 12.5%. In the (announcement date, day +240) window, which is comparable to the (0, +12) window of this study, the cumulative average value-weighted market return is 5.4%.

A.2. Industry Performance

In contrast to a lack of the timing of IPOs with regard to the general level of stock prices, the return performance of industry stocks surrounding IPOs reveals a significantly different picture.

Consider first the performance of the size-and industry-matched index when the returns on the index are adjusted for the equally-weighted market return. As reported in Column 3 of Table III, and Figure 2, the one-year average excess return before the filing date is 15.18 % (significant at the 1% level).[9] The average waiting period excess return is 0%. The one-year average excess return following the offering date is -8.46% (significant at the 1% level). Examination of shorter interval excess returns suggests that industry stocks outperform the market, and rise continuously before the filing date. However, subsequent to the offering date, the superior performance ceases and below average performance is observed. The average market-adjusted stock price of the index declines continuously after the offering date.

Although it is observed that there is a positive average excess return before the filing date and a negative average excess return occurs after the filing date, it is possible that these results are driven by a relatively small number of outlier returns. One way to

[9] This is based upon the t-test which tests the null hypothesis that the average market-adjusted return is equal to zero.

consider this possibility is to investigate the fraction of observations with positive excess returns and test for its significance. Column 4 of Table III shows that the percentage of observations with positive one-year excess returns preceding the filing date is 56.7% (significant at the 1% level).[10] The percentage of positive excess returns for the waiting period is 47.9% (significant at the 10% level). The percentage of positive one-year excess returns following the offering date is 33.3% (significant at the 1% level). Examination of shorter interval excess returns indicates that in the periods before the filing date, over or close to 50% of the observations have positive excess returns. However, after the filing date, less than 50% of the observations have positive excess returns for all intervals. Thus, these results indicate that the timing pattern of IPOs in regard to industry stock performance is not due to outlier observations.

Using the industry returns adjusted for the value-weighted market return yields similar results. The one-year average excess return before the filing date is 22.12% (significant at the 1% level). The average waiting period excess return is 0.76% (insignificant). The one-year average excess return following the offering date is -0.62% (insignificant). Excess returns over shorter intervals indicate that industry stocks outperform the market before the filing date. However, subsequent to the filing date, abnormal performance ceases and average performance is observed.

[10] This is based upon the sign test which tests the null hypothesis that the median market-adjusted return is equal to zero.

The fraction of positive excess returns before the filing date provides another insight, as reported in Column 6 of Table III. The fraction of positive excess returns before the filing date is over 50% for all intervals. The fraction of positive excess returns during the waiting period is 50%. The fraction of positive excess returns after the offering date is below 50% over all intervals.

In sum, these results suggest that IPO firms are, on average, more likely to go public not only when the market valuation of comparable stocks in the same industry is high, but there is also a tendency to attain the maximum levels, relative to the market as a whole.[11]

B. Robustness

The above results suggest that IPO firms are, on average, more likely to go public when the market valuation of the comparable stocks in the same industry is at its peak.

[11] Another test is constructed using the offering date as a point of reference. The time intervals are redefined relative to the offering date. Using the value-weighted market return, the one-year average excess return prior to the offering date is 20.75% (significant at the 1% level), and the fraction of positive excess returns is 60% (significant at the 1% level). The one-month average excess return is 0.91% (significant at the 1% level), and the fraction of Positive excess return is 50.9% (insignificant). Examination of small-interval returns suggests that there is still a run-up in the performance of the index.

However, there are several concerns about the observed timing pattern of IPOs with respect to the performance of comparable stocks in the same industry. First, the timing pattern of canceled IPOs may be different from that of successful ones. Second, the observed timing pattern might be concentrated in particular industries. Third, it may be concentrated in some periods. Finally, it may be sensitive to the particular index selected. Thus, it is necessary to verify the robustness of the observed timing pattern of IPOs with respect to the performance of comparable stocks in the same industry by examining these possibilities. For ease of exposition, the industry return adjusted for the value-weighted market return is employed as the market index from here onwards.[12]

B.1. Canceled Offerings

The sample discussed so far comprises successful offerings. Thus, it might be interesting to examine the timing pattern of canceled offerings. Therefore, 378 canceled IPO filings between 1980-1991 are identified from the weekly editions of Investment Dealer's Digest. Since SIC codes for the majority of these firms are not available from any public source, estimates are used to determine the relevant codes. The estimates are based on company nomenclature. For most of the firms, there is significant ambiguity in regard to actual lines of business. Therefore, these firms are excluded from the

[12] Using the equally-weighted index as the market index yields qualitatively similar results. Thus, they are not reported here. However, they are available in the Appendix.

examination of the timing of canceled IPOs. Two-digit SIC codes are used for remaining firms in lieu of three-digit codes, as it is difficult to determine the industrial categories precisely. This procedure results in a subsample of 73 canceled IPOs. As is obvious, this methodology is subjective in nature, and therefore, resulting empirical tests should be viewed with some caution.

However, empirical results seem to corroborate the timing pattern observed in successful IPOs. Table IV reports the performance of the industry-matched index surrounding canceled IPOs. In this table, Period 0 refers to the time interval between the filing date and the date when the Investment Dealer's Digest reported the cancellations. However, this cancellation date does not correspond to the date when firms actually decided to cancel their IPOs. This means that comparison of the waiting period performance of successful IPOs with Period 0 performance of canceled IPOs may not be relevant. The same can be said of comparison of post-Period 0 performance between successful and canceled IPOs. Hence, the analysis focuses on the pre-filing performance.

The one-year excess return before the filing date is 15.76% (significant at the 1% level). The fraction of positive excess returns for the same period is 61.6% (significant at the 1% level). The pre-filing one-month excess return is -0.13% (insignificant). The fraction of positive excess returns is 45.2% (insignificant). A close look at shorter interval excess returns indicates that industry stocks beat the market, rising continuously before the filing date. These results suggest that the timing pattern of successful IPOs is not subject to a selection bias. The vast majority of firms which canceled their IPOs did

not reenter the IPO market subsequently. This fact, coupled with performance of the index during the pre-filing and waiting periods, seems to suggest that cancellation of IPOs is not caused by poor timing.

B.2. Industry Concentration

While the above results show the timing pattern of IPOs with respect to the prices of stocks in the same industry, it is possible that these results are dominated by a few industries which are heavily represented in the sample. Considering the fact that, out of 247 industries, four industries represent 25% of IPOs in the sample and 15 industries occupy nearly 50% of the sample (Table I and Table IV), it is conceivable that a few industries are producing these excess returns. To ascertain the robustness of the timing pattern of IPOs across the industries, the sample is split into four subgroups of industries so that there are approximately equal number of IPOs in each subgroup. First, all industries in the sample are ranked according to the number of IPOs per industry. Then, the whole sample is divided into four subgroups. The first subgroup represents the group of industries which has the biggest representation of IPOs in the sample, followed by the second, third, and fourth groups. Table V presents some descriptive statistics of these four subgroups. The average number of IPOs per industry over the sample period is 137.7, 40.3, 12.8, and 2.8 for the first, second, third, and fourth subgroups, respectively.

Table VI and Figure 3 depict the performance of the industry index for all four subgroups. In general, a similar timing pattern is observed for all four subgroups in terms of the direction of performance. These results suggest that the timing pattern of IPOs is not limited to the small number of industries which are heavily represented in the sample.

B.3. Sub-periods

Although the observed timing pattern of IPOs is not restricted to a few industries, it is still possible that these results are dominated by a shorter sub-period. To consider this possibility, the sample period is divided into two time intervals, 1980-1985 and 1986-1991 and an investigation is conducted on the performance of the size-and-industry-matched index for each sub-period. Each period has the same number of IPOs (1,077 IPOs).

As reported in Table VII and Figure 4, for both sub-periods, there is still the same pattern of timing of IPO firms around the filing date. Stocks of the industry index earn positive excess returns prior to the filing date. Subsequent to the filing date, above-market performance ceases and average performance is observed. The one-year average excess return before the filing date is 32.09% (significant at the 1% level) for the 1980-85 period, compared with 12.09% (significant at the 1% level) for the 1986-91 period. The average waiting period excess return is 0.32% (insignificant) in the first sub-period and is 1.21% (significant at the 1% level) in the second. The one-year average excess return

following the offering date is -2.55% (significant at the 1% level) and 1.32% (insignificant) for the first and second sub-periods respectively. Examination of shorter interval excess returns indicates that the average stock price of the industry index outperform the market before the filing date and perform almost at par with the market after the offering date. These results indicate that the observed timing pattern of IPO firms is not restricted to a particular sub-period.

B.4. Index

To form the size-and-industry-matched index, this study employed seasoned firms in the same industry that have been listed on the NASDAQ for at least three years, as of the IPO filing date and are close in terms of market capitalization. As an alternative, the timing pattern of IPOs is examined with another industry index that is composed of all firms in the same industry that have been listed on the NASDAQ for at least three years, as of the IPO filing date (the industry-matched index).

A similar picture emerges again. As reported in Table VIII and Figure 5, positive abnormal performance is still observed before the filing date and average performance occurs thereafter. These results suggest that the timing pattern of IPOs is not driven by a particular industry index. However, in pre-filing periods, the performance of the industry-matched index is weak relative to that of the size-and-industry matched index. The one-year average excess return preceding the filing date is 10.21% (significant at the

1% level), compared to 22.12% for the size-and-industry matched index. There is little difference in the performance of the two indices in post-offering periods. [13]

[13] An investigation is also made into the timing pattern of IPOs with another size-and-industry-matched index, which is composed of three-year seasoned firms whose sizes lie between a size three times larger and three times smaller than IPO firms, as of the offering year. Since the result shows a qualitatively similar pattern, this is not reported here.

VI. Underwriter and Timing

The results in the previous chapter suggest that IPO firms are, on average, more likely to go public when the market valuation of comparable stocks in the same industry is high. An interesting question which arises at this point is whether IPOs with different characteristics show different timing behaviors. The focus of this chapter is on assessing whether the more reputable underwriters possess a greater proficiency in timing of IPOs than their less reputable counterparts.

A. Measurement

A.1. Underwriter Classification

Measuring the timing abilities of underwriters requires a measurable proxy for timing ability. Assuming that higher reputation is associated with superior timing ability, this study focuses on possible proxies for investment bank reputation. Reputation does

not readily lend itself to unambiguous calibration. As a proxy for an investment bank's reputation, this study initially utilizes the number of offerings underwritten by each investment bank. Arguably, the number of deals made in the IPO market by an investment bank is a reflection of that bank's reputation for proficiency in bringing firms to the market. Later, two other proxy variables will be considered for underwriter reputation.

The IPO sample is first divided into two sub-periods, 1980-1985 and 1986-1991. Then, investment banks are ranked within each sub-period by the number of offerings they brought to the market. Partitioning of the sample period is carried out because the reputation of a bank may change over time. If an IPO has more than one lead underwriter, the first underwriter listed in the Investment Dealer's Digest is given full credit for the issue. Within each period, the banks are further partitioned into two subgroups at the median of the distribution of the number of offerings. Because it is difficult to discern precisely the difference in prestige among underwriters, especially among the less prestigious underwriters, this two-tier system is employed. Within each period, the top 50% of underwriters are referred to as the first-tier investment bank group, and the bottom 50%, as the second-tier investment bank group. Panels A1 and A2 of Table IX provide the number of underwriters represented in each subgroup for each period and other descriptive statistics. It is shown that there is a high concentration in the IPO market. For the period 1980-1985, out of 189 different banks, only 22 banks

(11.7%) brought forth about 50 % of the sample of IPO offerings. For the period 1986-1991, out of 191 different banks, only 14 banks (7.4%) captured about half the sample.

Panels B1 and B2 of Table IX provide the names of banks that belong to the first-tier investment bank group for each period in the sample. The top three banks are L.F. Rothscild, D.H. Blair and Prudential Bache during 1980-1985, and Alex Brown and Sons, Goldman Sachs & Co and Merrill Lynch during 1986-1991.

A.2. Time Horizon

In order to assess the timing abilities of underwriters, it is necessary to define a time interval over which timing patterns are compared. Because a firm may be forced to go public when it needs funds rather than at some favorable time, differences in timing patterns may reflect differences in the timing of capital needs of firms, rather than differences in market timing ability. However, even if a firm is constrained by the time period in which it must raise funds, over shorter periods of time, it may have some timing flexibility. Besides, underwriters, in general, may only be capable of forecasting market conditions over a short horizon. Thus, to compare the timing performance of underwriters, it might be more appropriate to consider a short-term period over which underwriters can exercise timing flexibility. This study will investigate the timing patterns of underwriters up to one year before the filing date and one year after the offering date, with a particular emphasis on the waiting period.

It can be argued that an IPO is timed well if the market valuation of industry stocks appreciates before the filing date, since the increase in price during this period may capture the gain from delaying the decision to enter the market until the filing date. However, differential timing patterns over this period may not necessarily translate into the evidence of differential timing abilities. Since changes in industry conditions before the filing date can be observed on the filing date, any difference in timing patterns during this period may not be attributed to differing timing abilities. Rather, any difference in timing patterns may be ascribed to the fact that different firms need capital at different times. It can also be argued that IPO firms may simply tend to go public after unusually good periods of industry performance. Such practice is consistent with the evidence documented above. However, these simple decision rules make no prediction about performance during the waiting period. Thus, performance in the pre-filing period may not be a good indicator of timing ability.

It is propounded that the best basis for judging the relative timing performance of underwriters is the time period over which a forecast has to be made. Therefore, market conditions during the waiting period are particularly important in comparing the timing ability of underwriters, since a forecast has to be made on the filing date, of what market conditions are likely to be over the waiting period.

An IPO cannot be brought to the market instantaneously at all times, even if timing is propitious. There is a lag between the decision to enter the market and the time of actual entry. Once the decision to enter the market is made, the firm must register with

the SEC, and wait for its approval. During this waiting period, pre-selling of the issue by the underwriter takes place. Changes in conditions of industry stocks during this period must be predicted and considered at the time of filing. If there is a deterioration in market conditions after the filing date and before the offering date, an IPO firm has two choices: sell the issue at the lower price or cancel the issue and enter the market later. In canceling the issue, the firm has to weigh the price decline against the cost of a subsequent registration and the loss of investment opportunities. Since the sample is composed of successful offerings, a deterioration in market conditions would imply firms' acceptance of a price decline, as opposed to cancellation of the issue. Thus, it is suggested that an IPO is timed well if the market valuation of industry stocks appreciates during the waiting period.

The relative timing performance of IPOs underwritten by different investment banks is studied using the excess return on the size-and-industry-matched index. Two tests are employed to assess the relative timing proficiency of different groups of underwriters: (1) the t-test of differences in average excess returns (2) the sign test of differences in excess returns. Arguably, the sign test may be more appropriate because the results of the t-test could be influenced by a few large outliers in the excess returns. Furthermore, investment bankers may possess the skill to forecast the direction of market movements but not the magnitude. Later, a regression analysis is also performed when the robustness of the findings is examined. The value-weighted market index is employed as the market index.

B. Empirical Findings

B.1. Timing Pattern Surrounding the Waiting Period

Table X and Figure 6 report the timing patterns of IPOs underwritten by the first-tier and second-tier investment bank groups. For the first-tier group, the one-year average market-adjusted return before the filing date is 26.93%. For the second-tier group, the average market-adjusted return for the same period is 17.42 %. The difference in average market-adjusted returns is significant (at the 1% level). The fraction of positive market-adjusted returns for the same interval is 68.7 % for the first-tier group and 55.0% for the second-tier group. The difference in the fraction of positive market-adjusted returns is significant (at the 1 % level). As the interval shortens, the difference in average market-adjusted returns and in the fraction of positive excess returns is still significant. For the first-tier group, the one-month average market-adjusted return before the filing date is 1.85%. For the second group, the average market-adjusted return for the same period is 1.05%. The difference is significant (at the 5% level). The fraction of positive market-adjusted returns for the same interval is 58.2 % for the first group, 52.2% for the second group. The difference is significant (at the 1 % level).

For the first group, both a higher price run-up and a higher fraction of positive market-adjusted returns are observed before the filing date, as compared to the second group. This observation suggests that IPOs underwritten by the first-tier bank group take place when the market conditions before the filing date are more favorable. It appears that the timing pattern of IPOs underwritten by the first-tier group is indicative of superior timing ability on their part. However, as noted, interpretation should be made with caution. One explanation of the observed timing pattern of the first-tier group could be adherence to a simple rule of going public after a run-up in industry performance. Thus, it may not be that the first-tier group of banks have better timing ability. It might also be argued that IPO firms underwritten by the first-tier investment bank group have a greater urgency for funds when industry conditions are more favorable, and IPO firms underwritten by the second-tier investment bank group need greater access to funds when industry conditions are less favorable.

On the other hand, after the offering date, the difference in the two groups becomes less pronounced than before the filing date. The one-year average market-adjusted return after the offering date is 1.51% for the first-tier group, and -2.71% for the second-tier group. The difference is significant (at the 1% level). The difference in the fraction of positive market-adjusted returns is also significant (at the 5% level). The fraction of positive market-adjusted returns for the same interval is 46.1% for the first-tier group, and 38.8 % for the second-tier group.

B.2. Timing Pattern During the Waiting Period

For the first group, the waiting period average excess return is 1.54%. For the second group, the same measure yields 0%. The difference is significant (at the 1% level). The fraction of positive excess returns for the same interval is 54.8% for the first group, and 45.4% for the second group. The difference is significant (at the 1% level).

The first-tier group depicts a significantly higher fraction of positive excess returns and also a higher average excess return. This indicates that IPOs underwritten by the first-tier investment bank group take place when industry conditions during the waiting period are more favorable. This evidence is consistent with the conjecture that IPOs underwritten by the first-tier investment bank group are better timed, relative to the second-tier group, since industry conditions during the waiting period are not observable at the time of filing of IPOs.

C. Alternative Explanations

The above results are consistent with the conjecture that banks in the first-tier group are more proficient than the second group of banks in taking firms public under more favorable market conditions, when timing performance is measured by the change

in market-adjusted returns on the industry index over the waiting period. However, these changes in market-adjusted returns during the waiting period may have alternative explanations. First, the difference in observed patterns during the waiting period may indicate that the more reputable underwriters have a greater proclivity to cancel their offerings during the waiting period, if their timing turns out to be wrong. Second, it may be due to a difference in the length of the waiting period. Third, it may be due to dissimilar time patterns of capital needs of different firms. Fourth, it may be an artifice of the underwriter ranking system used in this study. Finally, it may be the case that it is managers of firms who control timing of offerings, as opposed to underwriters. In this section, the validity of these alternative explanations is examined.

C.1. Willingness to Withdraw Offerings

Since the sample consists of successful IPOs, it is subject to a selection bias. The apparently better timing ability of the first group of underwriters may reflect the fact that the more reputable underwriters have a greater tendency to cancel the offerings, if timing turns out to be wrong. Such willingness on the part of the more prestigious underwriters to withdraw IPOs in the face of deteriorating market conditions may explain the apparent superiority of these underwriters in timing IPOs.

To investigate this possibility, 378 withdrawn and abandoned IPO filings are identified between 1980 and 1991 in the weekly editions of the Investment Dealer's

Digest. These canceled IPOs are drawn from the same industries as the successful IPOs. These canceled IPOs originated through a firm commitment underwriting arrangement. A comparison is made between the IPO cancellation ratios of each group of underwriters. The cancellation ratio of IPOs is defined as the number of IPOs canceled by an underwriter group divided by the number of IPOs filed by that group.

The cancellation ratio is 11.5% (138 cancellations / 1058 total filings) for the fist group of underwriters and 18.0% (240 cancellations / 1096 total filings) for the second group. The cancellation ratio of the second group is higher than that of the first group. This suggests that the less reputable group of underwriters is more likely to cancel their offerings. Thus, the superior timing performance of the more reputable underwriters does not appear to be driven by a greater tendency on their part to cancel IPOs.

C.2. Difference in the Waiting Period

A second possible explanation for the better timing performance of the first group may be related to the length of the waiting period. The failure of the less prestigious banks to take firms public under more favorable market conditions may reflect possibly inferior skills in executing an offering, rather than an inability to perceive good market conditions. Alternatively, the worse timing performance of the less reputable investment banks may be due to a delay in the SEC's review process. It is typical of smaller IPOs to be subjected to greater scrutiny, and thus, more time may be required to receive the

SEC's approval. In either case, IPOs underwritten by the less reputable banks would tend to have longer waiting periods, which may undermine their timing abilities.

To consider this possibility, a comparison is made between the length of the waiting period of the first and second group. In fact, the waiting period is longer for the second group. The average waiting period is 40 trading days for the first group, and 49 trading days for the second group.[14] To ascertain whether timing performance may be affected by the length of the waiting period, the length of the waiting period of the second group is artificially reset to that of the first group (40 days), and then the second group's average market-adjusted return and the fraction of positive market-adjusted returns are calculated for that shorter period.

The average market-adjusted return of the second group calculated this way is 0.15%, and the fraction of positive market-adjusted returns is 45.3%. The actual average market-adjusted return of the second group is 0%, and the actual fraction of positive market-adjusted returns is 45.4%. The actual average market-adjusted return of the first group is 1.54%, and the actual fraction of positive market-adjusted returns is 54.8%. These figures indicate that the first-tier group's performance is still superior to that of the second group. Therefore, empirical evidence indicates that the poor timing performance

[14] The distribution of the waiting period is also calculated. The standard deviation is 31 trading days for the first group, and 43 trading days for the second group. The wider dispersion of the waiting period for the second group also suggests that the timing abilities of the less reputable banks may be undermined by this difference in the waiting period.

of the second group of underwriters is not driven by the longer waiting period for their IPOs.

C.3. Difference in the Time Patterns of Capital Needs

Another concern is that the difference in timing patterns may be due to dissimilarity in the time patterns of capital needs of firms in the two groups, rather than a difference in timing proficiency. For example, IPO firms underwritten by the first-tier investment bank group may have a greater urgency to raise new funds when market conditions are more favorable, while IPO firms underwritten by the second-tier investment bank group may need funds more when market conditions are less favorable. To consider this possibility, the entire IPO sample is partitioned into two subgroups, depending upon market conditions before the filing date. It is then verified whether the observed timing pattern during the waiting period still holds true in the two subgroups. More specifically, the whole sample is first divided into two subgroups. This is done according to whether the one-month pre-filing excess returns on the Size-and-Industry-matched Index are positive or negative. Within each subgroup, a comparison is then made between the performance of the first-tier and second-tier investment bank groups. This comparison is made in regard to the waiting period excess returns on the index, for each sample subgroup.

Panel A of Table XI shows results when the one-month excess returns before the filing date are positive. The average excess return of the industry index during the waiting period is 2.15% for the IPOs underwritten by the first-tier investment bank and 0.58% for the IPOs underwritten by the second-tier investment bank group. The difference is significant (at the 5% level). The fraction of positive excess returns is 56.2% for the first group, and 47.3% for the second group. The difference is significant (at the 1% level).

Panel B of Table XI shows results when the one-month excess returns before filing dates are negative. These results in general conform to those reported in Panel A. The average excess return of the industry index is 0.71% for the IPOs underwritten by the first-tier investment bank and -0.61% for the IPOs underwritten by the second-tier bank group. The difference is significant (at the 10% level). The fraction of positive excess returns is 52.8% for the first group, and 43.5% for the second group. The difference is significant (at the 5% level).

In sum, the results in Panels A and B of Table XI suggest that, regardless of market conditions before the filing date, IPO firms underwritten by the first-tier group of investment banks are more likely to go public when the market valuation of industry stocks is high, than those underwritten by the second group of investment banks. This evidence is consistent with the conjecture that the superior timing proficiency of the first group of underwriters is not caused by the possibility that the IPO firms underwritten by these banks may need funds more when overall industry conditions are more favorable.

C.4. Classification of Underwriters

Another concern is that the better timing performance of the more reputable underwriters may be an artifice of the criteria used for classification of underwriters. Even though there is no reason to believe that the number of IPO deals underwritten by an investment bank introduces a systematic bias in measuring the "true" reputation of the underwriter, the robustness of the above findings is verified by using other ranking systems. One proxy for reputation is the average deal-size of the underwriter. An average-deal size is defined as the total dollar value of IPO offerings underwritten by an investment bank, divided by the number of IPO deals made by that bank. Investment banks are divided according to the median of the average deal-size variable. Those investment banks with an average-deal size above or equal to the median are included in the first-tier investment bank group, and the remaining investment banks are allocated to the second-tier group.

Using average deal-size does not change the conclusion that the more reputable investment banks take firms public under better market conditions. The results are reported in Row 2 of Table XII. The excess return on the industry index during the waiting period is 1.70% for the first-tier group, and -0.14% for the second-tier group. The difference is significant (at the 1% level). The fraction of positive excess returns is

55.6% for the first-tier group, compared to 44.6% for the second-tier group. The difference is significant (at the 1% level).

To further ascertain the robustness of timing performance, the Carter/Manaster ranking system is employed.[15] As reported in Row 3 of Table XII, a similar picture emerges again. The difference in timing performance between the two groups is still significant.

[15] Carter and Manaster (1990) determine an investment bank's level of prestige by examining IPO tombstone advertisements. Based upon the location of each bank in the first ad examined, the bank is given a rank from one to nine. A second ad is then examined. If any bank in the second ad is listed above any bank in the first ad, the new underwriters are assigned the rank of the original group, and the rank of the original group is reduced. This process is continued until all tombstone ads are exhausted. The results of this methodology is a prestige rating for each investment bank on a scale from zero (representing least prestigious) through nine (most prestigious). Investment banks with a prestige rating between eight and nine are allotted to the first-tier group, and banks having a rating below eight are assigned to the second-tier group. However, using the Carter/Manaster measure in this study is problematic, because their sample years do not match those of this study. In addition, some underwriters of the sample used in this study are not listed in their list. If such is the case, those underwriters are assumed to belong to the second-tier group.

C.5. Underwriter Timing vs. Manager Timing

Another problem in examining timing performance is investigating whether investment bankers or managers of issuing firms are responsible for timing. If issuing firms entrust their managers with the task of timing, it might be possible to develop another interpretation. The above results may support the alternative explanation that managers of issuing firms in the first-tier investment bank group possess superior timing abilities, as compared to their counterparts in the second-tier group. It may also be that often, timing decisions are ultimately arrived at through agreement between both parties concerned. In this case, it is virtually impossible to determine which party is responsible. However, some arguments tend to support the view that it is more likely to be underwriters who are responsible for timing, rather than firms' managers. In the firm-commitment offering, it is underwriters who bear flotation risk, contact investors during the waiting period, and also possess information about investors' interest in the particular IPO, as well as previous ones. Also, entrepreneurs of IPO firms may not have as much expertise as underwriters, in matters concerning the financial market. However, these managers may have better information about the value of their firms and competitors. In this section, several tests are conducted which may lend support to the conclusion that underwriters do take up much responsibility, if not all, for timing decisions.

C.5.1. Regression Analysis

To verify the robustness of the role of underwriters in timing, probit regressions are employed. The dependent variable assumes a value of one for IPOs associated with the positive market-adjusted return on the industry index during the waiting period, and to those associated with the negative market-adjusted return, zero is assigned. As for independent variables, Group represents a zero-one dummy variable for underwriters. For the first group of underwriters, this variable takes the value of one, and for the second group, the value is zero. Regression results are also reported using a continuous variable for investment bank reputation, as opposed to a zero-one dummy variable. A firm size variable is used as a control variable, under the presumption that managerial timing is directly related to firm size.[16] The regression procedures are carried out both by including and excluding IPO firm size as the control variable.[17]

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[16] Using firm size as a proxy for managerial timing assumes that managers of larger firms have greater abilities and/or information to forecast developments in the financial market and the industry, than managers of smaller firms. It is also noted that IPOs of big firms are usually underwritten by prestigious investment banks. Thus, if mutual correlation exists between the investment bank variable and the firm size variable, it would be difficult to interpret regression results.

[17] The IPO firm size variable used here is the market capitalization at the end of the offering year. To account for the fact that the size of the entire stock market varies over time, the market capitalization of an IPO firm is divided by the market value of the NASDAQ market index for each year. This relative firm

First, the number of offerings is employed as a proxy for investment bank reputation. Results are reported in Panel A of Table XIII. In the regression without firm size as a control variable (Regression 1), the coefficient of the investment bank dummy variable is positive and significant at the 1% level (p = 0.00). Regression 2 shows that the coefficient of the continuous investment bank variable (the number of IPO deals) is also positive, and significant at the 1% level (p = 0.00).

Regressions 3 and 4 show results when firm size is included as a control variable. In Regression 3, the coefficient of the investment bank dummy variable is positive and significant at the 1% level (p = 0.00), while the firm size variable is less significant (p = 0.03). Regression 4 shows that the coefficient of the continuous investment bank variable is also positive, and significant at the 1% level (p = 0.00). On the other hand, the firm size variable becomes even less significant (p = 0.06). Thus, the continuous investment bank variable has greater statistical significance than the zero-one dummy variable. In sum, these results are consistent with the view that the more reputable group of underwriters tends to take firms public when market conditions during the waiting period are more favorable, than do their less reputable counterparts.

Panel B of Table XIII reports similar results when the average deal-size is used as a proxy for investment bank reputation. In general, using the average deal-size also

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size variable also takes inflation into consideration. In these regressions, a scaled variable of 10000*relative firm size is used as the firm size variable.

supports the conjecture that the more reputable investment banks take firms public under more favorable market conditions.

In each regression, the coefficient of bank reputation has significant explanatory power. In the regression without firm size (Regression 1), the coefficient of the log of average deal-size is positive and significant at the 1% level ($p = 0.00$). In the regression with firm size (Regression 2), the coefficient of the investment bank variable is still positive and significant at the 1% level ($p = 0.00$), while the firm size variable is insignificant ($p = 0.14$). These results are consistent with the conclusion that the more reputable group of underwriters tends to take firms public under more favorable market conditions.

C.5.2. The Timing of Self-underwritten IPOs

To verify further the role of underwriters in the timing of IPOs, the timing pattern of self-underwritten IPOs is examined. These IPOs are those of investment banks underwritten by themselves.[18] For these self-managed IPOs, the waiting period market-adjusted return on the size-and-industry-matched index is 2.60% (significant at the 10% level). The fraction of positive excess returns is 54.5% (insignificant). These results

[18] There are 11 self-underwritten IPOs. The small sample size hinders meaningful statistical inference. Thus, the empirical results are only suggestive in nature.

suggest that investment banks time their own offerings when the market valuation of their peers is high.

C.5.3. Timing Performance and Subsequent Change in the Number of Deals

Another test is performed to ascertain the timing role of underwriters. It is investigated whether investment banks gain or lose their subsequent IPO deals as a result of performance in timing of previous IPOs. The loss of subsequent IPO deals by investment banks due to poor timing advice indicates that IPO firms perceive the importance of timing.

To test whether there is a relation between timing performance and subsequent changes in the number of deals, the following method is employed. Within the first-tier group of underwriters in the first sub-period (1980-1985), underwriters are partitioned into two groups. One group is composed of underwriters that remain in the first tier category in the second sub-period (1986-1991). The other group comprises underwriters who are relegated to the second group.[19] Between these two groups, it is analyzed whether there is a difference in timing performance in the first sub-period. The average

[19] Of the 22 first-tier investment banks (reported in Panel B1 of Table IX), 10 banks belong to this category. These banks are L F Rothscild, D H Blair &Co, Prudential Bache, Dean Witter Reynolds, Rooney Pace Inc., Bear Stearns, E. F. Hutton, Laidlaw Adams, Ladenburg Thalmann, and Paulson Investment.

market-adjusted return is 1.56% for the first group, as compared to 0.31% for the second group. This difference is statistically insignificant at the traditional levels. The fraction of positive market-adjusted returns is 58.0% and 46.0% for the first and second groups respectively. Their difference is significant (at the 5% level). These results appear to support the conjecture that underwriters are subject to market penalties because of poor timing ability.[20]

As for the second-tier group of underwriters in the first sub-period (1980-1985), underwriters are again divided into two groups. One group is composed of underwriters who ascend to the first tier group in the second sub-period (1986-1991).[21] The other group comprises underwriters who remain in the second category. Between these two groups, timing performance in the first sub-period is compared. The average market-adjusted return is 0.20% for the first group, as compared to -0.36% for the second group.

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[20] Five banks, which fell into the second-tier group in the second sub-period, exited the IPO market. These banks are omitted from the sample, and the same test is conducted again. The average market-adjusted return is -0.11% for the second group. The difference between the first and second groups is significant (at the 10% level). The fraction of positive market-adjusted returns is 44.7% for the second group. The difference between the two groups is insignificant. The difference in magnitude between the two values obtained for these two group is greater than that obtained from the test which includes all banks.

[21] Of the 167 second tier investment banks (reported in Panel B2 of Table IX), 4 banks fits into this category. These banks are Paine Webber, First Boston, Robertson Coleman, and Montgomery Securities. The small sample size hinders meaningful statistical influence. Thus, the empirical results using this sample are only suggestive in nature.

This difference is statistically insignificant at the traditional levels. The fraction of positive market-adjusted returns is 50.0% and 43.6% for the first and second groups respectively. Their difference is statistically insignificant. Even though these tests are insignificant at the traditional levels, the sign and magnitude seem to suggest that financial markets reward underwriters who possess better timing ability.[22]

[22] The analysis in this study has focused on the timing role of underwriters. However, an underwriter has two sets of customers to whom its reputation is of great importance. First there are companies issuing stock and the second set of customers are the investors that buy the stock. Even though good timing provides benefits to issuing firms, it would not necessarily do the same to the investors. It is an interesting question to look at the matter of timing in relation to the investors. Nanda, Yi, and Yun (1995) show that the worst average performance of IPOs occurs for offerings done by less established investment banks. There is no underperformance for the substantial fraction of IPOs accounted for by the most prestigious underwriters. There is obviously scope for further research.

VII. Conclusion

The successful timing of an IPO can provide significant benefit. Taking companies public when their equity valuation is high makes it possible to raise more funds, that is, it allows firms to obtain capital when their cost of capital is low. Successful timing also minimizes the dilution of the entrepreneur's stake in ownership, and increases the payoff from an exit strategy to venture capitalists and others who provided seed capital during firms' early stages. Moreover, successful timing of IPOs may enhance the reputation of investment banks, increasing their access to future IPOs.

The first issue addressed in this study is whether IPOs, in general, are timed when they are highly valued. IPO timing is measured by relying on the performance of an index composed of publicly owned companies engaged in the same or similar business. It is a difficult task to determine the market value of firms prior to their IPO, both because they do not have a market price and because some issuing firms have little or no operating history. One starting point for determining the market value of the IPO firms is the comparison of their operational and financial performance and status with that of publicly owned companies in the same or similar industry. Thus, the timing decision of

IPO firms is likely to be governed by the current market valuation of comparable firms in the same industry.

Evidence is provided here about the timing of IPOs relative to market conditions before and after IPO offerings. It is found that firms are, on average, more likely to go public when the market valuation of comparable stocks in the same industry is at its peak relative to the entire market. In contrast, no evidence is found of a pattern of IPO firms timing their offerings with respect to market-wide conditions. To the best of my knowledge, this is the first attempt to examine IPO timing beyond Lerner's biotechnology firms. It is also the first to look at the timing of new stocks with respect to industry conditions. Unlike this study, most prior studies of IPOs and SEOs, investigate timing with respect to firm-specific or economy-wide conditions.

The analysis of this study on the timing pattern of IPO firms also shed new light on the issue of the long-run post-issue underperformance of IPOs documented by Ritter (1991) and Loughran and Ritter (1995). They show that IPOs significantly underperform the market over the five years after going public, and that the poor performance is not a risk effect nor a long-term return reversal. They call this long-term pricing abnormality the "new issue puzzle". One possible explanation they offer to resolve this puzzle is that firms take advantage of transitory windows of opportunity by issuing equity when, on average, they are substantially overvalued. However, they do not show direct evidence on whether IPO firms time their offerings. In contrast to prior studies, this study provides

evidence on whether IPO firms time their offerings relative to market conditions *before and after* IPO offerings.

The second issue addressed in this study is whether underwriters play a role in the timing of IPOs. The existing literature on the role of underwriters has concentrated on underwriter certification and marketing. However, prior studies have apparently ignored the market timing role often ascribed to underwriters by practitioners. It is shown that IPO timing is a function of the reputation of underwriters who have expertise in the financial market. In their advisory role, underwriters advise their client firms on offer timing, in addition to pricing decisions and, ultimately, distributing the shares to investors. Unlike auditors, lawyers and engineers, who are responsible only for specific elements of registration statements, underwriters are responsible for the timing decision, relying on information from all parties to the offering, knowledge of the issuer's industry performance, and expertise gained in continuous market participation. Investment banks spend significant resources analyzing individual stocks, industries and overall markets. The more reputable underwriters have a comparative advantage in analyzing financial markets, because of scale economies in information acquisition and in search, than their less reputable counterparts. The more reputable investment banks are able to search more efficiently because of superior expertise in the new issue market gained from extensive experience, and because of a more extensive customer base. Because of the benefits from successful timing and the costs of poor timing advice, investment banks' reputation and, thus, value will depend in part on how well they time IPOs. It is found

that the more reputable underwriters possess a greater proficiency than their lesser known counterparts, in taking companies public when the market valuation of comparable stocks in the same industry is high. These results are robust to a plethora of statistical tests and alternative explanations.

Table I

Sample Description, 1980-1991

Included in the sample are IPO firms that went public between 1980 and 1991. The IPOs are firm commitment offerings. Regulation A offerings and unit offerings are excluded. In addition, all these IPO firms are listed on the NYSE, AMEX, or NASDAQ. Foreign companies, American Depository Receipts (ADRs), and financial institutions are omitted. Three-digit SIC codes are employed for industry classification.

Panel A: Distribution of IPOs and Industry Description

SIC	Industry Description	Number of IPOs	Percent	Cumulative Percent
737	computer and data processing services	210	9.8	9.8
357	computer and office equipment	153	7.1	16.9
283	medicinals & botanicals and biological products	103	4.8	21.6
367	electronic components and accessories	85	4.0	25.6
384	medical instruments and supplies	83	3.9	29.4
366	communications equipment	82	3.8	33.2
581	eating and drinking places	65	3.0	36.3
382	measuring and controlling instruments	44	2.0	38.3
138	oil and gas exploration, drilling oil & gas wells	38	1.8	40.0
809	health and allied services	33	1.5	41.6
131	crude petroleum & natural gas	32	1.5	43.1
495	sewerage and sanitary systems	28	1.3	44.4
506	electrical goods	26	1.2	45.6
739	business services	26	1.2	46.8
451	air transportation	25	1.2	48.0
others	other 232 industries	1121	52.0	100.0
total	247 industries	2154	100.0	

Panel B: Distribution of IPOs by Year and Industry

SIC	Total	80	81	82	83	84	85	86	87	88	89	90	91
737	210	4	18	11	50	19	9	27	19	7	11	6	29
357	153	7	16	8	40	11	14	16	13	3	8	9	8
283	103	2	6	5	21	5	4	15	5	1	4	4	31
367	85	5	10	3	14	10	4	8	9	4	4	3	11
384	83	5	14	4	12	4	5	6	7	5	4	5	12
366	82	2	17	7	20	6	6	5	7	2	1	5	4
581	65	1	7	6	17	7	5	6	3	0	4	2	7
382	44	5	7	3	10	3	5	5	3	0	0	0	3
138	38	6	21	1	0	0	0	0	0	0	2	6	2
809	33	2	4	0	5	5	6	2	4	0	5	5	6
131	32	9	10	0	0	0	0	0	2	0	3	8	0
495	28	0	0	1	2	0	3	6	7	3	2	2	2
506	26	1	4	0	7	2	0	4	3	1	0	3	1
739	26	1	5	3	7	2	2	3	3	0	0	0	0
451	25	4	4	1	6	5	2	1	1	0	0	1	0
others	1121	24	75	15	171	83	104	203	170	66	48	40	111
Total	2154	78	218	68	382	162	169	307	256	92	96	99	227

Table II

Average Market Returns in the 12-Month Periods surrounding IPOs, 1980-1991

Hereafter, Period 0 represents the time period between the filing date and the offering date (the waiting period). Pre-filing months are defined relative to the filing date, and post-offering months are defined relative to the offering date, where months are defined as successive 21-trading-day periods. The average market return for the period (a, b) is calculated as follows: For each IPO, the EW (or VW) geometrically compounded market return is calculated during the period (a, b). Then, the cross-sectional average of these returns is computed across all IPOs. Market returns are obtained from the daily NASDAQ CRSP return tape.

Months relative to the Waiting Period	The Equally-weighted Market Index		The Value-weighted Market Index	
	Returns	% Positive	Returns	% Positive
(-12, 0)	35.08	90.7	28.45	88.9
(-11, 0)	33.18	88.9	26.71	88.1
(-10, 0)	31.21	88.3	24.79	87.5
(-9, 0)	28.55	87.6	22.57	84.4
(-8, 0)	21.24	84.7	20.24	82.8
(-7, 0)	22.59	80.9	17.53	80.3
(-6, 0)	18.95	80.2	14.57	81.3
(-5, 0)	15.25	79.1	11.52	79.1
(-4, 0)	11.45	74.0	8.54	71.8
(-3, 0)	7.95	71.4	5.89	65.6
(-2, 0)	4.74	68.2	3.38	64.0
(-1, 0)	2.05	68.5	1.48	64.4
0	2.50	62.7	1.71	59.6
(0, +1)	0.83	60.8	0.33	57.5
(0, +2)	0.16	56.4	0.60	52.3
(0, +3)	2.52	53.4	0.93	50.6
(0, +4)	3.36	51.6	0.93	51.2
(0, +5)	4.14	51.4	1.23	52.2
(0, +6)	5.37	51.6	1.89	52.8
(0, +7)	6.95	51.8	2.77	51.7
(0, +8)	8.30	55.2	3.39	53.7
(0, +9)	9.83	57.2	4.21	54.6
(0, +10)	11.25	58.1	4.69	56.5
(0, +11)	12.37	58.9	5.11	56.7
(0, +12)	13.86	63.2	5.86	56.7

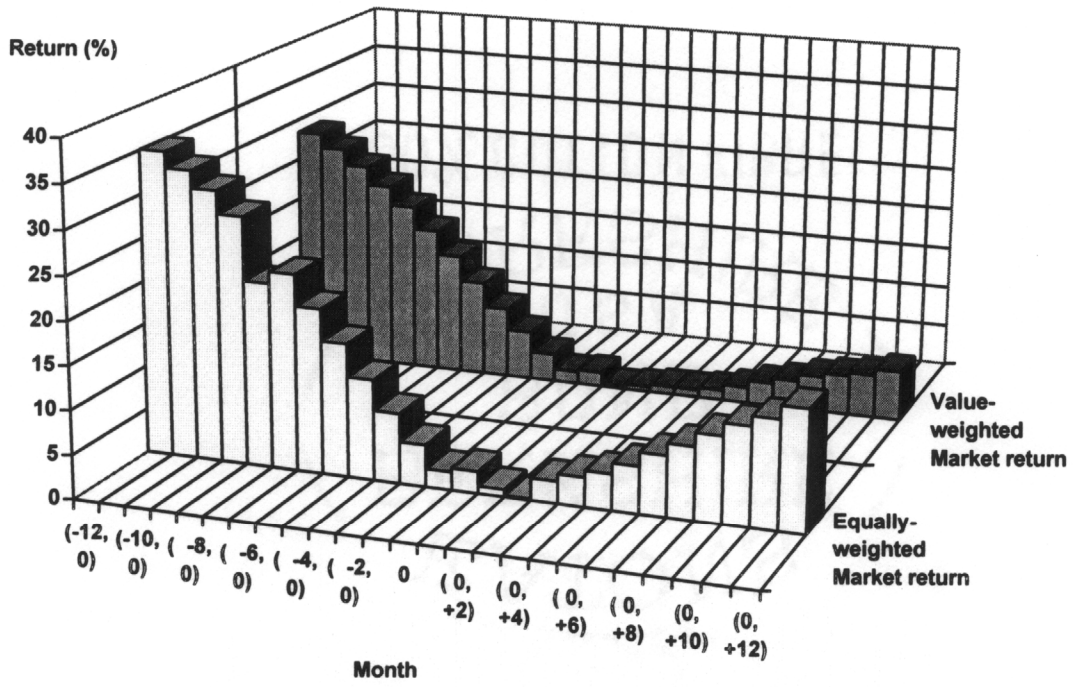

Figure 1. Average market returns from 12 months before until 12 months after IPOs, 1980-1991. The numbers graphed above are reported in Table II.

Table III

Average Returns on the Size-and-Industry-matched Index, 1980-1991

This table shows the performance of the Size-and-Industry-matched Index surrounding IPOs. The average raw return on the Size-and-Industry-matched Index over the period (a, b) is computed by the following method: For each IPO, geometrically compounded (buy-and-hold) returns are first calculated for matching firms. Then, an equally-weighted average return across these matching firms is calculated. After that, the cross-sectional average of these returns across all IPOs is calculated. To compute the market-adjusted return during the period (a, b), for each IPO the market return is subtracted from the raw return on the Size-and-Industry-matched Index. Then, the cross-sectional average of these returns across all IPOs is calculated. The size-and-industry index comprises seasoned firms in the same industry, with sizes lying within a range five times larger than, and one fifth as large as, an IPO firm, in the offering year (20% * the size of an IPO firm - 500% * the size of an IPO firm). In addition, these seasoned firms must be listed on the NASDAQ for at least three years prior to the IPO filing date.

Months relative to the waiting period	Raw returns	EW Market Adjusted Returns	% Positive	VW Market Adjusted Returns	% Positive
(-12, 0)	50.55	15.18***	56.7***	22.12***	61.8***
(-11, 0)	46.50	12.96***	54.8***	19.80***	60.7***
(-10, 0)	43.81	12.25***	55.8***	19.02***	61.5***
(-9, 0)	39.38	10.52***	54.9***	16.83***	61.7***
(-8, 0)	35.48	9.45***	55.3***	15.26***	61.6***
(-7, 0)	30.38	7.64***	54.2***	12.87***	60.2***
(-6, 0)	25.03	5.93***	52.2*	10.48***	59.3***
(-5, 0)	20.27	4.93***	50.2	8.76***	57.6***
(-4, 0)	15.00	3.47***	49.7	6.46***	57.9***
(-3, 0)	10.23	2.22***	50.4	4.34***	56.9***
(-2, 0)	6.24	1.48***	48.5	2.86***	55.6***
(-1, 0)	2.93	0.87***	51.0	1.45***	55.2***
0	2.48	0	47.9*	0.76***	50.0
(0, +1)	0.67	-0.10	44.8***	0.34**	48.1
(0, +2)	1.44	-0.17	44.2***	0.85***	48.6
(0, +3)	1.92	-0.58*	41.1***	0.98***	47.5**
(0, +4)	2.14	-1.06***	38.2***	1.21***	44.4***
(0, +5)	2.44	-1.48***	38.8***	1.21***	43.8***
(0, +6)	3.28	-1.80***	38.2***	1.38***	44.7***
(0, +7)	4.09	-2.54***	37.1***	1.32**	44.0***
(0, +8)	4.26	-3.79***	35.6***	0.87	44.2***
(0, +9)	4.31	-5.34***	34.6***	0.10	43.3***
(0, +10)	4.72	-6.32***	33.8***	0.00	43.2***
(0, +11)	4.80	-7.35***	33.6***	-0.31	42.6***
(0, +12)	5.23	-8.46***	33.3***	-0.62	42.4***

*** Significant at 1 percent
** Significant at 5 percent
* Significant at 10 percent

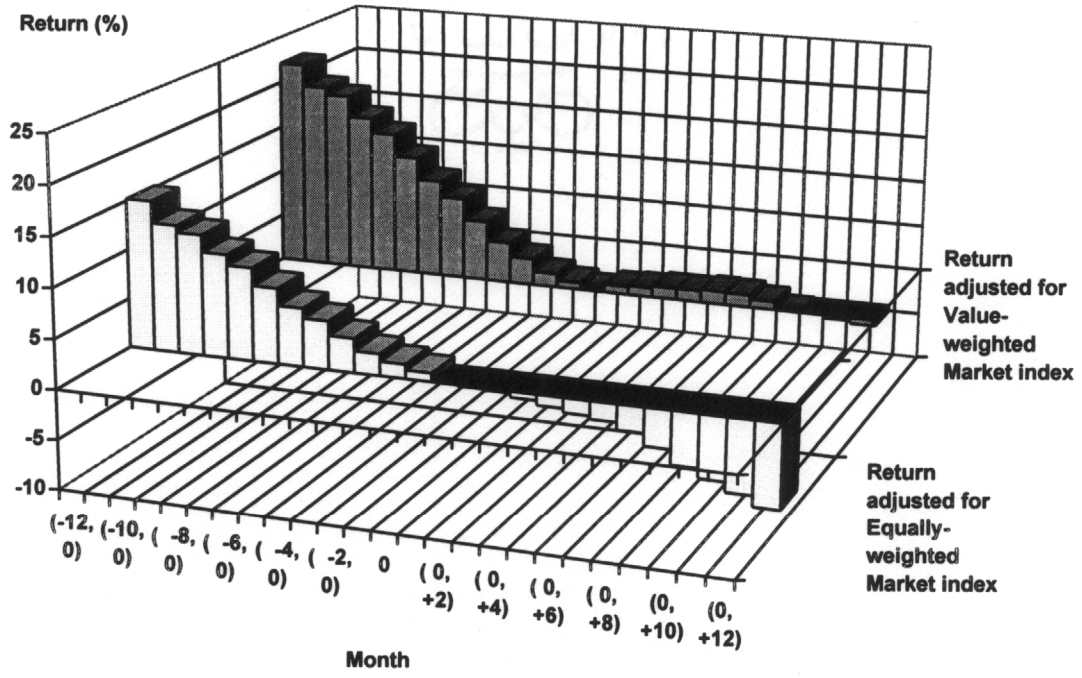

Figure 2. Average market-adjusted returns on the Size-and-Industry-matched Index, 1980-1991. The numbers graphed above are reported in Table III.

Table IV

Average Returns on the Industry-matched Index surrounding Canceled IPOs, 1980-1991

This table illustrates the timing pattern of canceled offerings. 378 canceled IPO filings between 1980-1991 are identified from the weekly editions of Investment Dealer's Digest. Since SIC codes for the majority of these firms are not available from any public source, estimates are used to determine the relevant codes. The estimates are based on company nomenclature. For most of the firms, there is significant ambiguity in regard to actual lines of business. Therefore, these firms are excluded from the examination of the timing of canceled IPOs. Two-digit SIC codes are used for remaining firms in lieu of three-digit codes, as it is difficult to determine the industrial categories precisely. This procedure results in a subsample of only 73 canceled IPO filings. The table shows the performance of Industry-matched-Index surrounding these 73 canceled offerings.

Months relative to the waiting period	Raw Returns	VW Market-adjusted Returns	% Positive
(-12, 0)	39.61	15.76***	61.6*
(-11, 0)	34.78	14.83***	71.2***
(-10, 0)	29.29	12.54***	68.4***
(-9, 0)	23.17	9.91***	69.8***
(-8, 0)	18.98	8.94***	68.4***
(-7, 0)	14.48	7.51***	65.7***
(-6, 0)	8.64	4.65**	60.2*
(-5, 0)	4.74	2.83*	60.2*
(-4, 0)	2.69	1.51	57.5
(-3, 0)	0.57	1.24	58.9
(-2, 0)	-0.37	0.38	49.3
(-1, 0)	-1.54	-0.13	45.2
0	11.07	6.60	64.3**
(0, +1)	-0.21	-0.29	49.3
(0, +2)	-0.30	-1.48*	42.4
(0, +3)	0.46	-2.42**	43.8
(0, +4)	2.23	-2.10	43.8
(0, +5)	5.01	-2.00	41.0
(0, +6)	7.83	-2.11	42.4
(0, +7)	10.27	-1.27	49.3
(0, +8)	12.56	-1.19	49.3
(0, +9)	12.67	-2.49	49.3
(0, +10)	14.80	-2.67	50.6
(0, +11)	18.88	-1.32	53.4
(0, +12)	21.55	-0.84	53.4

Table V

Industry Representation of IPOs When the Sample is Divided into 4 subgroups according to the Number of IPOs Per Industry, 1980-1991

The sample is split into four subgroups of industries so that there are approximately equal number of IPOs in each subgroup. First, all the industries in the sample are ranked according to the number of IPOs per industry. Then, the whole sample is divided into four subgroups. The first subgroup represents the group of industries which has the biggest representation of IPOs in the sample, followed by the second, third, and fourth subgroups.

Subgroup	Industries Represented	Average # IPOs per Industry	Max # of IPOs in any one Industry	Min # of IPOs in any one Industry	# of IPOs in the Group
1st	4	137.7	210	85	551
2nd	13	40.3	83	21	525
3rd	42	12.8	21	8	540
4th	188	2.8	8	1	538

Table VI

Average Returns on the Size-and-Industry-matched Index When the Sample is Divided into Four Subgroups according to the Number of IPOs Per Industry, 1980-1991

This table shows the performance of the Size-and-Industry-matched index for each subgroup when the sample is divided into four subgroups according to the number of IPOs per industry.

Panel A: The First Group of Industries, 1980-1991

Months relative to the waiting period	Raw Returns	VW Market-adjusted Returns	% Positive
(-12, 0)	54.44	23.59***	69.2***
(-11, 0)	51.31	22.13***	66.9***
(-10, 0)	48.32	21.11***	68.0***
(-9, 0)	43.31	18.56***	66.7***
(-8, 0)	38.78	16.45***	66.9***
(-7, 0)	34.00	14.24***	64.9***
(-6, 0)	28.09	11.64***	61.8***
(-5, 0)	22.84	9.81***	60.0***
(-4, 0)	17.29	7.19***	58.9***
(-3, 0)	11.89	5.12***	58.3***
(-2, 0)	7.26	3.32***	57.4***
(-1, 0)	3.58	1.72***	58.5***
0	2.94	1.05***	53.0**
(0, +1)	1.30	0.76***	50.0**
(0, +2)	1.92	1.34***	51.2
(0, +3)	3.03	1.88***	50.1
(0, +4)	2.92	1.77***	45.0**
(0, +5)	3.08	1.64***	44.9**
(0, +6)	4.26	2.06***	45.2**
(0, +7)	5.16	2.17***	43.6***
(0, +8)	5.34	1.92**	44.7**
(0, +9)	5.88	1.46*	44.0***
(0, +10)	6.21	1.42	44.7**
(0, +11)	5.55	0 37	43.4***
(0, +12)	5.74	-0.28	41.8***

Panel B: The Second Group of Industries, 1980-1991

Months relative to the waiting period	Raw Returns	VW Market-adjusted Returns	% Positive
(-12, 0)	52.96	23.70***	62.3***
(-11, 0)	49.30	21.70***	61.5***
(-10, 0)	45.85	20.19***	61.5***
(-9, 0)	41.65	18.31***	62.7***
(-8, 0)	37.78	16.86***	61.9***
(-7, 0)	31.07	13.55***	60.5***
(-6, 0)	25.08	11.32***	60.7***
(-5, 0)	19.60	9.08***	59.3***
(-4, 0)	14.21	6.65***	59.7***
(-3, 0)	9.49	4.18***	59.3***
(-2, 0)	5.41	2.35***	56.4***
(-1, 0)	2.63	0.90***	53.4
0	2.35	0.75	48.3
(0, +1)	-0.03	0.00	49.3
(0, +2)	0.54	0.38	45.1**
(0, +3)	0.55	0.35	43.1***
(0, +4)	0.62	0.39	39.8***
(0, +5)	0.70	0.09	38.4***
(0, +6)	1.35	0.05	38.0***
(0, +7)	1.51	-0.52	37.6***
(0, +8)	1.39	-1.16	37.0***
(0, +9)	1.18	-2.26**	36.2***
(0, +10)	1.12	-2.72**	35.7***
(0, +11)	1.60	-3.10**	34.9***
(0, +12)	1.67	-3.88***	35.5***

Panel C: The Third Group of Industries, 1980-1991

Months relative to the waiting period	Raw Returns	VW Market-adjusted Returns	% Positive
(-12, 0)	49.63	23.91***	60.2***
(-11, 0)	44.08	19.88***	59.1***
(-10, 0)	40.62	18.00***	59.5***
(-9, 0)	37.36	16.92***	60.0***
(-8, 0)	34.24	16.01***	61.2***
(-7, 0)	29.85	14.09***	59.7***
(-6, 0)	25.41	11.61***	58.5***
(-5, 0)	21.53	10.31***	56.2***
(-4, 0)	16.57	8.43***	58.3***
(-3, 0)	10.93	5.40***	56.6***
(-2, 0)	7.48	4.34***	56.2***
(-1, 0)	2.92	1.93***	54.3*
0	2.02	0.4	47.7
(0, +1)	0.62	0.37	45.2**
(0, +2)	1.49	0.85	49.0
(0, +3)	2.62	1.22	48.0
(0, +4)	3.23	1.67*	45.6*
(0, +5)	2.90	1.13	43.5***
(0, +6)	3.32	1.04	46.3
(0, +7)	4.77	1.71	47.7
(0, +8)	5.60	1.51	47.1
(0, +9)	4.98	0.04	45.2**
(0, +10)	5.54	0.00	45.0**
(0, +11)	6.31	0.54	44.6**
(0, +12)	6.33	-0.01	45.0**

Panel D: The Fourth Group of Industries, 1980-1991

Months relative to the waiting period	Raw Returns	VW Market-adjusted Returns	% Positive
(-12, 0)	41.96	14.90***	51.3
(-11, 0)	37.97	13.10***	51.6
(-10, 0)	37.96	15.35***	53.9
(-9, 0)	32.48	11.70***	54.5*
(-8, 0)	28.45	9.90***	53.3
(-7, 0)	24.25	7.98***	53.0
(-6, 0)	19.50	5.78***	54.5*
(-5, 0)	15.35	4.41***	53.0
(-4, 0)	10.28	2.27**	53.0
(-3, 0)	7.67	1.84*	51.3
(-2, 0)	4.10	0.81	50.7
(-1, 0)	2.35	1.15***	53.6
0	2.58	0.82	51.0
(0, +1)	0.77	0.14	47.5
(0, +2)	1.89	0.75	48.6
(0, +3)	1.11	0.16	49.1
(0, +4)	1.64	0.88	48.5
(0, +5)	3.37	2.31*	50.5
(0, +6)	4.52	2.74**	51.4
(0, +7)	5.25	2.16	48.8
(0, +8)	4.93	1.32	50.2
(0, +9)	5.50	1.49	50.0
(0, +10)	6.50	1.87	49.7
(0, +11)	6.23	1.52	50.2
(0, +12)	8.19	2.80*	50.2

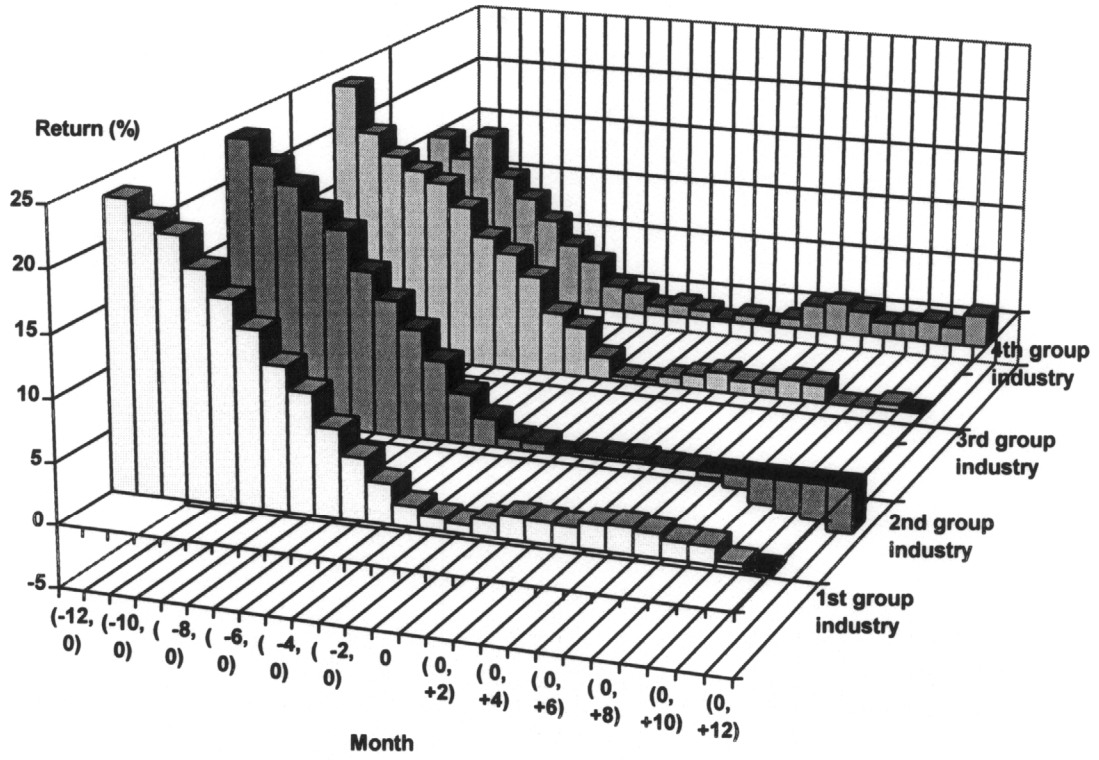

Figure 3. Average VW market-adjusted returns on the Size-and-Industry-matched Index when the Sample is Divided into Four Subgroups according to the Number of IPOs per Industry, 1980-1991. The numbers graphed above are reported in Table V.

Table VII

Average Returns on the Size-and-Industry-matched Index When the Sample Period is Divided into Two Time Intervals

This table shows the performance of the Size-and-Industry-matched index for each subperiod, when the sample is divided into two time periods (1980-1985 and 1986-1991).

Panel A: 1980-1985

Months relative to the waiting period	Raw Returns	VW Market-adjusted Returns	% Positive
(-12, 0)	69.21	32.09***	69.9***
(-11, 0)	62.85	28.43***	68.0***
(-10, 0)	57.01	25.62***	68.0**
(-9, 0)	50.07	22.68***	67.2***
(-8, 0)	43.77	20.42***	67.3***
(-7, 0)	35.87	16.79***	65.2***
(-6, 0)	27.59	12.65***	62.0***
(-5, 0)	21.23	9.98***	59.2***
(-4, 0)	14.92	7.13***	59.7***
(-3, 0)	9.53	4.28***	55.9***
(-2, 0)	5.42	2.49***	51.9
(-1, 0)	2.64	1.29***	53.6**
0	1.71	0.32	48.2
(0, +1)	0.66	0.12	46.9*
(0, +2)	1.20	0.54	45.8***
(0, +3)	1.51	0.45	44.0***
(0, +4)	1.47	0.20	40.0***
(0, +5)	1.42	-0.24	40.0***
(0, +6)	2.15	-0.18	40.2**
(0, +7)	2.43	-0.12	39.1***
(0, +8)	1.72	-0.76	39.4***
(0, +9)	1.51	-1.51*	38.3***
(0, +10)	1.70	-1.64*	38.5***
(0, +11)	1.98	-1.86**	36.9***
(0, +12)	2.11	-2.55***	36.4***

Panel B: 1986-1991

Months relative to the waiting period	Raw Returns	VW Market-adjusted Returns	% Positive
(-12, 0)	31.63	12.01***	53.5**
(-11, 0)	29.93	11.04***	53.2**
(-10, 0)	30.43	12.34***	54.9***
(-9, 0)	28.54	10.89***	56.1***
(-8, 0)	27.07	10.03***	55.9***
(-7, 0)	24.82	8.90***	55.2***
(-6, 0)	22.44	8.28***	56.6***
(-5, 0)	19.28	7.51***	55.9***
(-4, 0)	15.07	5.79***	56.1***
(-3, 0)	10.93	4.41***	57.8***
(-2, 0)	7.08	3.24***	59.3***
(-1, 0)	3.23	1.60***	56.7***
0	3.26	1.21***	51.9
(0, +1)	0.68	0.57**	49.4
(0, +2)	1.67	1.16***	51.4
(0, +3)	2.32	1.52***	51.0
(0, +4)	2.83	2.23***	48.9
(0, +5)	3.48	2.70***	47.7
(0, +6)	4.43	2.98***	49.2
(0, +7)	5.79	2.80***	48.9
(0, +8)	6.84	2.54***	49.2
(0, +9)	7.16	1.74**	48.3
(0, +10)	7.78	1.72**	48.0
(0, +11)	7.66	1.26	48.4
(0, +12)	8.44	1.32	48.6

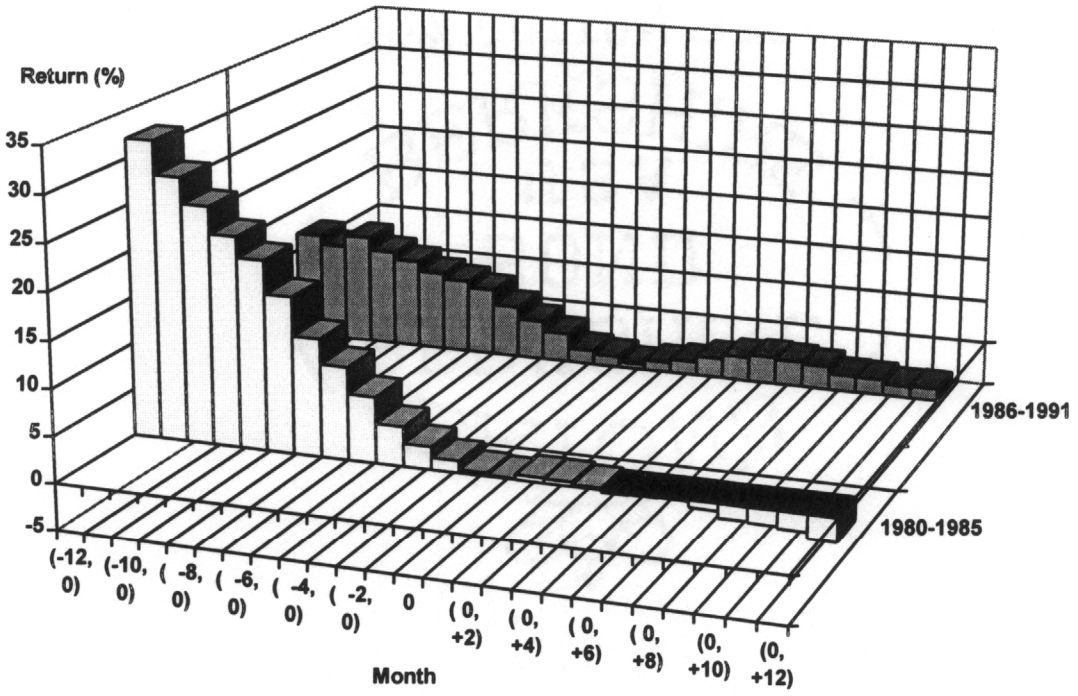

Figure 4. Average VW market-adjusted returns when the sample period is divided into two time intervals. The numbers graphed above are reported in Table VI.

Table VIII

Average Returns on the Industry-matched Index, 1980-1991

This table shows the performance of the Industry-matched Index surrounding IPOs. This index is composed of all firms in the same industry that have been listed on the NASDAQ for at least three years, as of the IPO filing date.

Months relative to the waiting period	Raw Returns	VW Market-adjusted Returns	% Positive
(-12, 0)	38.52	10.21***	53.4***
(-11, 0)	36.16	9.68***	53.1***
(-10, 0)	34.70	10.10***	54.5***
(-9, 0)	31.79	9.43***	53.9***
(-8, 0)	29.09	9.07***	53.9***
(-7, 0)	25.25	7.87***	54.2***
(-6, 0)	20.81	6.37***	53.2***
(-5, 0)	16.78	5.30***	53.1***
(-4, 0)	12.54	4.04***	53.6***
(-3, 0)	8.59	2.71***	53.0***
(-2, 0)	5.04	1.62***	51.6
(-1, 0)	2.30	0.80***	52.3**
0	1.85	0.12	47.5**
(0, +1)	0.79	0.42**	48.6
(0, +2)	1.49	0.89***	47.3**
(0, +3)	2.09	1.18***	46.8***
(0, +4)	2.27	1.29***	45.1***
(0, +5)	2.46	1.14***	43.9***
(0, +6)	3.26	1.28***	43.7***
(0, +7)	3.90	1.04**	43.2***
(0, +8)	4.30	0.85*	44.1***
(0, +9)	4.69	0.44	43.4***
(0, +10)	5.38	0.60	43.7***
(0, +11)	5.58	0.36	43.7***
(0, +12)	6.03	0.09	44.5***

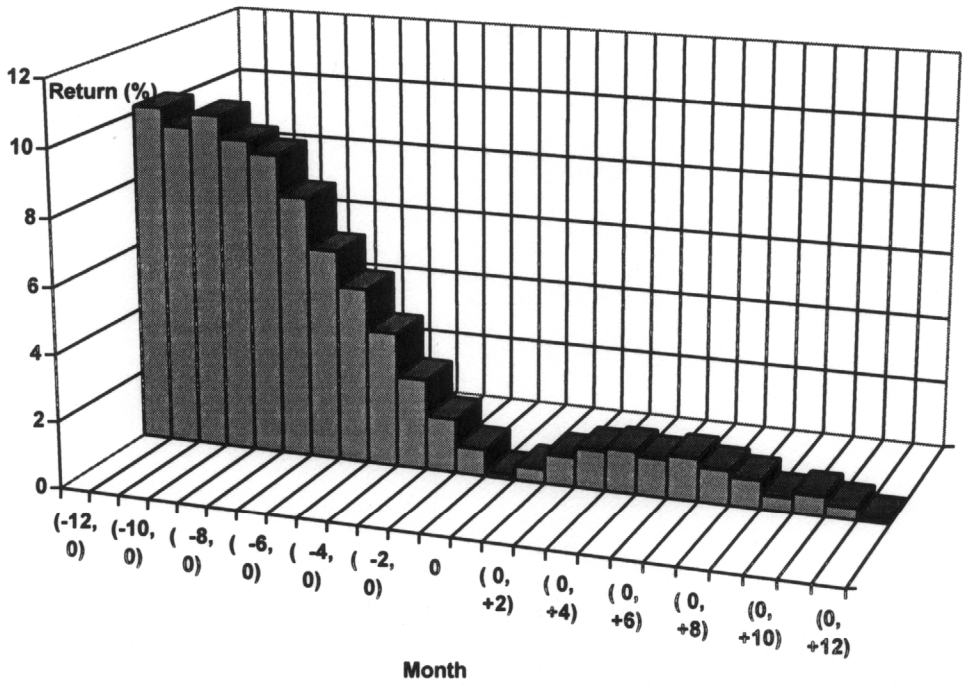

Figure 5. Average VW market-adjusted returns on the Industry-matched Index from 12 months before until 12 months after IPOs, 1980-1991. The numbers graphed above are reported in Table VII.

Table IX

Description of Underwriters

The IPO sample period is first divided into two time intervals, 1980-1985 and 1986-1991. Then, investment banks are ranked within each sub-period by the number of offerings they brought to the market. If an IPO has more than one lead underwriter, the first underwriter listed in the Investment Dealer's Digest is given full credit for the issue. Within each period, the banks are further partitioned into two subgroups at the median of the distribution of the number of offerings. Within each period, the top 50% of underwriters are referred to as the first-tier investment bank group, and the bottom 50% constitutes the second-tier group.

Panel A: Underwriter Representation of IPOs

Panel A1: 1980-1985

Subgroup	Underwriters represented (%)	Average # IPOs per Underwriter	Max # of IPOs in any one Underwriter	Min # of IPOs in any one Underwriter	# of IPOs in the Group (%)
1st	22 (11.7%)	24.4	53	14	537 (49.9%)
2nd	167 (88.3%)	3.2	13	1	540 (50.1%)
Total	189 (100%)				1077 (100%)

Panel A2: 1986-1991

Subgroup	Underwriters represented (%)	Average # IPOs per Underwriter	Max # of IPOs in any one Underwriter	Min # of IPOs in any one Underwriter	# of IPOs in the Group (%)
1st	14 (7.4%)	37.2	79	21	521 (48.4%)
2nd	177 (92.6%)	3.1	17	1	556 (51.6%)
Total	191 (100%)				1077 (100%)

Panel B: Rankings of Underwriters

Panel B1: 1980-1985

Rank	Underwriter	# offerings	%	Offering Amount ($mil.)	Accumulated # Offerings
1	L F Rothschild	53	4.9	1411	53
2	D H Blair & Co	43	4.0	184	96
3	Prudential Bache	38	3.5	931	134
4	Kidder Peabody	34	3.2	864	168
5	Alex Brown and Sons	33	3.0	685	201
6	Drexel Burnham	32	3.0	626	233
7	Sherason Lehman	31	2.9	875	264
8	Hambrecht & Quist	26	2.4	426	290
9	Goldman Sachs & Co	23	2.1	755	313
10	Merrill Lynch	23	2.1	748	336
11	Dean Witter Reynolds	20	1.9	388	356
12	Rooney Pace Inc	19	1.8	88	375
13	Bear Stearns	18	1.7	171	393
14	Donaldson Lufkin	18	1.7	302	411
15	E.F.Hutton Co & Inc	18	1.7	337	429
16	Morgan Stanley	18	1.7	929	447
17	Laidlaw Adams	17	1.6	93	464
18	Ladenburg Thalmann	15	1.4	105	479
19	Lehman Brothers	15	1.4	529	494
20	Smith Barney Harris	15	1.4	270	509
21	Advest Inc	14	1.3	72	523
22	Paulson Investment	14	1.3	53	537

Panel B2: 1986-1991

Rank	Underwriter	# offerings	%	Offering Amount ($mil.)	Accumulated # Offerings
1	Alex Brown and Sons	79	7.3	2008	79
2	Goldman Sachs & Co	51	4.7	4574	130
3	Merrill Lynch	49	4.6	4541	179
4	Drexel Burnham	47	4.4	1729	226
5	Morgan Stanley	40	3.7	1581	266
6	Paine Webber	39	3.6	1063	305
7	Kidder Peabody	34	3.1	1206	339
8	Smith Barney	32	3.0	1044	371
9	First Boston	30	2.8	2434	401
10	Shearson Lehman	27	2.5	1829	428
11	Robertson Colman	26	2.4	605	454
12	Montgomery Securities	24	2.2	626	478
13	Donaldson Lufkin	22	2.0	1193	500
14	Hambrecht & Quist	21	2.0	473	521

Table X

Differences in the Timing Patterns of IPOs Underwritten by Different Groups of Underwriters, 1980-1991

This table depicts the timing patterns of IPOs underwritten by the first-tier and second-tier investment bank groups. IPO timing is measured by the performance of the Size-and-Industry-matched index surrounding IPOs. The VW market-adjusted return is employed to assess the performance of the index.

Months relative to the waiting period	Market-adjusted Returns of Top 50% Group	Market-adjusted Returns of Bottom 50% Group	T-test of difference	% positive of Top 50%t Group	% positive of Bottom 50% Group	Sign test of difference
(-12, 0)	26.93	17.42	***	68.7	55.0	***
(-11, 0)	24.90	14.83	***	66.8	54.7	***
(-10, 0)	23.70	14.46	***	67.6	55.5	***
(-9, 0)	20.38	13.36	***	67.5	56.0	***
(-8, 0)	17.94	12.64	***	67.3	56.1	***
(-7, 0)	15.29	10.51	***	64.9	55.6	***
(-6, 0)	12.32	8.68	***	64.7	54.1	***
(-5, 0)	10.34	7.21	**	62.2	53.0	***
(-4, 0)	7.63	5.32	**	62.8	53.1	***
(-3, 0)	5.39	3.32	***	61.2	52.6	***
(-2, 0)	3.55	2.18	**	60.1	51.2	***
(-1, 0)	1.85	1.05	**	58.2	52.2	***
0	1.54	0.00	***	54.8	45.4	***
(0, +1)	0.50	0.18		48.4	47.9	
(0, +2)	1.52	0.19	**	50.4	46.7	*
(0, +3)	1.77	0.22	**	49.5	45.6	
(0, +4)	2.30	0.14	***	47.2	41.7	**
(0, +5)	2.64	-0.17	***	48.1	39.7	***
(0, +6)	3.08	-0.26	***	49.4	40.1	***
(0, +7)	3.42	-0.71	***	48.7	39.4	***
(0, +8)	3.28	-1.47	***	48.5	40.1	***
(0, +9)	2.73	-2.46	***	48.2	38.5	***
(0, +10)	2.48	-2.37	***	48.3	38.3	***
(0, +11)	2.12	-2.68	***	46.8	38.6	***
(0, +12)	1.51	-2.71	***	46.1	38.8	**

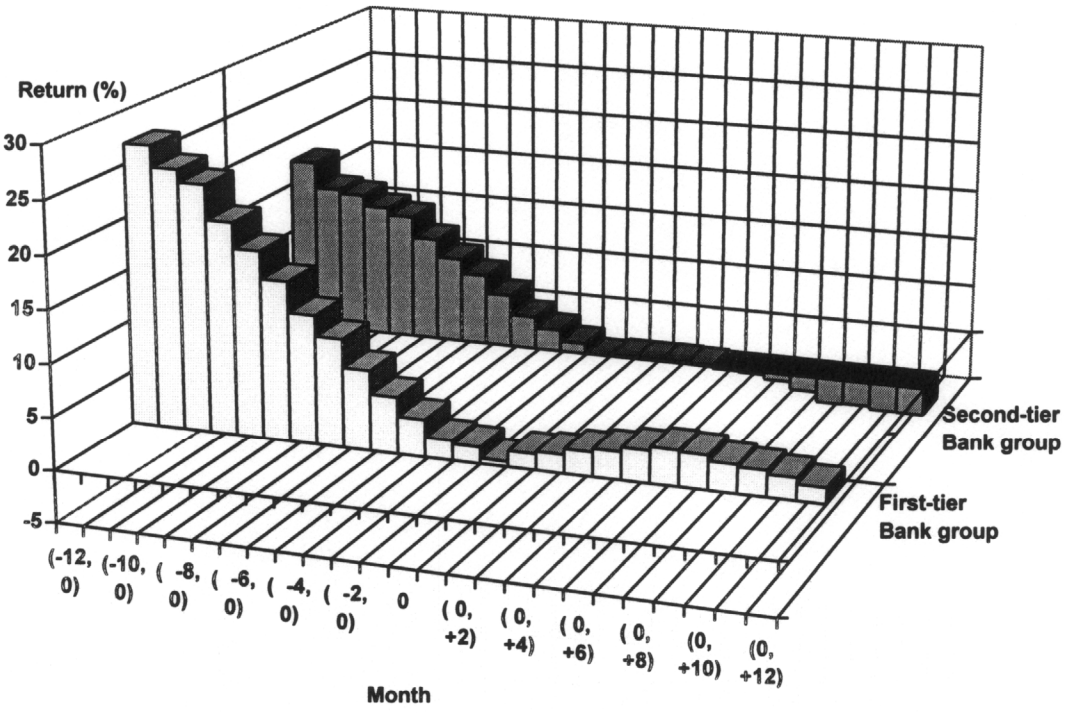

Figure 6. Average VW market-adjusted returns on the Size-and-Industry-matched Index when the sample is divided into two groups of underwriters, 1980-1991. The numbers graphed above are reported in Table X.

Table XI

Test of Differences in the Waiting-Period Timing Patterns of IPOs Underwritten by Different Underwriter Groups, Contingent upon Pre-filing Market Conditions

The whole sample is first divided into two subgroups. This is done, depending on whether the one-month pre-filing excess returns on the Size-and-Industry-matched Index are positive or negative. Within each subgroup, a comparison is then made between the performance of the first-tier and second-tier investment bank groups. This comparison is made in regard to the waiting period excess returns on the index, for each sample subgroup. The VW market-adjusted return is employed to measure excess returns.

Panel A: When Excess Returns over the Period (-1, 0) are Positive

Periods relative to the waiting period	Market-adjusted Returns of the First group	Market-adjusted Returns of the Second group	T-test of difference	% positive of the First group%	% positive of the Second group	Sign test of difference
(-1, 0)	6.17	6.17		100.0	100.0	
0	2.15	0.58	**	56.2	47.3	***
(0, +1)	0.51	0.43		49.2	48.3	

Panel B: When Excess Returns over the Period (-1, 0) are Negative

Periods relative to the waiting period	Market-adjusted Return of the First group	Market-adjusted Return of the Second group	T-test of difference	% positive of the First group%	% positive of the Second group	Sign test of difference
(-1, 0)	-4.15	-4.54		0	0	
0	0.71	-0.61	*	52.8	43.5	**
(0, +1)	0.50	-0.07		47.4	47.6	

Table XII

Differences in the Timing Performance of Different Groups of Underwriters
(Using Average deal size and C/M as a reputation measure)

This table shows the timing patterns of IPOs underwritten by the first-tier and second-tier investment bank groups, when average deal-size and the Carter/Manaster (C/M) ranking system are employed as proxies for underwriter reputation. An average-deal size is defined as the total dollar value of IPO offerings underwritten by an investment bank, divided by the number of IPO deals made by that bank. Investment banks are divided according to the median of the average deal-size variable. Those investment banks with an average-deal size above or equal to the median are included in the first-tier investment bank group, and the remaining investment banks are allocated to the second-tier group. A comparison is made between the performance of the first-tier and second-tier investment bank groups during the waiting period. The VW market-adjusted return on the Size-and-Industry-matched Index is employed to measure performance.

Bank Classification	Market-adjusted Return of 1st Group	Market-adjusted Return of 2nd Group	T-test of difference	% positive of 1st Group	% positive of 2nd Group	Sign test of difference
Averge Deal-Size	1.70	-0.14	***	55.6	44.6	***
C/M	1.39	0.28	**	54.5	46.6	***

Table XIII

Probit Regressions of the Waiting Period Market-adjusted Return

To verify the robustness of the role of underwriters in timing, probit regressions are employed. The dependent variable assumes a value of one if IPOs are associated with positive VW market-adjusted (waiting period) returns on the Size-and-Industry-matched Index, and 0 if related to negative market-adjusted returns. As for independent variables, Group represents a zero-one dummy variable for underwriters. For the first-tier group of underwriters, this variable takes the value of one, and for the second group, the value is zero. Regression results are also reported using a continuous variable for investment bank reputation, as opposed to a zero-one dummy variable. A firm size variable is used as a control variable, under the presumption that managerial timing is directly related to firm size. The regression procedures are carried out both by including and excluding IPO firm size as the control variable. First, the number of offerings is employed as a proxy for investment bank reputation. Second, the average deal-size is also used as a measure for reputation. (Asymptotic p-values are in parentheses)

Panel A: Using the Number of Offerings as a Proxy for Investment Bank Reputation

No	Intercept	Group	Log(count)	Firm size	Log-likelihood	Model p-value
1	-0.12***	0.24***			-1290	0.000
	(0.00)	(0.00)				
2	-0.29***		0.18***		-1287	0.092
	(0.00)		(0.00)			
3	-0.14***	0.20***		0.01**	-1288	0.000
	(0.00)	(0.00)		(0.03)		
4	-0.29***		0.10***	0.01*	-1285	0.000
	(0.00)		(0.00)	(0.06)		

Panel B: Using Average Deal-size as a Proxy for Investment Bank Reputation

No	Intercept	Log(average deal size)	Firm size	Log-likelihood	Model p-value
1	-1.22***	0.12***		-1289	0.000
	(0.00)	(0.00)			
2	-1.08***	0.10***	0.01	-1288	0.000
	(0.00)	(0.00)	(0.14)		

Appendix

(This appendix contains empirical results obtained from the usage of equally-weighted market-adjusted returns)

Table A-VI

Average Returns on the Size-and-Industry-matched Index When the Sample is Divided into Four Subgroups according to the Number of IPOs Per Industry, 1980-1991

This table shows the performance of the Size-and-Industry-matched index for each subgroup when the sample is divided into four subgroups according to the number of IPOs per industry.

Panel A: The First Group of Industries, 1980-1991

Months relative to the waiting period	Raw Returns	EW Market-adjusted Returns	% Positive
(-12, 0)	54.44	15.45***	62.0***
(-11, 0)	51.31	14.07***	61.4***
(-10, 0)	48.32	13.20***	60.1***
(-9, 0)	43.31	11.11***	57.4***
(-8, 0)	38.78	9.68***	57.4***
(-7, 0)	34.00	8.19***	57.0***
(-6, 0)	28.09	6.40***	53.6*
(-5, 0)	22.84	5.22***	50.3
(-4, 0)	17.29	3.68***	48.9
(-3, 0)	11.89	2.54**	48.5
(-2, 0)	7.26	1.67***	50.0
(-1, 0)	3.58	1.02***	54.3**
0	2.94	0.16	48.7
(0, +1)	1.30	0.00	47.2
(0, +2)	1.92	-0.17	42.9***
(0, +3)	3.03	-0.21	40.7***
(0, +4)	2.92	-1.12**	34.9***
(0, +5)	3.08	-1.72***	35.2***
(0, +6)	4.26	-1.91***	33.6***
(0, +7)	5.16	-2.68***	33.4***
(0, +8)	5.34	-3.88***	31.0***
(0, +9)	5.88	-5.23***	29.8***
(0, +10)	6.21	-6.38***	29.2***
(0, +11)	5.55	-8.27***	28.5***
(0, +12)	5.74	-9.89***	26.7***

*** Significant at 1 percent
** Significant at 5 percent
* Significant at 10 percent

Panel B: The Second Group of Industries, 1980-1991

Months relative to the waiting period	Raw Returns	EW Market-adjusted Returns	% Positive
(-12, 0)	52.96	16.58***	58.3***
(-11, 0)	49.30	14.83***	56.8***
(-10, 0)	45.85	13.38***	58.3***
(-9, 0)	41.65	12.09***	57.5***
(-8, 0)	37.78	11.18***	56.0***
(-7, 0)	31.07	8.27***	55.0**
(-6, 0)	25.08	6.59***	53.2
(-5, 0)	19.60	5.25***	51.6
(-4, 0)	14.21	3.94***	51.2
(-3, 0)	9.49	2.46***	51.8
(-2, 0)	5.41	1.30***	46.3
(-1, 0)	2.63	0.52*	48.3
0	2.35	-0.07	47.5
(0, +1)	-0.03	-0.52**	43.7***
(0, +2)	0.54	-0.57**	43.1***
(0, +3)	0.55	-1.17**	36.4***
(0, +4)	0.62	-1.77***	33.1***
(0, +5)	0.70	-2.43***	33.7***
(0, +6)	1.35	-2.81***	33.3***
(0, +7)	1.51	-3.99***	32.7***
(0, +8)	1.39	-5.41***	30.5**
(0, +9)	1.18	-7.08***	29.9***
(0, +10)	1.12	-8.36***	28.5***
(0, +11)	1.60	-9.30***	29.9***
(0, +12)	1.67	-10.74***	28.9***

Panel C: The Third Group of Industries, 1980-1991

Months relative to the waiting period	Raw Returns	EW Market-adjusted Returns	% Positive
(-12, 0)	49.63	17.59***	54.9**
(-11, 0)	44.08	13.53***	51.7
(-10, 0)	40.62	11.74***	53.6
(-9, 0)	37.36	10.96***	53.4
(-8, 0)	34.24	10.44***	56.6***
(-7, 0)	29.85	9.09***	53.6
(-6, 0)	25.41	7.43***	51.5
(-5, 0)	21.53	6.81***	50.7
(-4, 0)	16.57	5.47***	51.7
(-3, 0)	10.93	3.21***	52.6
(-2, 0)	7.48	2.85***	51.7
(-1, 0)	2.92	1.27***	49.8
0	2.02	-0.22	46.9
(0, +1)	0.62	-0.01	41.9***
(0, +2)	1.49	-0.08	44.3**
(0, +3)	2.62	-0.21	44.0***
(0, +4)	3.23	-0.49	42.9***
(0, +5)	2.90	-1.55	42.3***
(0, +6)	3.32	-2.36*	41.8***
(0, +7)	4.77	-2.41*	42.3***
(0, +8)	5.60	-3.26**	42.1***
(0, +9)	4.98	-5.49***	38.7***
(0, +10)	5.54	-6.58***	37.4***
(0, +11)	6.31	-6.81***	37.0***
(0, +12)	6.33	-8.37***	37.8***

Panel D: The Fourth Group of Industries

Months relative to the waiting period	Raw Returns	EW Market-adjusted Returns	% Positive
(-12, 0)	41.96	9.32***	48.0
(-11, 0)	37.97	7.60**	45.7
(-10, 0)	37.96	9.74**	48.0
(-9, 0)	32.48	6.64**	48.9
(-8, 0)	28.45	5.14**	48.9
(-7, 0)	24.25	3.80	49.2
(-6, 0)	19.50	2.10	49.2
(-5, 0)	15.35	1.36	47.5
(-4, 0)	10.28	-0.31	45.7
(-3, 0)	7.67	-0.00	48.3
(-2, 0)	4.10	-0.46	44.8*
(-1, 0)	2.35	0.61	51.6
0	2.58	0.16	48.6
(0, +1)	0.77	-0.01	46.3
(0, +2)	1.89	0.29	48.0
(0, +3)	1.11	-0.81	45.0*
(0, +4)	1.64	-0.70	44.4**
(0, +5)	3.37	0.42	47.3
(0, +6)	4.52	0.64	47.9
(0, +7)	5.25	-0.35	42.3***
(0, +8)	4.93	-1.98	41.8***
(0, +9)	5.50	-2.75*	43.5**
(0, +10)	6.50	-2.86*	43.8**
(0, +11)	6.23	-3.72**	42.3***
(0, +12)	8.19	-2.91*	44.1**

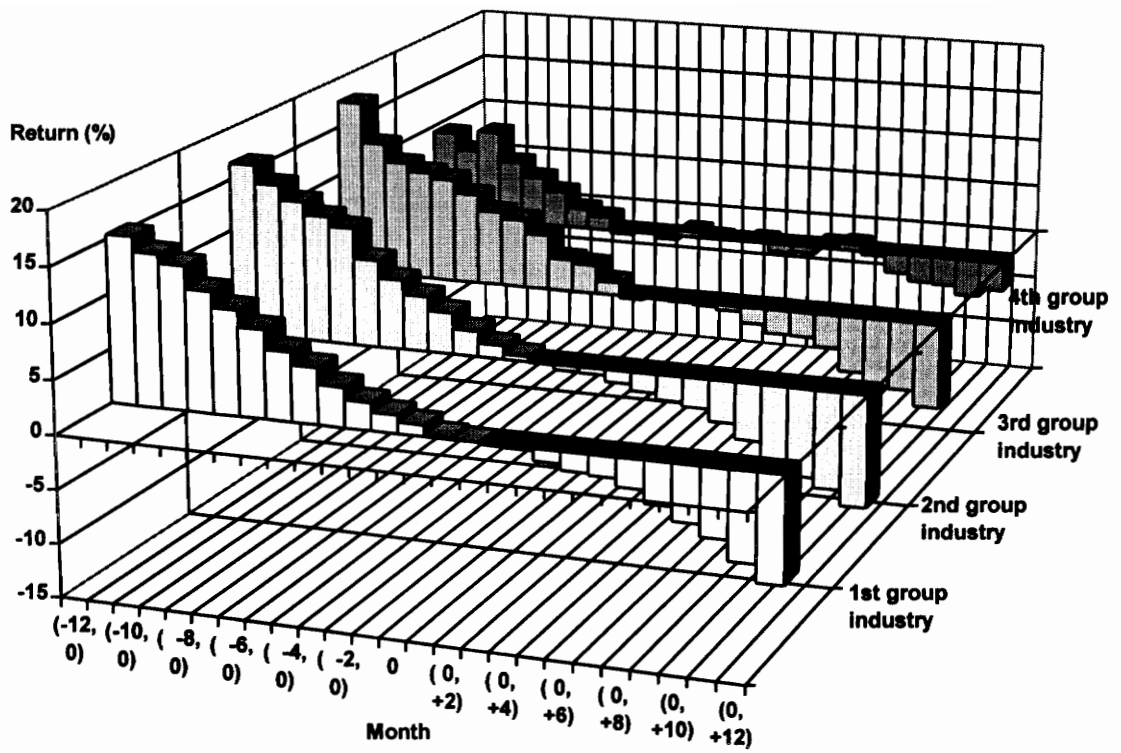

Figure A-3. Average EW market-adjusted returns on the Size-and-Industry-matched Index when the Sample is Divided into Four Subgroups according to the Number of IPOs per Industry, 1980-1991. The numbers graphed above are reported in Table A-V.

Table A-VII

Average Returns on the Size-and-Industry-matched Index When the Sample Period is Divided into Two Time Intervals

This table shows the performance of the Size-and-Industry-matched index for each subperiod, when the sample period is divided into two time periods (1980-1985 and 1986-1991).

Panel A: 1980-1985

Months relative to the waiting period	Raw Returns	EW Market-adjusted Returns	% Positive
(-12, 0)	69.21	23.28***	65.6***
(-11, 0)	62.85	19.85***	62.4***
(-10, 0)	57.01	17.31***	62.6***
(-9, 0)	50.07	15.19***	60.6***
(-8, 0)	43.77	13.62***	61.1***
(-7, 0)	35.87	10.73***	59.4***
(-6, 0)	27.59	7.49***	55.4***
(-5, 0)	21.23	5.92***	52.3
(-4, 0)	14.92	4.20***	51.3
(-3, 0)	9.53	2.43***	51.0
(-2, 0)	5.42	1.30***	46.0**
(-1, 0)	2.64	0.87***	50.0
0	1.71	0.20	48.5
(0, +1)	0.66	-0.10	45.0***
(0, +2)	1.20	0.03	45.7***
(0, +3)	1.51	-0.15	41.8***
(0, +4)	1.47	-0.50	38.3***
(0, +5)	1.42	-0.87	39.9***
(0, +6)	2.15	-0.72	39.8***
(0, +7)	2.43	-0.69	39.0***
(0, +8)	1.72	-1.23	38.4***
(0, +9)	1.51	-1.74**	38.1**
(0, +10)	1.70	-1.73**	38.6***
(0, +11)	1.98	-1.60*	39.0***
(0, +12)	2.11	-1.92**	39.5***

Panel B: 1986-1991

Months relative to the waiting period	Raw Returns	EW Market-adjusted Returns	% Positive
(-12, 0)	31.63	6.98***	47.6
(-11, 0)	29.93	5.98***	47.2*
(-10, 0)	30.43	7.12***	48.9
(-9, 0)	28.54	5.79***	49.1
(-8, 0)	27.07	5.23***	49.3
(-7, 0)	24.82	4.51***	48.9
(-6, 0)	22.44	4.35***	48.9
(-5, 0)	19.28	3.93***	48.1
(-4, 0)	15.07	2.74***	48.0
(-3, 0)	10.93	2.02***	49.8
(-2, 0)	7.08	1.66***	51.0
(-1, 0)	3.23	0.88***	52.1
0	3.26	-0.20	47.3
(0, +1)	0.68	-0.11	44.5***
(0, +2)	1.67	-0.38	42.8***
(0, +3)	2.32	-1.01**	40.5***
(0, +4)	2.83	-1.63***	38.0***
(0, +5)	3.48	-2.09***	37.7***
(0, +6)	4.43	-2.90***	36.6***
(0, +7)	5.79	-4.41***	35.1***
(0, +8)	6.84	-6.40***	32.9***
(0, +9)	7.16	-9.00***	31.0***
(0, +10)	7.78	-10.99***	28.9***
(0, +11)	7.66	-13.18***	28.0***
(0, +12)	8.44	-15.10***	27.0***

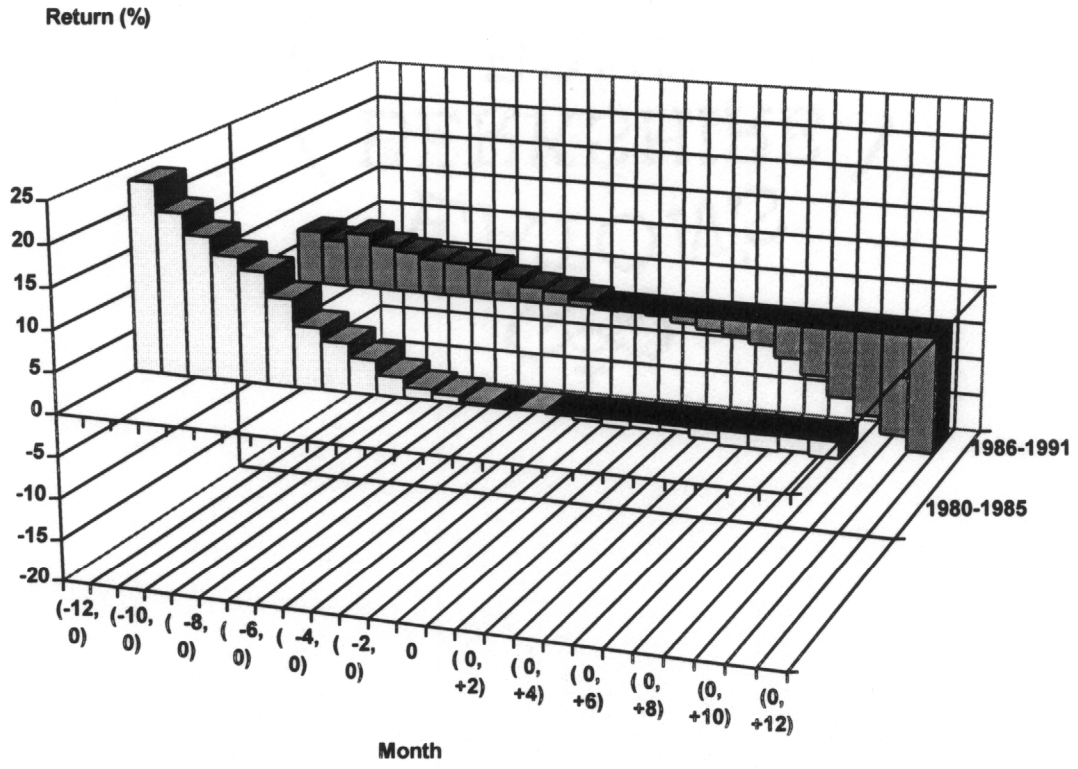

Figure A-4. Average EW market-adjusted returns when the sample period is divided into two time intervals. The numbers graphed above are reported in Table A-VI.

Table A-VIII

Average Returns on the Industry-matched Index, 1980-1991

This table shows the performance of the Industry-matched Index surrounding IPOs. This index is composed of all firms in the same industry that have been listed on the NASDAQ for at least three years.

Months relative to the waiting period	Raw Returns	EW Market-adjusted Returns	% Positive
(-12, 0)	38.52	3.40***	47.9*
(-11, 0)	36.16	2.96***	46.6***
(-10, 0)	34.70	3.46***	47.2**
(-9, 0)	31.79	3.25***	47.5**
(-8, 0)	29.09	3.38***	47.4**
(-7, 0)	25.25	2.75***	46.7***
(-6, 0)	20.81	1.91***	46.7***
(-5, 0)	16.78	1.57***	46.3***
(-4, 0)	12.54	1.10***	45.0***
(-3, 0)	8.59	0.63**	44.8***
(-2, 0)	5.04	0.27	45.3***
(-1, 0)	2.30	0.24*	48.4
0	1.85	-0.65***	42.8***
(0, +1)	0.79	-0.01	44.8***
(0, +2)	1.49	-0.11	42.4***
(0, +3)	2.09	-0.35	39.3***
(0, +4)	2.27	-0.91***	37.5***
(0, +5)	2.46	-1.47***	36.3***
(0, +6)	3.26	-1.84***	36.5***
(0, +7)	3.90	-2.73***	35.8***
(0, +8)	4.30	-3.70***	34.8***
(0, +9)	4.69	-4.85***	34.5***
(0, +10)	5.38	-5.56***	33.5***
(0, +11)	5.58	-6.47***	34.0***
(0, +12)	6.03	-7.50***	34.1***

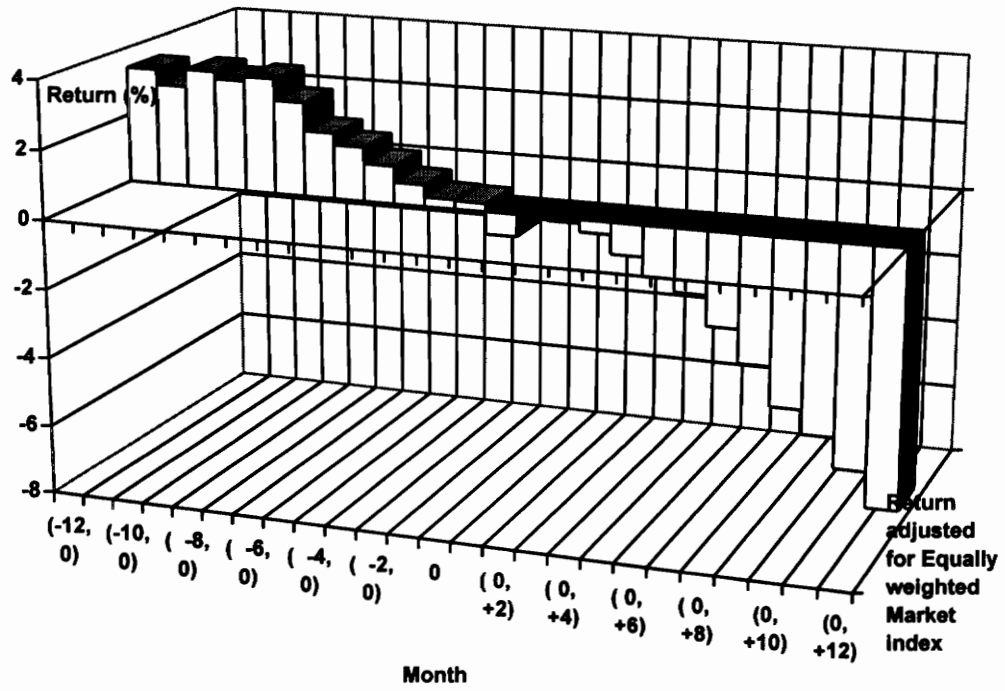

Figure A-5. Average EW market-adjusted returns on the Industry-matched Index from 12 months before until 12 months after IPOs, 1980-1991. The numbers graphed above are reported in Table A-VII.

Table A-X

Differences in the Timing Patterns of IPOs Underwritten by Different Groups of Underwriters, 1980-1991

This table depicts the timing patterns of IPOs underwritten by the first-tier and second-tier investment bank groups. IPO timing is measured by the performance of the Size-and-Industry-matched index surrounding IPOs. The EW market-adjusted return is employed to assess the performance of the index.

Months relative to the waiting period	Market-adjusted Return of the First group	Market-adjusted Return of the Second group	T-test of difference	% positive of the First group	% positive of the Second group	Sign test of difference
(-12, 0)	19.53	10.94	***	62.7	50.8	***
(-11, 0)	17.57	8.47	***	60.5	49.3	***
(-10, 0)	16.40	8.20	***	61.7	50.1	***
(-9, 0)	13.58	7.54	***	61.0	48.9	***
(-8, 0)	11.78	7.18	**	60.4	50.3	***
(-7, 0)	9.72	5.61	**	59.1	49.4	***
(-6, 0)	7.42	4.48	**	56.6	47.8	***
(-5, 0)	6.10	3.78	*	54.2	46.4	***
(-4, 0)	4.26	2.71	*	53.8	45.6	***
(-3, 0)	2.97	1.49	**	54.9	46.0	***
(-2, 0)	1.89	1.08		51.5	45.5	**
(-1, 0)	1.14	0.62		54.5	47.6	***
0	0.75	-0.73	***	51.5	44.4	***
(0, +1)	0.00	-0.21		46.0	43.6	
(0, +2)	0.26	-0.59	*	44.9	43.6	
(0, +3)	0.03	-1.18	*	41.8	40.5	
(0, +4)	-0.25	-1.85	**	39.0	37.4	
(0, +5)	-0.42	-2.50	**	41.5	36.2	
(0, +6)	-0.48	-3.09	***	41.8	34.7	**
(0, +7)	-0.88	-4.15	***	41.5	32.8	***
(0, +8)	-1.90	-5.63	***	40.1	31.4	**
(0, +9)	-3.42	-7.21	***	39.4	29.9	***
(0, +10)	-4.72	-7.89	***	36.9	30.7	***
(0, +11)	-5.81	-8.84	**	37.2	30.0	**
(0, +12)	-7.23	-9.67	*	35.3	31.4	

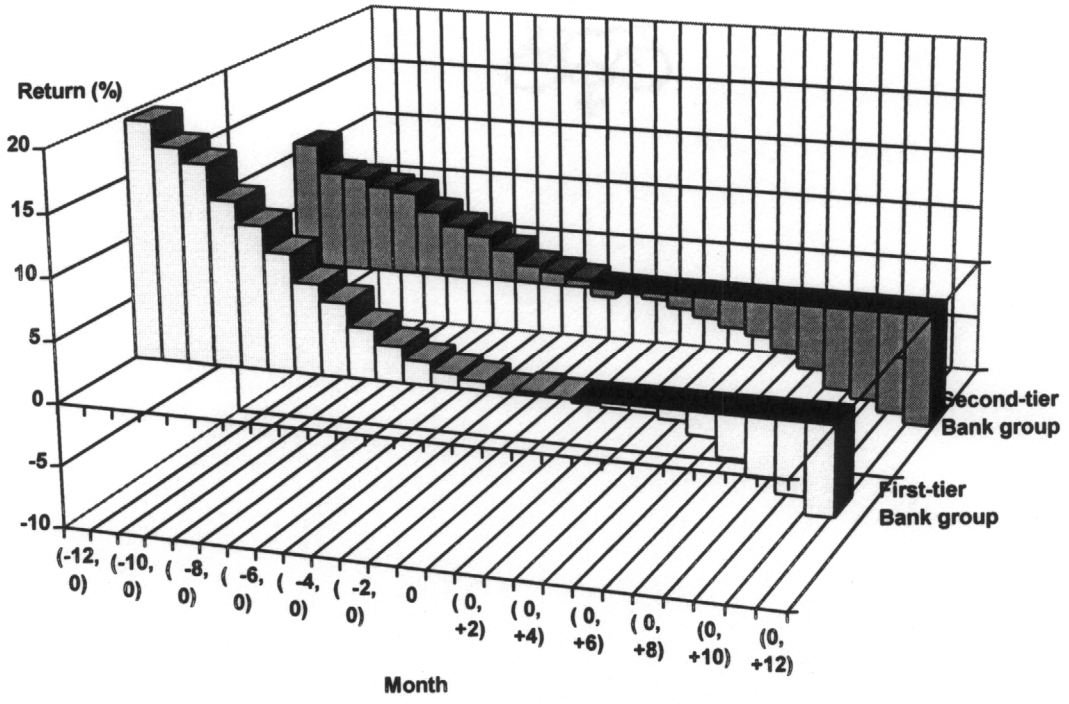

Figure A-6. Average EW market-adjusted returns on the Size-and-Industry-matched Index when the sample is divided into two groups of underwriters, 1980-1991. The numbers graphed above are reported in Table A-X.

Table A-XI

Test of Differences in the Waiting-Period Timing Patterns of IPOs Underwritten by Different Underwriter Groups, Contingent upon Pre-filing Market Conditions

The whole sample is first divided into two subgroups. This is done, depending on whether the one-month pre-filing excess returns on the Size-and-Industry-matched Index are positive or negative. Within each subgroup, a comparison is then made between the performance of the first-tier and second-tier investment bank groups. This comparison is made in regard to the waiting period excess returns on the index, for each sample subgroup. The EW market-adjusted return is employed to measure excess returns.

Panel A: When Excess Returns over the Period (-1, 0) are Positive

Months relative to the waiting period	Market-adjusted Return of the First group	Market-adjusted Return of the Second group	T-test of difference	% positive of the First group%	% positive of the Second group	Sign test of difference
(-1, 0)	5.81	6.15		100	100	
0	1.15	-0.21	**	53.8	44.2	***
(0, +1)	0.10	0.02		47.7	44.2	

Panel B: When Excess Returns over the Period (-1, 0) are Negative

Months relative to the waiting period	Market-adjusted Return of the First group	Market-adjusted Return of the Second group	T-test of difference	% positive of the First group%	% positive of the Second group	Sign test of difference
(-1, 0)	-4.47	-4.42		0	0	
0	0.22	-1.21	*	48.6	44.5	*
(0, +1)	-0.13	-0.44		43.9	43.0	

Table A-XII

Differences in the Timing Performance of Different Groups of Underwriters
(Using Average deal size and C/M as a reputation measure)

This table shows the timing patterns of IPOs underwritten by the first-tier and second-tier investment bank groups, when average deal-size and the Carter/Manaster (C/M) ranking system are employed as proxies for underwriter reputation. An average-deal size is defined as the total dollar value of IPO offerings underwritten by an investment bank, divided by the number of IPO deals made by that bank. Investment banks are divided according to the median of the average deal-size variable. Those investment banks with an average-deal size above or equal to the median are included in the first-tier investment bank group, and the remaining investment banks are allocated to the second-tier group. A comparison is made between the performance of the first-tier and second-tier investment bank groups during the waiting period. The EW market-adjusted return on the Size-and-Industry-matched Index is employed to measure performance.

Bank Classification	Market-adjusted Return of 1st Group	Market-adjusted Return of 2nd Group	T-test of difference	% positive of 1st Group	% positive of 2nd Group	Sign test of difference
Averge Deal Size	0.64	-0.65	***	51.3	44.6	***
C/M	0.46	-0.36		50.4	46.0	*

Table A-XIII

Probit Regressions of the Waiting Period Market-adjusted Return

To verify the robustness of the role of underwriters in timing, probit regressions are employed. The dependent variable assumes a value of one if IPOs are associated with positive EW market-adjusted (waiting period) returns on the Size-and-Industry-matched Index, and 0 if related to negative market-adjusted returns. As for independent variables, Group represents a zero-one dummy variable for underwriters. For the first-tier group of underwriters, this variable takes the value of one, and for the second group, the value is zero. Regression results are also reported using a continuous variable for investment bank reputation, as opposed to a zero-one dummy variable. A firm size variable is used as a control variable, under the presumption that managerial timing is directly related to firm size. The regression procedures are carried out both by including and excluding IPO firm size as the control variable. First, the number of offerings is employed as a proxy for investment bank reputation. Second, the average deal-size is also used as a measure for reputation. (Asymptotic p-values are in parentheses)

Panel A: Using the number of offerings as a proxy for investment bank reputation

No	Intercept	Group	Log(count)	Firm size	Log-likelihood	Model p-value
1	-0.14***	0.17***			-1291	0.000
	(0.00)	(0.00)				
2	-0.26***		0.08***		-1290	0.157
	(0.00)		(0.00)			
3	-0.16***	0.04**		0.01**	-1288	0.000
	(0.00)	(0.02)		(0.03)		
4	-0.27***		0.07***	0.01**	-1287	0.000
	(0.00)		(0.00)	(0.04)		

Panel B: Using average daeal-size as a proxy for investment bank reputation

No	Intercept	Log(average deal size)	Firm size	Log-likelihood	Model p-value
1	-0.85***	0.08***		-1291	0.000
	(0.00)	(0.00)			
2	-0.65**	0.06***	0.01**	-1289	0.000
	(0.03)	(0.06)	(0.05)		

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