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Concealing and confounding adverse signals: insider wealth-maximizing behavior in the IPO process

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Abstract

We study a known negative signal, the sale of insider shares in an IPO and find that insiders adopt two concealment strategies consistent with wealth-maximizing behavior. First, insiders underreport the number of personally owned shares in the prominent original prospectus and use an obscure amendment to communicate the true higher level of shares to be offered. Second, when insiders increase shares in a later amendment, they tend to either increase secondary shares disproportional to primary share increases, or to reduce primary shares to wholly or partly conceal the increase in secondary shares offered. Insiders confound the negative secondary share signal by simultaneously sending a positive lockup signal.

JEL classification: G14; G32

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1. Introduction

Actions by individuals and corporations are often perceived as signals. Undervalued, under-appreciated, superior types have incentives not only to send out positive signals, but also to avoid actions that could cause outsiders to make unfavorable conjectures. The avoidance of adverse signals is the subject of our investigation. We study two strategies used to mitigate the impact of adverse conjectures inherent in planned actions. First, insiders conceal the full extent of the planned action. Disclosing a lower level of planned action can reduce the severity of adverse conjecture. The original level is, nevertheless, carried out. Second, insiders offset the negative signal associated with the planned action by committing to a complementary action considered to be a positive signal. The negative signal is consciously confounded by a positive signal.

We investigate wealth-maximizing behavior of corporate insiders during the initial public offering (IPO) process for empirical evidence of concealing and confounding strategies. Four factors make the IPO process ideally suited for investigation. First, an IPO often includes a planned action (the selling of insiders' own shares) that sends a negative signal (Leland and Pyle, 1977). Outside investors infer that insider selling is negative because 1) the alignment of insiders' interests with those of new shareholders is reduced, creating potential moral hazard problems (Ritter, 1984a), and 2) the existence of asymmetric information in an IPO is high, creating potential adverse selection problems (Downes and Heinkel, 1982). The purpose of selling secondary shares is to increase insiders' wealth, yet, the process of selling sends a negative signal, drives down the IPO price, and is thus at odds with the purpose. Consequently, wealth-maximizing insiders have incentives to conceal and confound. Second, an IPO is a multi-

stage process making premeditated concealment possible. Insiders can disclose one amount of secondary shares to be sold when the prominent prospectus is filed and then switch to a greater amount when the obscure subsequent amendment is filed. Third, an IPO allows multiple signals, including positive signals, making the confounding strategy possible. For instance, insiders can lock up shares that are not offered in the IPO (i.e., commit to not sell personal shares for a certain period of time after the IPO). The strength of the positive signal is a function of lockup length and the size of insider holdings under the lockup restriction (Courteau, 1995; and Brau, Lambson, and McQueen, 2001). Fourth, IPOs are common, and due to Security and Exchange Commission (SEC) regulations, financial information is both available and complete. Thus we perform our empirical analysis on a large sample.

Our empirical results support the argument that insiders conceal and confound the negative signal of selling secondary shares. Among the insiders who sell their own shares in the IPO, most underreport the number of secondary shares in the original filing relative to what they actually sell. The additional secondary shares are filed after the original prospectus in a less visible channel called a prospectus amendment. When additional secondary shares are relatively large, insiders further camouflage the increase with an offsetting reduction in primary shares offered. Many insiders mitigate negative signals, such as originally filing to sell a large percentage of the company, by committing to a confounding positive signal, such as a longer lockup period.

Insiders' wealth-maximizing behaviors are conditional on new information revealed in the demand for shares after the original filing but before the offer date. When demand for the IPO is higher than expected, and if the issuers decide to increase the total number of shares

offered, the increased shares are predominantly secondary shares, allowing insiders to directly capture the perceived overpricing.

After finding evidence of concealment and confounding, we test: 1) two possible monitors of insider wealth-maximizing behavior, 2) the implicit assumptions underlying concealment strategies, and 3) a competing explanation for share adjustments between the original prospectus and the IPO date. We investigate the role of two potential monitors, reputable underwriters and venture capitalists, and find that neither has a significant impact on issuers' use of various concealment strategies studied here. Amendment filings of secondary shares impact first-day IPO pricing less than shares filed in the original prospectus. The market takes into account the information in the original filing, but does not do so with similar sensitivity to information in the amendment filing. A competing hypothesis claims that insiders target a specific level of outside equity and subsequently make share adjustments to maintain this predetermined level. Unlike the insider wealth-maximization hypothesis, the competing hypothesis is not supported by the data.

The organization of this paper is as follows. Section 2 discusses the regulatory, theoretical, and empirical background of the study, as well as testable empirical predictions. Section 3 contains the data, empirical analysis, and results. Section 4 presents tests of the fundamental assumptions, as well as a competing hypothesis. Section 5 summarizes and concludes. The Appendix provides an example of a specific company's SEC filings.

2. Empirical implications of concealing and confounding strategies

The fundamental purpose of the Securities Act of 1933 as stated in the preamble is "to provide full and fair disclosure of the character of the securities sold in interstate commerce and through the mails, and to prevent fraud in the sale thereof...." Rule 144 of the Securities Act limits the number of shares an insider can sell in a publicly traded firm, thereby restricting insider opportunistic behavior. We define "insiders" as owners of secondary shares. Secondary (previously issued) shares are defined as shares from which the net proceeds go directly to the selling shareholders, as opposed to primary shares where the net proceeds go directly to the issuing company. For example, if by utilizing private information, an insider perceives the expected price outside investors are willing to pay is too high, this insider is limited on the amount of personally owned shares (s)he may sell in the open market and thus cannot fully exploit the mispricing.

If the limitations of Rule 144 are binding, insiders have incentives to offer their shares, along with the new shares, in the IPO. To cash out in an IPO, insiders must first register their own shares (known as secondary shares); second, report the amount of secondary shares in the IPO prospectus or its later amendments; and third, sell the shares, along with the primary shares, at the IPO offer price. If wealth-maximizing insiders choose to skirt Rule 144 via the IPO, the prospectus must state that the company will receive none of the proceeds from the sale of shares by the selling stockholders (i.e., from secondary shares). The SEC does not limit the number of secondary shares the insider can sell in the IPO (i.e., the insider can sell 100% of secondary shares). Nevertheless, investors realizing the presence of information asymmetry observe the percentage of ownership that insiders retain in the firm and view this as a signal of firm value

(Leland and Pyle, 1977). Insiders that maintain large ownership positions send a positive signal, while those that divest a large portion of the firm send a negative signal. Thus, insiders have incentives to maintain (or at least appear to maintain) a significant portion of their personal shares to maximize their own wealth. Stated differently, insiders, cognizant of outsiders' perceptions, have incentives to conceal their personal wealth-maximizing behavior.

Previous literature shows that some insiders act opportunistically to maximize personal wealth in seasoned equity offerings. Giammarino, Heinkel, and Hollifield (1994) develop a model in which a corporate manager has private information pertaining to the value of a firm. In order to exploit this information, the insider engages in anonymous trading on a personal account in the secondary market while the firm simultaneously issues new shares into the primary market. Giammarino et al. conclude that insiders tend to act in their own self-interest, either through intrinsic rewards or personal trading profits. If some insiders are willing to act opportunistically to maximize personal wealth in seasoned offerings, some may act opportunistically in initial offerings as well.

Concealing the wealth-maximizing behavior is accomplished by initially filing in the original prospectus (form S-1) a smaller number of secondary shares than insiders truly intend to sell. The remaining shares are then filed in a later (and more obscure) amendment that is closer to the offer date. By concealing the true magnitude of their intended sale, insiders are in effect manipulating the outside investors' perception of firm value. Insiders not only hope that the amendment is unnoticed, but also hope that the preliminary prospectus and the road show begin a cascade or herding effect that may overshadow the addition of secondary shares in later amendment(s). Welch (1992) provides a discussion of the cascade effect. This first concealment

strategy (planned before distribution of the prospectus and acquisition of information on the expected demand of the issue) is a form of premeditated wealth-maximizing opportunism we call "underreporting."

Once the original S-1 is filed and the demand for the issue is estimated, insiders have a second opportunity to maximize their personal wealth. Insiders can strategically adjust the mix of secondary and primary shares offered. If the estimated offer price (conditioned on the estimated demand) is greater than their informed estimated value of the stock, insiders have incentives to increase the number of secondary shares to expropriate wealth from the new investors. In contrast, if insiders perceive that the market underprices the issue, then insiders have incentives to partially withdraw their own shares by reducing the number of secondary shares in the final offer.

When insiders strategically adjust the number of secondary shares, they can employ a second concealment strategy by offsetting the change in secondary shares with an opposite change in primary shares. By doing so, the overall number of shares in the offer remains fairly constant and the amendment draws less attention. This second concealment strategy of adjusting primary shares to offset secondary shares is a form of wealth-maximizing opportunism we call "switching." (For an example of how the SEC filings read in the case of a share adjustment, or switching, see the Appendix.)

Insiders selling secondary shares, concealed or not, have incentives to send a positive signal in an attempt to confound the anticipated negative conjecture caused by the secondary shares. We regard the attempt to confound the adverse signal with a positive signal as an extreme form of signal jamming. See, Mirman, Samuelson, and Urbano (1993) for an example

of the signal jamming literature. One potential positive signal in an IPO is to commit to a longer lockup period. Whereas selling some secondary shares at the IPO sends a negative signal, committing to hold the other secondary shares for a long period sends a positive signal (Courteau, 1995; and Brau, Lambson, and McQueen, 2001). Ibbotson and Ritter (1995) argue that investors are willing to pay more for a firm in which the insiders agree to retain their shares for long lockup periods. Field and Hanka (2001) show that the market responds significantly negatively when lockups expire. We call the strategy of sending a positive signal to allay a negative signal "signal confounding."

2.1. Testable predictions of underreporting, switching, and signal confounding

Concealment by underreporting requires that insiders file fewer secondary shares in the initial prospectus than the desired amount. By underreporting the true size of the eventual secondary shares to be offered, the insiders attempt to obtain a higher offer price. Since the insiders must eventually increase the number of secondary shares to the desired amount, they must choose a less noticeable channel to indicate their true intentions. In IPOs, the prospectus is well circulated, but subsequent amendments generally are not. Many amendments are filed just before the offer date. In our sample, the average time between the offer date and the amendment immediately preceding it is less than a week (6.9 days). The median time between the amendment and the offer date is only three days. Thus, amendment filings constitute a less visible channel for information dissemination and should increase the probability of successful concealment by insiders.

Underreporting predicts 1) the number of secondary shares in the initial filing is less than the number of secondary shares in the final offer, and 2) the number of IPOs with additional secondary shares filed in later amendments exceeds those that reduce secondary shares.

Insiders may use the switching strategy to further reduce the amendment filing's informativeness. Insiders reason that investors pay greater attention to coarser information, such as changes in the total number of shares offered, than to finer information on the mix of these shares. A concealment strategy that enables insiders to hide the later increase in secondary shares is to file a corresponding reduction in the number of primary shares, thus maintaining the appearance of no (or a marginal) change in total shares offered. Switching predicts that insiders substitute newly filed secondary shares for originally filed primary shares.

A second component of secondary share increases and switching may not be premeditated and is conditioned on the estimated pre-market demand schedule of the IPO. After the initial filing details are agreed on and printed in the preliminary prospectus, the underwriter begins gathering pre-market information via roadshows and circulating the prospectus. Consistent with Benveniste and Spindt (1989) and Galloway, Loderer, and Sheehan (1998), underwriters estimate a demand schedule from the information acquired and adjust the offer price accordingly. Once the information-gathering process begins however, insiders can also adjust the number of secondary shares, depending on the observed estimated demand schedule.

Assume that insiders assign a value to the firm based on their access to private firm information. As insiders learn of the tentative demand for the issue, they adjust their expectation of the price that will clear the market. In the case of strong demand, issuers and their underwriters will increase the offering price. If the new offer price is greater than the insiders'

estimated value, wealth-maximizing insiders have incentives to increase the number of secondary shares to capture the overpricing of the market. The larger this overpricing, the greater the incentive these insiders have to sell additional secondary shares in the market. When demand is perceived to be high, wealth-maximizing insiders are predicted to either 1) increase secondary shares and reduce primary shares in the amended filing to conceal the secondary increase or 2) increase both secondary and primary shares, with secondary shares accounting for the majority of the increase. The demand-conditioned wealth-maximization argument is consistent with Habib and Ljungqvist's (2001) model of insider wealth maximization.

In the opposite case, when insiders perceive that the market has undervalued the IPO, wealth-maximizing insiders have incentives to decrease the number of secondary shares offered in a later amendment. By reducing the number of secondary shares, insiders avoid selling their personally owned stock at a discount and also send a positive signal to the market. In contrast to high-demand cases, when insiders reduce the number of secondary shares they have no incentive to conceal this adjustment as the decrease conveys a positive signal. Thus, in low-demand cases, insiders are predicted to decrease the number of secondary shares disproportionately more than the number of primary shares to avoid selling their personal shares at a discount.

In the signal confounding strategy, insiders are predicted to commit to a longer lockup period (i.e., a positive signal) when they file to sell a larger percentage of the firm in the original prospectus (i.e., a negative signal). Additionally, insiders who offer a greater portion of the company in the IPO (i.e., a negative signal) are predicted to initially underreport to a greater extent (i.e., a positive signal) and then to more aggressively add secondary shares in later amendments.

3. Results and analysis

The data for this analysis are taken from the Security Data Company's (SDC) New Issues database. The sample consists of 1,837 firmly underwritten IPOs that either filed or offered secondary shares from 1980 through 1997. Limited partnerships, ADRs, unit offers, carve-outs, reverse leveraged buyouts, and closed end mutual funds are not included in the sample. The number of secondary and primary shares filed in the preliminary prospectus is hand collected from the *Investment Dealer's Digest (IDD)*. The filing and offer prices are taken from SDC, and the early years (1980 through 1981) are supplemented from *IDD*. All other IPO data are retrieved from SDC.

Table 1 shows that the incidence of insiders filing to sell their holdings in the IPO is significant. Our sample of 1,837 IPOs that file or issue secondary shares from 1980 through 1997 makes up 32% of the total IPOs over this same period that meet the sample screening criteria (i.e., 5,764 firms). On average, over a quarter (27%) of the shares offered in the IPO are secondary shares. Of the IPOs with secondary offers, 726 (44%) involve amendments that adjust the number of secondary shares after the initial filing. The change in the secondary share sample consists of 1,650 firms and not 1,837 firms due to the definition of the change metric. The denominator equals the number of secondary shares originally filed. Out of the firms in our sample, 187 originally filed zero secondary shares and then amended the offer to include secondary shares. The percentage of secondary shares to total shares offered increases from 21% to 49%. We winsorize the two absolute change variables at two (i.e., 200% increase) to control for outliers. Our results are robust if we use unwinsorized numbers. The average number of share changes due to amendment filings shows an increase in secondary shares but a decrease in

primary shares. The tendency for firms to increase secondary shares provides preliminary support for underreporting. In some cases, the change in secondary shares via a later amendment is quite substantial. The maximum increase is 21,000,000 shares, and the maximum decrease is 13,500,000 shares. The average increase in secondary shares offered for those that adjusted shares via later amendments is 154,617 shares. The rest of the descriptive variables confirm that our IPO sample is not irregular with respect to size, offer-price range, venture capital presence, underwriter prestige, etc.

3.1 Tests for the underreporting and switching strategies

Table 2 summarizes the types of insider-amended filings, after expected demand for the issue is revealed between the initial filing and final offer dates. The issues are classified as a weak, expected, or strong demand based on the proxy, offer-price revision (i.e., whether the issue experiences a pre-IPO offer price decrease, no change, or increase, respectively). The bold figures in each column are the conditional probabilities of the types of amendment, given a strong, weak, or expected demand. Specifically, in column 1, 21.9% of IPOs with secondary offerings revise the offer price above the initial offering price range. Of the issues with strong demand, we find that over one-half file an amendment on a later date, of which increased secondary shares outnumber decreased secondary shares by a margin of almost three to one $[(40.7/14.5) = 2.8 \text{ times}]$.

We first examine evidence for premeditated underreporting, in which insiders hold back in the original filing part of the shares they intend to sell in the IPO, and then file at a later date. Although intention is difficult to measure, and the observed actions taken by the insiders could

be affected by their perception of the pre-IPO demand schedule, we attempt to isolate premeditated actions by examining the portfolio of IPOs within the expected demand column. The expected demand case serves as a clean sample that best reflects insiders' original intentions by removing the confounding effects from pre-IPO offer price adjustments. In column 2 of Table 2, we find that in the expected demand sample, the number of issues with insiders filing amendments to increase secondary shares outnumber those filing to reduce secondary shares by 50% (24.2/16.0) at conventional significance levels ($p < 0.0001$). The result is consistent with premeditated underreporting.

In unreported testing, we perform difference tests not only on the frequencies of increases and decreases as in Table 2, but also on the magnitude of share adjustments for the expected demand portfolio. Using three different measures of secondary share adjustments, secondary share increases are larger than secondary share decreases in the expected demand portfolio, at the 5% level of significance for all measures.¹ In two of the three cases, the order of magnitude is more than double the amount of secondary share increases over decreases; and in the third case, the difference is more than 30%. Also in unreported tests, we identify a sample of issues in which the insiders file amended offers where secondary share adjustments are offset perfectly by an equal but opposite change in primary shares. These cases have preserved the appearance of no change in the total number of shares offered. The most frequent cases are in the expected demand portfolio (114 out of 140 cases), where investors expect a constant offer size, i.e., no change in shares offered to accompany no change in offer price. When measured as the change

¹ The three measures of secondary share adjustments are: 1) $(\text{secondary offered} - \text{secondary filed}) / \text{secondary filed}$, 2) $(\text{secondary offered} - \text{secondary filed}) / \text{total filed}$, and 3) $(\text{secondary offered} / \text{total offered}) - (\text{secondary filed} / \text{total filed})$, where "total" is equal to the sum of primary and secondary shares.

in secondary shares divided by the total shares filed in the original prospectus, insiders perform an exact substitution of 23% of the shares offered on average.

The results for demand-conditioned underreporting, in which insiders condition their share adjustments on the revealed demand for the IPO, are even stronger than the expected demand case. Column 3 reports that, if revealed demand is weak, insiders decrease secondary shares 2.9 (218/76) times more frequently than they increase. On the other hand, when the revealed demand is strong (column 1), the number of IPOs with insiders filing to increase their own shares via amendments to those that filed for reduction is 2.8 (164/59) times more frequent.

The weak and strong demand results are consistent with demand-conditioned adjustments. Wealth-maximizing insiders take advantage of high or low demand for the issues and respond by increasing or decreasing the number of secondary shares offered. We perform Chi-Square tests using two hypotheses: the unconditional test of no change in secondary shares, regardless of demand, and the conditional test of an equal change (increase, no change, decrease) of secondary shares, conditional on demand. Both hypotheses are rejected with p-values less than 0.0001, supporting both premeditated and demand-conditioned underreporting.

Despite the strong support for our insider wealth-maximization argument found in Table 2, there are 76 firms in weak demand that choose to increase secondary shares, suggesting a potential contradiction to our wealth-maximization prediction. Because of this concern, we analyze these 76 IPOs in two ways.² The first is to investigate if there is a corresponding change in total shares outstanding, along with the offer price change that could create de facto pre-IPO

² Along with the 76 issuers that increase secondary shares, we also analyze 12 firms from Table 3 that do not change secondary shares, but increase primary shares in weak market conditions. Our subsequent results are robust to using either the sample of 76 or 88 IPOs.

splits or reverse splits. The second is to examine whether the insiders of these IPOs are the types who are more likely to hold relatively low reservation prices, which may still be lower than the reduced offer price.

We test the stock split explanation for share increases in weak demand by hand-collecting 176 initial and final prospectuses.³ We perform a t-test and a Wilcoxon rank test on the percentage change in shares between initial and final filing with the null hypothesis of no change. The null cannot be rejected, with a t-test p-value of 0.7264 and a Wilcoxon p-value of 0.2685. The mean for the percentage change is 0.0057, the median is zero, and the mode is zero. Thus, insiders do not appear to adjust significantly the total number of shares in the firm.

We further investigate whether there is a rational explanation as to why insiders would sell more shares in the face of weak market demand and reduced offer price. Selling more shares in a weak market would be consistent with insiders holding reservation prices lower than the reduced offer price. Although we do not know the true reservation price of these insiders, it seems reasonable that insiders who regard the IPO as an "exit strategy" are also those who hold low reservation prices. We examine the characteristics of these 86 firms in comparison to those of our overall sample. We find that insiders who increase shares in weak markets: 1) offer a greater percentage of the firm in the IPO (i.e., low retention insiders), 2) employ lower prestige underwriters, 3) have less venture capital backing, 4) lock up for longer periods of time (i.e., signal confounding), and 5) come to market in cold periods. The composite profile of this group suggests that these insiders are more likely to be interested in an early exit. Having been

³ We obtain 36 prospectuses from EDGAR, 67 from On-Line Disclosure Global Access, and 69 from photocopies of the prospectuses ordered from Primark Data. These prospectuses represent the initial and final shares outstanding for 86 of the 88 firms that increase secondary or primary shares in weak demand states. Two sets of prospectuses could not be located.

informed of an unfavorable market reception, and given their low reservation prices, these self-serving insiders still choose to increase shares.

Additional evidence on underreporting and switching is provided in Table 3, which considers various states in primary and secondary share adjustments in response to estimated demand. Panel A (Panel B) identifies cases of primary or secondary share changes that are expected to prevail when expected demand is high (low). We use a frequency Z-statistic to compute statistical differences from Hogg and Tanis (1993). Of the eight cases, insider wealth-maximizing behavior (i.e., underreporting and/or switching) is supported in seven, and found to be statistically different under weak-versus-strong demand conditions. The exception of no difference is the fourth case of secondary share increase and primary share decrease. This case is examined in greater detail in Table 4.

When revealed demand is strong, corporate insiders issue more shares (secondary and/or primary) by a factor of three times over reducing these shares (i.e., the sum of the first four cases under strong demand is 197, while the sum of the next four cases is only 60).⁴ In the case of weak demand, we find that insiders reduce secondary shares almost three times as often as increasing them ($2.86 = (72+74+72)/(12+17+47)$). Both of these results are consistent with insider wealth maximization.

Next, we examine the details of combined secondary and primary share changes for the expected demand cases. Consistent with premeditated underreporting, we find that insiders are nearly twice as likely to increase shares offered than to reduce them (the ratio of the sum of first four items (297) to the sum of second four items (166)). Consistent with a concealment strategy

of switching, the greatest numbers are those amendments with partially or wholly offsetting secondary and primary shares (102 + 77). In the next table, we address directly the extent of substitution between primary and secondary shares by comparing the actual number of shares that are added or reduced.

3.2 The substitution and complementary changes in secondary and primary shares

Insiders who maximize personal wealth are expected to 1) increase secondary and reduce primary shares if the intention is to camouflage the additional filing, and 2) increase secondary shares more than primary shares (if both are to be increased) and reduce secondary shares more than primary (if both are to be reduced). Table 4 confirms these predictions.

Panel A reports the extent of the change (addition or reduction) in the number of secondary shares to the change in primary shares in amended filings subsequent to the original prospectus filing. Three cases of interest are studied. When secondary shares are increased and primary shares are reduced under strong demand, for every primary share that is withdrawn, two additional secondary shares are issued in its place. But when weak demand is observed, for every primary share withdrawn, less than one secondary share is added. The proportion is even higher in cases when both secondary and primary are increased or reduced. With perceived strong demand, for every primary share added in amendment filing, over six secondary shares are added on average. The number declines to a third, or two shares of secondary added to one share of primary, in the case of weak demand. When insiders perceive underpricing under strong

⁴ The eight cases in Table 3 do not sum to the full sample size of 1,837 because we do not include the no change in secondary and primary shares case.

demand, insiders withdraw 2.7 times as many own shares for every primary share reduced in the amended filing in strong demand conditions and 1.97 times in weak demand conditions.

When comparing changes in secondary to primary issues on a relative basis (Panel B), the percentage increase in secondary shares is over 11 times the percentage decrease in primary shares when they are substitutes under strong demand and almost three times under weak demand. If both types of shares increase, the percentage increase in secondary shares is over nine times that of primary shares under strong demand and 2.9 times under weak demand. The offsetting adjustments of primary shares reported in Tables 3 and 4 indicate that secondary share adjustments are not simply caused by naïve insiders increasing the number of secondary shares to capture the perceived overvaluation.

3.3. Motives and circumstances of insiders

Having shown that some IPO insiders may manipulate how their own shares are filed in the IPO to maximize personal wealth, we now examine factors that may help explain the actions chosen by these insiders. First, we start with the motives of the insiders. Insiders may either view the IPO as a means to acquire funding for the firm's growth opportunities or as a way to cash out their investments. If insiders' objectives are to cash out, they have to be concerned with the adverse-information impact of offering a high percentage of the firm in the original filing. These low retention issuers attempt to mitigate the negative signal of selling secondary shares by 1) underreporting the true extent of the intended offering and 2) covering up the extent of the secondary offer. In Panel A of Table 5, we divide the sample into low versus high retention groups, with the expectation that the low retention group will file more amended secondary

shares. We define high (low) retention firms as those that offer less (more) than the sample median percentage of the firm in the IPO. Wealth-maximizing behavior predicts that low retention insiders will exhibit a greater tendency for premeditated strategies than the high retention group (i.e., more secondary increases even when demand does not change) and for demand-conditioned strategies (i.e., greatest secondary share increases in the strong demand case). Additionally, high retention firms are predicted to reduce shares less aggressively than low retention firms, since low retention firms' objectives are to sell more shares. Panel A confirms these predictions. The low retention insiders are more heavily involved in additional filings. Issuers that offer to sell a larger portion of the firm also offer more secondary shares in the original filing and even more shares in amended filings. These issuers are more likely to increase personally owned shares for sale when the offer price is increased and withdraw fewer shares when the offer price is reduced.

Consistent with the confounding strategy of insider wealth-maximization (i.e., firms with negative signals use offsetting positive signals), Panel A of Table 5 shows that low retention firms commit to a statistically longer lockup period. Because insiders successfully sell their shares in the IPO, they effectively beat longer lockup periods that prohibit insider sales for a specified period of time after trading begins.

Since offering greater ownership to outsiders decreases the alignment between insiders and shareholders resulting in increased agency costs (Jensen and Meckling, 1976), we interpret the retention results under an agency cost framework. The greater incidence of insider wealth-maximizing behavior is consistent with what one might expect from potentially higher agency,

low retention issuers in absence of effective monitoring. We examine the question of third party monitoring in Table 6.

Panel B of Table 5 investigates the source of insiders' superior perception. The actions taken by the insiders, as reported in amended filings, can serve as a useful measure of their perception of firm value relative to the estimated market price. A question related to insider motivation is the source of their perceived superior valuation. By definition, true superior inside information has to be firm idiosyncratic, because insiders cannot make a valid claim to have superior knowledge of economy or industry-wide data. To test whether insiders make adjustments in secondary offers based on economy or industry circumstances, we divide the IPOs into those offered under hot or cold IPO markets. Like Loughran and Ritter (2000), we proxy for hot IPO markets by dividing the total number of IPOs in any given month by the number of publicly traded firms for that month listed on CRSP. The number of IPOs for each month comes from Jay Ritter's website. A hot (cold) market is defined as any IPO offered during a period of IPO volume greater (less) than the sample median. Hot IPO markets are circumstances under economy or industry influence that are known to affect the volume and pricing of IPOs, but may not affect insiders' actions once the pre-IPO demand of the firm is estimated. Consistent with firm-idiosyncratic information asymmetries, Panel B shows that none of the insiders' actions taken at and after the original filing are influenced by the state of the economy or industry reception for IPOs.

3.4 Monitoring by third parties

If the observed insider wealth-maximizing behaviors are types of agency costs in the IPO, do governance mechanisms exist, other than the SEC, that monitor on behalf of new shareholders? We investigate two potential candidates that are often cited in the IPO literature—the presence of a prestigious investment bank and venture capital firms.⁵ If sophisticated third parties perform the monitoring function, one can hypothesize that firms with highly reputable investment banks or venture capital financing take fewer insider wealth-maximizing actions.

Table 6 compares the extent of secondary share adjustments between low and high reputation underwriters in Panel A, and between non-venture and venture capital backed issuers in Panel B. We find that, contrary to the expectations under the certification hypothesis, IPOs with high reputation underwriters are statistically indistinguishable from IPOs with low reputation underwriters. Additionally, Panel B reports that the presence of venture capital makes no difference in secondary share adjustments. The results taken together do not support the monitoring role by either investment banks or venture capital firms as it pertains to secondary share adjustments.

4. Robustness tests

We implicitly assume that the sale of secondary shares in the IPO conveys negative information as predicted by Leland and Pyle (1977) and that amendment filing is a more obscure channel of communication to outside investors. The ideal test for these assumptions would be to demonstrate that 1) issuers set the initial filing price range of the IPO conditional on the size of

⁵ See Beatty and Ritter (1986), Booth and Smith (1986), Carter and Manaster (1990), and Carter, Dark, and Singh (1998) for discussions of underwriter certification. See Barry, et al. (1990), Megginson and Weiss (1991), and Brav and Gompers (1997) for discussions of venture capital certification.

secondary shares filed, and 2) the final offer price fully reflects the impact of secondary shares adjusted in later amendments. If we could document and measure 1 and 2 above, we could then directly test the impact of secondary share adjustments on firm value.

Due to the difficulty of measuring firm value and its attributes prior to the existence of a public stock price, we cannot determine if or how the filing of secondary shares affects the initial filing price range or the final offer price. Thus, we are not able to directly test the relationship between secondary share sales and the value of the firm as predicted by Leland and Pyle (1977).

Although we cannot measure the effect of secondary share adjustments on firm value prior to the IPO, we may still find traces of the effect once the IPO begins to trade. If issuers do not fully incorporate the secondary share pre-offer information into the offer price, and if the first day market closing price does, then the first day return can be used as an indirect test of our two assumptions. Clearly, this is a weaker test than the ideal test described above. If original or subsequent secondary shares have statistically insignificant effects on first day returns, it does not necessarily imply that secondary shares have no effect on overall IPO pricing. The secondary share effect might have been reflected in the pre-offer pricing. Nevertheless, finding significant negative effects from the information on originally filed secondary shares and finding no or smaller effects from amendment filings would be consistent with the underlying assumption that amendment filing is a less noticed channel of communication.

We construct a regression model expressing the IPO initial return (i.e., the first day return) as a function of secondary shares originally filed, secondary shares amended, and control

variables that are important in previous studies.⁶ We estimate a series of models based on the full model:

$$\begin{aligned}
 IR_i = & \alpha_i + \beta_1 SECFIL_i + \beta_2 SECA_i + \beta_3 FILESIZE_i + \beta_4 UNDERWRITER_i \\
 & + \beta_5 VC_i + \beta_6 IPOMARKET_i + \beta_7 PRICE\Delta_i + \varepsilon_i,
 \end{aligned}
 \tag{1}$$

where

IR_i	=	first day closing price minus the offer price, all divided by the offer price for firm i . ⁷
$SECFIL_i$	=	number of secondary shares initially filed divided by the total number of shares initially filed in firm i 's IPO.
$SECA_i$	=	percent change in secondary shares from initial filing to the offer date for firm i .
$FILESIZE_i$	=	logged product of the number of shares initially filed in the IPO and the initial mid-filing price for firm i .
$UNDERWRITER_i$	=	proportion of the total dollar volume of IPO underwriting that firm i 's underwriter had the year before the offer.
VC_i	=	one if firm i is venture capital backed, and zero otherwise.
$IPOMARKET_i$	=	number of IPOs in the month firm i conducted the IPO divided by the total number of firms listed on CRSP for the same month.
$PRICE\Delta_i$	=	final offer price minus the initial mid-filing price all divided by the initial mid-filing price for firm i .

Table 7 presents the regression results. Our results are robust to White's (1980) heteroskedastic correction. Additionally, multicollinearity is found not to be problematic, with all variance inflation factors less than two. If our underlying assumptions pertaining to original versus amended shares hold, we predict original secondary shares filed ($SECFIL_i$) to have a larger effect on the initial return than subsequent share adjustments ($SECA_i$). Additionally, if

⁶ Examples of literature documenting each control variable are: $FILESIZE$ (Ritter, 1987), $UNDERWRITER$ (Carter and Manaster, 1990), VC (Megginson and Weiss, 1991), $IPOMARKET$ (Ritter, 1984b), and $PRICE\Delta$ (Hanley, 1993).

⁷ Our results are nearly identical when we define initial return as the log of the ratio of first day closing price to offer price.

secondary shares issued in the IPO are perceived as negative information as predicted by signaling theory, we expect a negative coefficient for SECFIL. The full model, Model 1, shows SECFIL to be negatively related to initial returns beyond the 1% level of significance. This finding is consistent with Carter and Manaster (1990) who find a significant negative relationship between the percentage of secondary shares offered in the IPO and initial return. Also consistent with our underlying premise, amended secondary shares are not significantly related to initial returns. Thus, the regression results provide supportive evidence that originally filed secondary shares have a significant impact on the market pricing of IPOs whereas amended secondary shares do not.

In the full model we include control variables that have been shown to be important in prior literature. To check whether the lack of significance of the SECA term is due to the presence of the control variables, we re-estimate the regression without them and report three nested models. Since change in secondary shares is often in response to a perceived high demand for the IPO, to avoid the possibility that SECA may proxy for market demand, we maintain offer price change, a more direct measure of market demand in each model. Model 2 includes the two variables of direct interest, SECFIL and SECA. Consistent with the Model 1 results, the coefficient for SECFIL is significant and negative, whereas the coefficient for SECA is statistically zero. Models 3 and 4 report each secondary share variable separately to ensure SECFIL is not interfering with the influence of SECA. In Model 3, SECFIL remains negative and significant. In Model 4, SECA remains statistically insignificant.

4.1 A competing hypothesis

A second robustness test involves examining the possibility that our result could be due to an alternative explanation. A competing hypothesis is that the insiders have a desired target amount of equity to be raised in the IPO. The argument is that prior to the offering, firm managers decide on an optimal capital structure. To make this capital structure operable, insiders determine the mix of debt and equity. Insiders then structure the IPO to raise the optimal amount of outside equity. If the offer price increases (decreases) between the original filing and the offer date, the competing hypothesis predicts that the number of primary shares will be reduced (increased) so the firm will maintain the optimal amount of outside equity. If the number of primary shares is not reduced when the offer price is increased, the excess cash could lead to additional agency costs. Additionally, if the overall number of shares in the offer is reduced, it is harder for investment banks to reward investors for their truthful information revelation (as in Benveniste and Spindt, 1989). Therefore, the overall number of shares is kept constant by increasing secondary shares. Thus the competing logic argues that insiders do not act to maximize their personal wealth; they merely adhere to an optimal capital structure plan.

A review of Table 3 does not support this competing hypothesis. Of the eight cases, seven provide evidence against the target equity hypothesis. For example, the target equity hypothesis predicts that each case in Panel A should contain a greater number of observations in the weak category (offer-price reduction) than in the strong category (offer-price increase). This prediction directly tests the notion that insiders adjust shares to maintain the same amount of outside equity. In three of the four cases, this hypothesis is rejected beyond the 1% level, and in the fourth case, the difference is not significant. Thus the evidence suggests that the competing

hypothesis of a target equity amount is not supported; whereas, the bulk of the evidence reported in the paper is consistent with the insider wealth-maximizing hypothesis.

5. Summary and conclusions

We formulate and test the question of whether insiders take actions to mitigate the adverse impact of negative signals to maximize their personal wealth. Using data from IPOs, we show that insiders employ two concealment strategies and a confounding strategy in an attempt to prevent outsiders from drawing unfavorable conjectures regarding the firm's value. We establish that secondary sales and amendment filings are not insignificant occurrences in IPOs. Over the period 1980 to 1997, 32% of IPOs file or issue secondary shares (i.e., 1,837 out of 5,764 IPOs). On average, secondary shares account for over a quarter (27%) of the proceeds in our sample. Of those that file secondary shares in the original filing, 44% also make additional secondary share filings via amendments.

We find evidence that insiders hold back their intended number of shares at the original filing. When information acquired (from road shows and other marketing efforts) after the original filing leads to an offer-price increase, the number of issuers with insiders increasing secondary shares outnumbers those decreasing by 50%. We also find that among various combinations of secondary versus primary share adjustments in amendment filings, the most frequently observed case involves substitution of secondary for primary shares. In the case of exact substitution of secondary for primary shares, insiders switch a rather large portion, representing 23% of the total shares offered.

When issuers condition their actions on the basis of revealed market demand and adjust the offer prices, we find even stronger results. Under strong demand, the number of issues with insiders increasing their secondary shares offered is almost three times (2.8) as great as those decreasing their own shares offered. On the other hand, when the offer price is reduced, issues with insiders reducing personal shares outnumber those decreasing by 2.9 times. In terms of the number of share changes under excess positive market demand, two secondary shares are added for every primary share withdrawn. In strong demand, when total shares offered increase, we find that for every primary share added, six new secondary shares are offered. In contrast, when insiders decrease total shares offered, they withdraw two to three times as many secondary shares as primary shares.

We establish that the tendency of insiders to pursue these wealth-maximizing behaviors can be explained by their motives. Insiders whose objective is to cash out in the IPO, who retain less of their shares at the original filing, are found to increase secondary shares through amendments more frequently. They are also more likely to commit to a longer lockup period, a confounding positive signal. When these personal wealth-maximizing behaviors are viewed as a form of agency problems for the new investors, we are led to ask if there are market mechanisms to mitigate these actions. We examine two often-mentioned third-party monitors of IPO firms: high reputation underwriters and venture capitalists. We find no evidence that the incidence of these behaviors is reduced under these third parties.

Finally, we test the underlying premises of the paper that secondary shares convey negative information and that wealth-maximizing insiders choose to under-file secondary shares in the original filing because they regard amendment filings as less noticeable or more obscure

channels. A regression model with the first day return as the dependent variable supports the underlying assumptions. Whereas we find original prospectus information on secondary shares filed is perceived as unfavorable information, secondary shares adjusted via amendment filings are not priced.

Overall, our study adds new insights to the issue of mitigating negative signals. We focus on the framework of IPOs and the selling of secondary shares. Future research can analyze additional actions perceived as negative signals, such as dividend cuts or employee layoffs, and the associated wealth-maximizing behavior of insiders. Additionally, we explore the issues of concealing and confounding negative signals to maximize insider personal wealth. Future research can study mechanisms, other than concealing and confounding, that insiders use to mitigate potential negative signals.

Appendix. An example of a company's various SEC filings involving secondary shares

The company is the Manchester Equipment Company, which issued an IPO on November 25, 1996. Quotations under the document names are taken directly from the SEC-filed documents as reported on EDGAR.

10/3/1996 S-1 (Initial prospectus)

All of the 2,500,000 shares of Common Stock offered hereby are being sold by Manchester Equipment Co., Inc. ("Manchester" or the "Company").

11/7/1996 S-1/A (Prospectus amendment) and 11/19/1996 S-1/A (Prospectus amendment)

Of the 2,500,000 shares of Common Stock offered hereby, 2,125,000 shares are being sold by Manchester Equipment Co., Inc. ("Manchester" or the "Company") and 375,000 shares are being sold by a selling shareholder of the Company (the "Selling Shareholder").

11/25/1996 (Issue date)

Manchester Equipment floats 2,500,000 shares at the price of \$10.00, the company nets \$19,709,375 and the selling insiders net \$3,478,125. The net of nearly \$3.5 million has been perfectly transferred from the company's coffers to selling insiders' personal accounts, with the total shares of 2,500,000 never changing (and thus tombstone ads, etc. never change either).

11/26/1996 424B4 (Final prospectus)

Of the 2,500,000 shares of Common Stock offered hereby, 2,125,000 shares are being sold by Manchester Equipment Co., Inc. ("Manchester" or the "Company") and 375,000 shares are being sold by a selling shareholder of the Company (the "Selling Shareholder").

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Table 1

Descriptive statistics of a sample of IPOs that filed/issued secondary shares, 1980 to 1997

This table reports the descriptive statistics for a sample of initial public offers from 1980 to 1997. Offer size is computed as the number of shares offered in the IPO multiplied by the final offer price. Percentage of shares offered is computed as the ratio of the number of shares offered in the IPO divided by the total number of shares outstanding upon completion of the offer. Absolute change in secondary shares is the absolute value of the change in percentage of secondary shares (i.e., (secondary offered-secondary filed)/secondary filed). The "among amended" sample consists of only those IPOs that had a revision in the number of secondary shares between original filing and offer. Actual offer price is the price at which the offer entered the primary market. Lockup period is the number of days after IPO that the insiders pledge not to sell their remaining secondary shares. Venture capital indicator equals one when the IPO is backed by venture capital and zero otherwise. Underwriter prestige is the proportion of the total dollar volume of IPO underwriting that each underwriter had the year before the offer. IPO volume is the number of IPOs in any given month divided by the total number of firms listed on CRSP for the corresponding month. n is the sample size, mean is the arithmetic mean, median is the arithmetic median, and SD is the standard deviation.

Variable	n	Mean	Median	SD	Minimum	Maximum
Offer size (\$)	1,837	37,140,736	24,000,000	48,553,572	1,850,000	611,000,000
Percentage of shares offered	1,819	32.95	31.76	12.74	2.18	100
Secondary shares filed/total shares filed	1,837	0.27	0.25	0.20	0.00	1
Secondary shares offered/total shares offered	1,837	0.29	0.25	0.21	0.00	1
Secondary shares offered - filed	1,837	76,846	0.00	1,133,899	-13,500,000	21,000,000
Secondary shares offered - filed (among amended)	913	154,617	16,550	1,605,096	-13,500,000	21,000,000
Primary shares offered - primary shares filed	1,837	-126,660	0.00	2,511,634	-98,150,000	11,440,000
Absolute change in secondary shares (full sample)	1,650	0.21	0.00	0.38	0.00	2
Absolute change in secondary shares (among amended)	726	0.49	0.33	0.45	0.00	2
Average upper bound of filing price range (\$)	1,829	13.47	13.00	3.90	0.10	39.50
Average lower bound of filing price range (\$)	1,836	11.53	11.00	3.60	0.10	39.50
Actual offer price (\$)	1,837	12.51	12.00	4.40	0.10	38.15
First day closing price (\$)	1,837	14.26	13.13	6.20	0.22	58.38
Lockup period (days)	1,152	187.27	180	83.23	30.00	1,808
Venture capital indicator	1,810	0.44	0.00	0.50	0.00	1.00
Underwriter prestige	1,837	0.04	0.02	0.04	0.00	0.30
IPO volume	1,837	0.81	0.76	0.36	0.11	1.98

Table 2

Contingency table of 1,837 IPOs between 1980 and 1997 that filed/issued secondary shares

Strong (weak) demand is defined as a final offer price that is above (below) the original price-filing range. Expected demand is when the final offer price is within the original price-filing range. An increase (decrease) in secondary shares is when insiders raise (lower) the number of secondary shares between the original filing and the offer. The unconditional chi-square tests the null hypothesis of no association between demand and secondary share adjustments using all of the table data simultaneously. The Conditional chi-square tests the null of equal secondary share adjustments for each demand state.

	<u>Demand</u>			Subtotal	
	Strong	Expected	Weak		
<u>Secondary Shares</u>					
Decrease	59	158	218	435	Count
	3.21	8.6	11.87	23.68	Table %
	14.54	16.04	48.5		Column %
No change	180	589	155	924	Count
	9.8	32.06	8.44	50.3	Table %
	44.67	59.8	34.52		Column %
Increase	164	238	76	478	Count
	8.93	12.96	4.14	26.02	Table %
	40.69	24.16	16.93		Column %
Subtotal	403	985	449	1,837	Count
	21.94	53.62	24.44	100	Table %
<hr/>					
		<u>Value</u>	<u>p-value</u>		
Unconditional chi-square		246.8	<0.0001		
Conditional chi-square					
Offer price decrease		67.65	<0.0001		
Offer price constant		320.16	<0.0001		
Offer price increase		64.32	<0.0001		

Table 3

Frequencies of various share adjustments in IPOs between 1980 and 1997 that filed/issued secondary shares

Strong (weak) demand is defined as a final offer price that is above (below) the original price-filing range. Expected demand is when the final offer price is within the original price-filing range. Subsamples represent various states of secondary and primary share adjustments. In Panel A (Panel B), the Z-statistic is for the null hypothesis that the frequency of observations in the strong state is less (greater) than or equal to the frequency of observations in the strong demand state. The first number is the frequency; the second is the column percentage. *** represents rejection of the null hypothesis beyond the 0.01 level.

Subsample	Demand			Z-stat for H ₀ : Strong ≤ Weak
	Weak	Expected	Strong	
<i>Panel A. Cases predicted under strong market demand</i>				
Both secondary and primary shares increase	12 3.7%	59 12.7%	72 28.0%	7.40***
Secondary share increase, no primary share change	17 5.3%	77 16.6%	53 20.6%	4.90***
No secondary share change, primary share increase	12 3.7%	59 12.7%	33 12.8%	3.53***
Secondary share increase, primary share decrease	47 14.6%	102 22.0%	39 15.2%	-0.38
<i>Panel B. Cases predicted under weak market demand</i>				
				H ₀ : Weak ≤ Strong
Both secondary and primary shares decrease	74 23.1%	34 7.3%	9 3.5%	7.50***
Secondary share decrease, no primary share change	72 22.4%	47 10.2%	8 3.1%	7.53***
No Secondary share change, primary share decrease	15 4.7%	8 1.7%	1 0.4%	3.50***
Secondary share decrease, primary share increase	72 22.4%	77 16.6%	42 16.3%	2.43***
Total	321	463	257	

Table 4

Degree of substitution between primary and secondary share adjustments

The sample consists of 1,837 IPOs between 1980 and 1997 that filed or offered secondary shares. Strong (weak) demand is defined as a final offer price that is above (below) the original price-filing range. The numbers in the weak and strong demand columns are the arithmetic mean of each panel, as defined in the panel heading. ***, **, and * indicate significantly different from zero at the 0.01, 0.05, and 0.10 levels respectively.

	Weak Demand	Strong Demand
<i>Panel A. Extent of substitution, computed as the number of additional secondary shares offered to the number of additional primary shares offered, or withdrawn</i>		
Both secondary and primary shares increase	2.05	6.32**
Secondary increase, primary decrease	-0.97***	-2.00***
Both decrease	1.97***	2.70*
<i>Panel B. Elasticity of substitution, or, the ratio of secondary shares added as percent of secondary shares originally filed to the ratio of primary shares added as percent of primary shares originally filed.</i>		
Both secondary and primary shares increase	2.91	9.28**
Secondary increase, primary decrease	-2.97***	-11.57*
Both decrease	5.47***	1.96***

Table 5

Insiders' motives and circumstances in 1,837 IPOs between 1980 and 1997 that filed/issued secondary shares

File size is computed as the number of shares filed in the IPO multiplied by the mid-filing price. Percentage of firm offered is computed as the ratio of the number of shares offered in the IPO divided by the total number of shares outstanding on completion of the offer. Lockup period is the number of days after IPO that the insiders pledge not to sell their remaining secondary shares. Percent change in secondary shares is computed as (secondary offered-secondary filed)/secondary filed. Percent change in primary shares is calculated as (primary offered-primary filed)/primary filed. Low (high) retention firms are those where insiders retain below (above) the median insider ownership after the IPO. Cold (hot) market is defined as those issues that occur below (above) the median of the hot market metric, which is calculated as the number of IPOs in a given month divided by the total number of firms listed on CRSP for that month. Diff. test is the p-value for the null hypothesis of equal means.

	<i>Panel A. Insider Ownership Retention</i>			<i>Panel B. IPO Market Condition</i>		
	Low Retention	High Retention	Diff. Test	Cold Market	Hot Market	Diff. Test
File size	37,900,000	36,900,000	0.7362	40,100,000	34,800,000	0.0537
Percent of firm offered	42.139	23.753	<.0001	33.601	32.310	0.0307
Lockup period	192.36	181.30	0.0205	189.75	183.39	0.1454
Percent change in secondary shares						
Strong demand	0.1817	0.0953	0.0722	0.1273	0.1380	0.8225
Expected demand	0.0448	-0.0390	0.0009	0.0243	-0.0100	0.1838
Weak demand	-0.2220	-0.3440	0.0045	-0.3070	-0.2580	0.2392
Percent change in primary shares	0.0009	-0.0270	0.0038	-0.009	-0.017	0.4455

Table 6

Monitoring by third parties in 1,837 IPOs between 1980 and 1997 that filed/issued secondary shares

File size is computed as the number of shares filed in the IPO multiplied by the mid-filing price. Percentage of firm offered is computed as the ratio of the number of shares offered in the IPO divided by the total number of shares outstanding upon completion of the offer. Lockup period is the number of days after IPO that the insiders pledge not to sell their remaining secondary shares. Percent change in secondary shares is computed as (secondary offered-secondary filed)/secondary filed. Percent change in primary shares is calculated as (primary offered-primary filed)/primary filed. Low (high) underwriter prestige is when the lead underwriter is below (above) the median sample underwriter. Underwriter prestige is the proportion of the total dollar volume of IPO underwriting that each underwriter had the year before the offer. No VC (VC) means the firm has no (has) venture capital backing. Diff. test is the p-value for the null hypothesis of equal means.

	<i>Panel A. Underwriter Prestige</i>			<i>Panel B. Venture Capital Influence</i>		
	Low Underwriter	High Underwriter	Diff. Test	No VC	VC	Diff. Test
File size	23,400,000	51,400,000	<.0001	39,200,000	33,800,000	0.0493
Percent of firm offered	34.605	31.289	<.0001	33.517	32.235	0.0328
Lockup period	194.87	179.90	0.0023	195.97	178.21	0.0003
Percent change in secondary shares						
Offer price increased	0.0865	0.1583	0.1480	0.1121	0.1503	0.4265
Offer price stayed the same	0.0011	0.0109	0.7050	-0.0090	0.0250	0.1832
Offer price decreased	-0.2850	-0.2870	0.9598	-0.2640	-0.3130	0.2634
Percent change in primary shares	-0.0080	-0.0180	0.2782	-0.025	-0.0002	0.0082

Table 7

Ordinary least squares of initial return in samples of IPOs between 1980 and 1997 that issued secondary shares

$$IR_i = \alpha_i + \beta_1 SECFIL_i + \beta_2 SECA_i + \beta_3 FILESIZE_i + \beta_4 UNDERWRITER_i + \beta_5 VC_i + \beta_6 IPOMARKET_i + \beta_7 PRICE\Delta_i + \varepsilon_i$$

	Model 1 ^a	Model 2 ^a	Model 3 ^a	Model 4 ^a
SECFIL	-0.066 (0.0016)	-0.074 (0.0003)	-0.074 (0.0003)	
SECA	0.002 (0.8077)	0.002 (0.8460)		0.005 (0.6254)
FILESIZE	3.2E-04 (0.9514)			
UNDERWRITER	0.031 (0.7591)			
VC	0.023 (0.0036)			
IPOMARKET	-0.009 (0.3800)			
PRICEΔ	0.562 (<.0001)	0.571 (<.0001)	0.572 (<.0001)	0.568 (<.0001)
Intercept	0.139 (0.1150)	0.150 (<.0001)	0.150 (<.0001)	0.129 (<.0001)
Adjusted R ²	32.2%	32.0%	32.0%	31.5%
n	1,619	1,643	1,643	1,643

^a The first number for each variable is the estimated coefficient; the number in parentheses is the p-value for the null that the coefficient equals zero.

The samples are reduced from 1,837 IPOs due to missing variables.

Variable definitions

IR _i	=	first day closing price minus the offer price, all divided by the offer price for firm i.
SECFIL _i	=	number of secondary shares initially filed divided by the total number of shares initially filed in firm i's IPO.
SECA _i	=	percent change in secondary shares from initial filing to the offer date for firm i.
FILESIZE _i	=	logged product of the number of shares initially filed in the IPO and the initial mid-filing price for firm i.
UNDERWRITER _i	=	proportion of the total dollar volume of IPO underwriting that firm i's underwriter had the year before the offer.
VC _i	=	one if firm i is venture capital backed, and zero otherwise.
IPOMARKET _i	=	number of IPOs in the month firm i conducted the IPO divided by the total number of firms listed on CRSP for the same month.
PRICEΔ _i	=	final offer price minus the initial mid-filing price all divided by the initial mid-filing price for firm i.