Key Determinants of IPO Pricing

for the Years 1992-1995

by

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An honors thesis submitted in partial fulfillment

of the requirements for the degree of

Bachelor of Science

Undergraduate College

Leonard N. Stern School of Business

New York University

May 2004

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Abstract

Understanding the incentive structure within an IPO is crucial to explaining the pricing of the firms entering the primary market. This paper serves to confirm past research that the presence of increased ownership stakes and insider sales limit the incentive to underprice. In looking at the data for the years 1992-1995, I have found that by aligning the interest of the corporate insiders, venture capitalists, and investment banks with the offer price, the average first day returns will decrease.

Table of Contents

Section 1: Introduction

During the 1990s, companies entering the primary markets through initial public offerings experienced first day returns of, on average, 26.67 percent. This number is positively skewed by the presence of outliers in the late 1990s as a result of the technology, or "dot-com" bubble. In viewing an even longer time period, Ritter and Welch (2002) found that from 1980-2001, the percentage increase over the offering price for the first day averaged 18.8 percent. High first day returns are known as underpricing. Averages computed over long periods of time often hide periods of aberrant underpricing, such as the technology bubble. It is therefore critical to view not only the long-term trends in underpricing, but also find an understanding of various short-term phenomena in the primary equity market.

But why is underpricing important? When a company issues an initial public offering, they enter the equity markets to raise capital for various projects and investments. However, underpricing continually leaves money on the table for the institutional investors who purchase shares of an IPO at the lower offer price and achieve constant abnormal returns at the closing price (fair market value). As the level of underpricing creates a consistent loss of money for the firm, it is the subject of much debate and study.

In this paper, I will attempt to explain the presence of underpricing through pre-IPO ownership structure and selling behavior. In order to understand these two characteristics, it is necessary to have a more in depth understanding of the IPO process. When a company goes public, it hires an underwriter who through careful research and diligence forms a value of this company. This is indicated by the mean of the price range set by the bank. Before the bank can set the offer price, which translates into the amount of capital raised for the firm, the bank enters into what is known as the bookbuilding phase and creates a literal book of committed institutional investors. In these meetings between banks and investors, there is a two-way flow of information. First, the investment bank introduces to the investor the company they would like to bring public and the valuation or price they have set. Then the institutional investor responds with a positive, neutral or negative opinion. If the general consensus among the investors that the valuation set by the back is either too low or too high, the bank will change the offer price through what is known as a price revision. However, the incentive given to the institutional investors to provide this information is in the form of underpricing, as the banks do not fully adjust the price based on the information provided. As a result of the partial adjustment, underpricing exists and capital is purposely left on the table, not for the firms, but for the investors.

If it were only the banks and investors setting the offer price, underpricing would be rampant. However, there are other players in the IPO process whose interests are aligned with the highest offer price possible, specifically the pre-IPO owners. As agents of the corporation, insiders, either executives of the company or venture capitalists, are

concerned with the offer price and the amount of capital the company raises. However, the extent to which they will issue pressure on the banks to increase the offer price and not underprice is not as certain, as the agent-principal conflict questions the level of their concern. For example, if a CEO is paid a specific wage and has no stake in the company, his concern for the level of the offer is significantly less than if he was personally interested in the price through ownership or secondary selling of shares. This presence of ownership in the corporation or the selling of shares in the actual IPO would change the agent-principal relationship and align the interests of the insiders with the offer price. The final setting of the offer price and the extent of the underpricing is the result of a complex array of incentives and relationships between the main players in the IPO.

In a study entitled "IPO Pricing in the Dot-com Bubble," Ljungqvist and Wilhelm (henceforth LW), analyze the IPOs during the technology bubble of the late 1990s and offer explanations for the extreme underpricing that took place during this era. Using models containing variables for insider selling behavior and pre-IPO ownership stakes, Ljungqvist and Wilhelm offer partial explanations for underpricing and price revisions. Through marked changes in the pre-IPO ownership stakes and decreased insider selling, LW conclude that underpricing and price revisions decrease as insiders have more shares or are selling their own shares in the IPO.

In order to further test the ability of ownership and selling behavior to predict the level of underpricing, I will take the same models and apply them to data for the years 1992-1995. Without the tech-bubble outlier, the data for this time period will be less

volatile as the level of underpricing and price revisions do not fluctuate as much. However, the data will provide us with further insight into some of the controlled experiments conducted by LW, as their analysis of IPO pricing extends beyond the dot-com bubble and into various investor relationships and pricing behaviors. In this paper, I look to LW's research as a guide and point of reference, in not only forming an analysis of the data, but also in the comparison of results. This paper will serve not only as a potential validation of the conclusions made by LW, but also by finding similarities, the dot-com bubble can be seen as not simply an aberration rational behavior, but the result of fundamental changes in ownership and secondary sales.

Section 2: Sample and Data

The sample consists of firms completing an initial public offering between January 1992 and December 1995. Thomson Financial's SDC database lists 1,653 completed IPOs for that period, after excluding unit offers, closed-end funds (including REITs), financial institutions, ADRs of companies already listed in their home countries, limited partnerships, and penny stocks. I have prospectuses for all 1,653 companies. Prior to 1996, compiling prospectuses is difficult, as EDGAR, the SEC's Electronic Data Gathering, Analysis, and Retrieval service does not contain company filings that far back. For the 1992 data, prospectuses were gathered from Thomson Financial's Global Access.

SCD contains little information on ownership structure, so I hand collected data on CEO, VC, and investment bank ownership from prospectuses. High-tech firms are

identified following Loughran and Ritter's (2001) classification. First-day trading prices are generally from the Center for Research in Security Prices(CRSP).

Section 3: How Issuing Firms Changed Between 1992-1995

A. Firm Characteristics

Table I highlights annual figures of firms completing an initial public offering during the sample period of January 1992 to December 1995. The sample size for this period is 1,653 issuing firms from various industry sectors. In looking at a growing sector of importance in both the primary and secondary market, I find that high technology firms represent 28 percent of the sample across this entire period, varying from a low of 23 percent in 1994 to a high of 40 percent in 1995. LW (2003) find that the trend of increasing high-tech companies continues as these firms represent almost half the sample by the end of the decade. High Technology firms are characterized by uncertain earnings and high growth, and in their paper, LW point out the aggressive pricing banks use with high technology IPOs. This aggressive pricing leads to increased price revision and underpricing. Therefore, the increasing presence of high-technology firms in the sample will in the regressions have a strong positive effect on price revisions and underpricing.

The average age of the companies, at issuance, declined over the period from 16 years old in 1992 to 14 years old in 1995. However the average did peak a little in 1993 at 18 years old. This decline from 1993 to 1995 reflects the presence of much younger

firms as median age stayed constant. In the paper by LW, the average age drops off significantly in the years 1999-2000 to 10 years old with an age median of 6. The presence of younger firms will impact the regressions as LW points out younger firms have far less historical information, therefore making valuation much more difficult and pricing more aggressive.

Table I
Descriptive Statistics of Sample Firms

High-tech companies are the following: computer hardware, communications equipment, electronics, navigation equipment, measuring and controlling devices, communication services, and software. Please see LW(2003) for the SIC codes. Age is IPO year minus the founding date. Revenues are from SDC.

		1992-1995	1992	1993	1994	1995
Number of Sample Firms		1653	365	471	385	432
Fraction High-Tech Companies (in%)		28.25	27.40	22.08	23.38	40.05
Age						
	Mean	16.57	16.10	18.41	17.71	13.92
	Median	8	7	9	9	8
Revenue (in $millions)						
	Mean	163.45	202.11	148.99	148.99	170.39
	Median	37.1	39.5	35.1	35.1	31

B. Transaction Characteristics

Table II displays the characteristics relating to the IPO. The first characteristic, underpricing, measures the return on the stock on the first day of issuance. Underpricing dropped off in the beginning of the sample period, but rose to 21 percent in 1995. This increase by the end of the sample period was followed by much higher underpricing in the years 1996-2000, as first day averaged 73 percent in 1999.

As discussed in the beginning of the paper, the percentage change over the mean of the offer price is known as price revision and reflects information spilling over from the institutional investors. Positive information is followed by both price revisions and underpricing, as banks over the money left on the table as incentives to investors to be forthcoming with information. In our data note that the average price revision rose from negative 4 percent in 1992 to positive 5 percent in 1995, reflecting an increase in positive information from investors. By the end of the decade the amount of positive information received by investments banks was enough to settle on an offer price of 18.7 percent higher than the mean of the initial price range.

Table II
Descriptive Characteristics of Sample Transactions

Underpricing is the first day close over the offer price found on CRSP. Underwriter rankings are based on the Loughran and Ritter (2001) update of the Carter and Manaster (1990) tombstone measure. Price revisions are the percentage update between the expected offer price and final offer price.

		1992-1995	1992	1993	1994	1995
Number of Sample Firms		1653	365	471	385	432
Underpricing						
	Mean	13.88	10.41	12.98	9.74	21.44
	Median	6.88	4.36	6.25	4.55	13.22
Underwriter reputation ranking						
	Mean	6.95	7.26	6.98	6.53	7.04
	Median	8.1	8.1	8.1	8.1	8.1
Price Revisions						
	Mean	-0.36	-3.59	1.05	-4.93	4.91
	Std. Dev.	0.49	1.08	0.88	0.87	0.99
	Median	0	0	0	-2.5	1.135
	Fraction Priced Above Range	40.71	37.53	44.16	29.61	50
	Fraction Priced Below Range	59.29	62.47	55.84	70.39	50

C. Pre-IPO Ownership Structure of Issuing Firms

In keeping with SEC regulation, firms are required prior to issuance to disclose any person or entity with an equity stake greater than 5 percent. Additionally, firms are required to disclose the aggregate equity stake of all insiders, which includes individuals who serve on the Board of Directors or any senior executives. This group saw an early rise in their equity stakes, from 55 percent in 1992 to 68 percent in 1994, however, this dropped slightly to 64 percent in 1995. This decline in the final year is continued in the remaining years of the decade, as LW shows in their paper the decline in insider ownership from 63.9 percent in 1996 to 51.8 percent in 2000.

Table III
Ownership Structure Pre-IPO

Ownership data is hand-collected from the IPO prospectuses. "Insiders" are directors and executive officers as a group. VC-backing comes from the prospectuses and includes both venture capitalists and private equity funds. Mean and median investment bank and VC stakes are conditional on having such stakes. Ownership concentration is measured using a Herfindahl index, here computed as the sum of the squared equity stakes held by CEOs, VCs, corporates, and investment banks.

	1992-1995	1992	1993	1994	1995
Pre-IPO Insider Stakes					
Mean	62.28	55.40	61.70	67.92	63.69
Median	66.6	58.1	67	75	66.85
CEO Stakes					
Mean	23.36	20.20	24.13	27.04	21.47
Median	11.4	8.5	11.7	14.75	10.85
Investment Bank stakes					
Fraction w/ Investment Bank stake	20.02	9.32	25.48	18.96	24.07
Mean Stake	18.54	26.60	17.67	20.35	15.63
Median	10.76	16.5	10.28	13.5	9.18
VC-Backing					
Fraction VC-backed	29.64	49.32	24.84	23.38	23.84
Mean Stake	44.64	51.44	42.11	39.20	40.39
Median	42.5	49.85	39.4	33.75	41.3

Among the insiders, particular attention is paid to the stakes of the Chief Executive Officer. The stakes held by the CEO display no clear trend, rising to 27 percent in 1994 before dropping off to 21 percent in 1995. However, a trend is seen in the remainder of the decade as the CEO stake falls to 12 percent by 2000. As discussed in the paper, this negative trend in ownership should positively effect underpricing.

Besides insiders, other groups hold pre-IPO shares which are disclosed in the prospectus. During the sample period, investment banks held equity stakes in roughly 20 percent of the companies. This fraction increased over the period, starting at 9.3 percent of the companies in 1992 and increasing to 24 percent by 1995. In the data collected by LW for the years 1996-2000, the trend of increasing equity stakes held by investment banks continues, as the fraction rises to 44 percent in 2000.

Of the equity stakes held by investment banks in our sample, the mean of those stakes declined from 27 percent in 1992 to 15 percent in 1995. This negative trend in the mean stake size was noted also in the LW paper for the years 1996-2000.

Of the firms in our sample, 30 percent had stakes held by either venture capitalists or private equity funds. These firms will be known as having VC-backed IPOs. This fraction declined from 49 percent in 1992 to 24 percent in 1995. The negative trend of VC-backed IPOs does not continue in the years 1996-2000 as LW find an initial decline in VC-backed IPOs but then an eventual and significance rise to 72 percent by 2000. In our sample, the average equity stake of the VC-backed IPOs for the period was 44

percent, declining from 51 percent in 1992 to 40 percent in 1995. This negative trend is not found by LW in their sample period.

C. Insider Sales at the IPO

Of the firms in the sample, 37 percent included secondary selling of shares upon issuance. Of those with secondary sales, the average of the shares sold, as a percentage of the pre-IPO shares outstanding, remained constant throughout the period. Though our paper finds no significant trends in secondary sales, LW find a noticeable drop in both the number of firms with secondary sales and the averages of those sales.

Table IV
Insider Sales at the IPO

Secondary sales denote sales of existing shares. Incidents of CEOs, VCs, or investment banks selling shares at the IPO are identified from the prospectuses. "Insiders" are directors and executive officers as a group.

Number of Sample Firms		1992-1995	1992	1993	1994	1995
Secondary sales	Fractions w/ secondary sales	37.30	38.36	38.85	38.18	33.80
	Mean (% of pre-IPO shares outstanding)	6.95	7.25	6.97	6.64	6.96
	Median	0	0	0	0	0
Key Shareholders selling	Fraction w/ CEO sales at IPO	18.39	18.08	18.90	16.10	20.14
	Fraction of VC-backed IPOs w/ VC Sales	35.10	32.78	35.90	33.33	39.81
	Fraction of bank-backed IPOs w/ bank sales	28.40	23.53	33.33	26.03	25.96
Post-IPO insider stakes	Mean	41.85	37.71	40.31	44.96	44.25
	Median	44.35	38.6	42	49.4	45.96

In the period discussed in LW's paper, all secondary sellers (CEOs, VCs, IBs, and Insides) experience a decline in their average sales. Over the period in our sample

however, all groups of sellers except investment banks more often sold shares at the IPO. Table IV displays no significant trends in the selling behavior of the different groups, as the changes take place in the latter part of the decade. Though LW found that selling behavior has a significant impact on underpricing, our data, which is constant over time, will have less of an impact.

Section 4: The Determinants of Price Revision and Underpricing

In this section, I use statistical analysis to determine the effects of pre-IPO ownership and insider selling behavior on the price revision process and initial returns during the years 1992-1995. The models used in this discussion will mirror those reported by Ljungqvist and Wilhelm in their 2003 article, and in this section I will compare and discuss the regression results. I use ordinary least squares to provide a benchmark estimation of each model.

A. Price Revisions

From the time the underwriter sets the price range to the eventual offering price, investors have the opportunity to become further informed and subsequently influence the final price. This is known as a price revision. In Table V, I display the least squares estimation of four models that differ in the pre-IPO ownership stakes and insider sales, but all models control for the same effects.

The first two models (1) and (2) in Table V deal with pre-IPO ownership stakes. The first model attempts to explain price revisions through the presence of specific pre-IPO ownership stakes. The stakes that I look at are those held by the Chief Executive Officer, Venture Capitalists, and Investment Banks. In Table V, both the stakes of the venture capitalists and investment banks have a negative and significant effect on price revisions (p=.007 and p=.099, respectively). Specifically, a one percent increase in the size of the VC or IB stake decreases offer prices by 0.0003 percent and 0.0006 percent, relative to the midpoint. The stake of the CEO has a positive and significant effect on price revisions(p=.082); a one percent increase in the size of the CEO stake increases offer prices by .0003 percent, relative to the midpoint.

In the second model, I attempt to explain price revisions as a function of ownership concentration, which is the sum of the squared CEO, VC, and IB stakes. This is known as the Herfindahl measure. Note the negative and significant relation between ownership concentration and price revisions (p=.020). Specifically, a one percent increase in ownership concentration decreases offer prices by 0.0388 percent, relative to the midpoint. In LW's paper, the models that deal with pre-IPO ownership (1) and (2) show little significance in their relation to price revisions. Only the stake of the investment bank has a significant effect on price revisions (p<.100), as a one percent increase in the stake of investment banks decreases offer prices by 0.074 percent, relative to the midpoint.

In the third model, I test the explanatory power of insider sales on price revisions. My conjecture earlier was that the weight of insiders would positively impact price

revision, and for our time period, the data backs up that claim at a significant level (p=.088). Specifically, a one percent increase in the amount of insider sales as a percentage of pre-IPO shares outstanding increases offer prices by 0.07744 percent, relative to the midpoint. In LW's paper, they as well find a positive effect, but not at any level of significance.

The fourth model relates price revisions to the selling of shares by various types of groups, specifically CEOs, IBs, and VCs. In the model, I find all three groups to have a positive effect on price revisions, and the first two groups to have a significant effect (p=.002 and p=.055, respectively). To illustrate, a one percent increase in the number of shares sold by these two groups(CEOs and IBs) increases offer prices by 0.4922 and 0.3963 percent, relative to the midpoint. For LW's data, they as well find a positive and significant relation between the selling of shares by CEOs and price revision, specifically an increase in offer prices by 0.519 relative to the midpoint. Also, they find a positive and significant relation between price revisions and VC sales, but do not find a significant association with investment bank sales as I do.

The coefficients estimated for contemporaneous underpricing of IPOs in the same industry and the industry return during the issuer's bookbuilding phase are highly significant (p<.001) and suggest a large economic influence over price revisions. A one percent increase in the level of underpricing among the issuer's contemporaries increases the offer prices by 0.29 percent, relative to the midpoint. Also, a corresponding one percent increase in the industry return translates into an increase in price revisions by

0.19 percent, relative to the midpoint. In looking at the data by LW for the years 1996-2000, these coefficients have similar positive effects on price revisions.

As seen in Table V, price revisions are inversely related to the log of the issuing firm's age ($p<.001$) and positively related to high-tech firms ($p<.001$). In keeping with LW's interpretation of these variables, I believe that newer firms and those in newer industries (i.e. high-tech firms) are subject to more uncertainty in their pricing, and as a result, lead to increased price revisions. Looking again at Table V, note that banking reputation has a strong positive relation to price revisions ($p<.001$). It would therefore seem that prestigious banks are more adept at finding information and subsequently price aggressively. LW find that these variables also are significant during their sample period, and conclude that banks aggressively price young and more high-risked firms, resulting in increased price revisions.

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B. Underpricing

In Table VI, I report four models that attempt to explain the level of underpricing for the years 1992-1996 through pre-IPO ownership stakes and insider selling. And in addition to controlling for a fixed set of firm and offer characteristics as done in the price revision models, I have introduced additional variables. The participation ratio, which is the number of secondary sales sold relative to pre-IPO shares outstanding, is included in order to provide further insight into the effect of secondary sales on underpricing.

In LW's sample period, models mirroring what I have run in Table VI, display strong explanatory power for the level of underpricing. LW find a strong inverse effect

on underpricing by both the log of the firm's age and the participation ratio. My regression results are consistent with their findings and validate their assertion that underpricing is more severe when current shareholders have less at stake in the level of the offer price. I find that for every percentage increase in the level of participation (secondary sales), underpricing decreases by 0.065 percent.

In LW's paper, they are unable to confirm a direct relation between the investment bank rankings and underpricing. However, they confirm an indirect relation by finding that prestigious banks are more aggressive with their pricing through price revisions, therefore "indirectly" causing underpricing. My data confirms the indirect relation, however, unlike LW, confirms the direct relation between underpricing and investment bank rankings ($p<.001$). This data backs up work previously done by Loughran and Ritter, who confirm the inverse relation for our sample time period.

In Table VI, I report the positive and significant effect of both price revisions and price revisions (positive) on underpricing ($p<.001$). To illustrate, a one percent increase in price revisions increases the level of underpricing by 0.27 percent, or 0.43 percent if the price revision is positive. This finding is consistent with the findings documented by LW. I also report in Table VI a positive and significant affect on underpricing by the presence of high-technology firms ($p<.001$). LW note this finding and their paper for the years 1996-2000 by LW.

Controlling for firm and transaction characteristics, the pre-IPO ownership seems to vary in its effect on underpricing, as seen in the model (1). In LW's data, all stakes have a negative effect on underpricing, significantly and strongly so for VC and IB

stakes. In our data, only the pre-IPO ownership stake of the VC has a significant and negative effect (p=.038). Specifically, a one percent increase in the amount of the VC stake leads to a decrease in the level of underpricing by 0.00037 percent. Though the other stakes do not have a significant association with underpricing, I can confirm LW's conjecture that VC backed firms have strong relations with investment banks, and as a result of their stake in the company, they will pressure the investment banks to fairly price the offering.

In Model 9, I use the Herfindahl measure of ownership concentration in place of the individual stake variables. Its coefficient is negative, however not significant, which would have confirmed LW's conjecture that greater ownership concentration serves to increase offer prices and reduce underpricing.

In models (7) through (9), I report the effect of participation ratio alongside ownership variables on underpricing as significant and negative. In models (10) and (11) I disaggregate the participation ratio into sales by insiders as a group(10) and sales by CEOs, VS, and IB (11). I report on Table VI that neither insider sales nor the disaggregate sales have a significant effect on underpricing. The relation for all the variables is negative, but not at a high level of significance. In LW's paper, they find a negative and significant relation for both insider sales and VC sales. Our paper supports the negative effect, but cannot back LW's significant findings.

Section 5: Conclusion

In looking at both the data from the sample time period of 1992-1995 and comparing it to data from LW's sample period of 1996-2000, we see trends that continue and lead up to the extreme underpricing of the tech-bubble. The similarities in the data, especially among the effects of ownership stakes on price revisions and underpricing suggest a noticeable fall in the insider incentive to limit underpricing. Though the underpricing during the technology bubble was extreme and on first glance seems to be an aberration of the past averages of underpricing, LW suggest that this can be attested to drastic changes in insider ownership and selling behavior. The agency conflict that I mentioned early became much more influential, leading to CEOs and insiders to exert less influence on the level of underpricing. In my paper, I find that the stakes of venture capitalists, the stakes of investment banks, and ownership concentration have a significant and negative impact on price revisions. The data for 1992-1995 shows a strong explanatory power of VCs in determining the level underpricing; specifically increasing their stake in the firm decreases the amount of underpricing. Though the individual sellers (IB, CEO, VC) seem to not have a significant impact on underpricing, the aggregate of shares being sold, represented by the participation ratio, has significant effect. This confirms LW's claim that increased interest in the offer price through shares being sold will decrease the level of underpricing, regardless of who is selling. Overall, increasing the interests of players in the IPO through ownership stakes and secondary sales will negatively impact underpricing, providing companies with increased funding and limiting the amount of money left on the table.

Table V
Least-Squares Price Revision Regressions

The dependent variable in regressions (1) through (4) is the price revision from the midpoint of the initial filing range to the offer price, relative to the midpoint. The dependent variable in regression (5) is Loughran and Ritter's (2001) update of the Carter and Manaster (1990) investment bank ranking variable. Firm and offer characteristics are defined as in Tables I to IV. The two spillover variables are measured between the S-1 filling date and the final pricing date (the bookbuilding phase). Contemporary underpricing is computed as the average first-day return of all equally weighted return on all firms available in CRSP, according to the issuer's Fama-French industry. Models (1) through (5) are estimated using OSL. Standard errors are shown in italics. I use ***, **, * to denote significance at the 1 percent, 5 percent, and 10 percent levels (two-sided), respectively.

Column	(1)	(2)	(3)	(4)
Dependent Variable	Price Revision OLS	Price Revision OLS	Price Revision OLS	Price Revision OLS
Pre-IPO Ownership				
CEO Stake	0.0003099*			
	0.0001781			
VC Stake	-0.000532***			
	0.0001956			
IB Stake	-0.000662*			
	0.0004011			
Ownership Concentration		-0.0388**		
		0.01664		
Insider Sales at the IPO				
Size of insider sales			0.07744*	
			0.04538	
Size of CEO sales				0.4922***
				0.1601
Size of VC sales				0.1708

				0.1527
Size of IB Sales				0.3963*
				0.2065
Spillover Variables				
Mean contemporary underpricing	0.29095***	0.29503***	0.29257***	0.29336***
	0.03621	*0.03623*	*0.03627*	*0.03621*
Industry Return	0.19338***	0.19878***	0.19881***	0.19717***
	0.0318	*0.03186*	*0.03189*	*0.03181*
Firm and offer characteristics				
ln(1+age)	-0.01972***	-0.01736***	-0.01896***	-0.01948***
	0.004749	*0.004724*	*0.004779*	*0.004736*
=1 if high tech industry	0.06492***	0.0599***	0.06139***	0.06044***
	0.01081	*0.01071*	*0.0107*	*0.01074*
IB Ranking	0.009834***	0.007437***	0.007218***	0.007145***
	0.002107	*0.002028*	*0.002035*	*0.002031*
=1 if Venture Backed				
Constant	-0.09425***	-0.07679***	-0.08256***	-0.08346***
	0.01854	*0.01775*	*0.01748*	*0.01738*
R^2	13.20%	12.60%	12.50%	13.10%
F-test	31.18***	39.57***	39.09***	30.9***

Table VI
Least-Squares Underpricing Regressions

The dependent variable in all regressions is the initial return (the first-day closing price relative to the offer price). The participation ratio is the number of secondary shares sold at the IPO normalized by the number of pre-IPO shares outstanding. Price revisions positive equals the price revisions between the midpoint of the filing range and the final offer price if positive, and zero if otherwise. Models (7) through (11) are estimated using OSL. Standard errors are shown in italics. I use ***, **, * to denote significance at the 1 percent, 5 percent, and 10 percent levels (two-sided), respectively.

Column	(7)	(9)	(10)	(11)
Dependent Variable	Underpricing OLS	Underpricing OLS	Underpricing OLS	Underpricing OLS
Pre-IPO Ownership				
CEO Stake	0.0001417			
	0.0001643			
VC Stake	-0.0003733**			
	0.0001801			
IB Stake	0.0001381			
	0.0003668			
Ownership Concentration		-0.0143		
		0.01532		
Insider Sales at the IPO				
Size of insider sales			-0.06072	
			0.04141	
Size of CEO sales				-0.0217
				0.1469
Size of VC sales				-0.0691

				0.139
Size of IB Sales				-0.0782
				0.1999
Spillover Variables				
Mean contemporary underpricing				
Industry Return				
Firm and offer characteristics				
ln(1+age)	-0.009648**	-0.008124*	-0.008395*	-0.00837*
	0.004451	*0.004421*	*0.004397*	*0.004379*
Participation Ratio	-0.06515**	-0.0649**		
	0.03087	*0.03084*		
=1 if high tech industry	0.065479***	0.061657***	0.062088***	0.06253***
	0.009691	*0.009595*	*0.009567*	*0.01001*
IB Ranking	-0.005946***	-0.007032***	-0.007294***	-0.007709***
	0.002005	*0.00193*	*0.00192*	*0.001928*
Price Revision	0.26922***	0.27764***	0.27786***	0.28856***
	0.0402	*0.04006*	*0.03999*	*0.04035*
Prive Revision Positive	0.43576***	0.42771***	0.42982***	0.34991***
	0.06381	*0.06376*	*0.06368*	*0.06638*
Constant	0.16016***	0.16762***	0.16411***	0.16928***
	0.01667	*0.01582*	*0.01551*	*0.01548*
R^2	32.40%	32.20%	32.10%	27.60%
F-test	87.15***	111.09***	129.53***	73.7***

References

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