The Effects of Laddering and Spinning in Underwriter Manipulation of IPOs

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Abstract

Using a unique and larger sample of companies from going public from 1998-2000 classified by both spinning and laddering manipulation, we are able to disentangle the effects of laddering and spinning and find that much of the underpricing during the internet bubble was due to laddering rather than spinning. In fact, we find that a laddered IPO is expected to be underpriced by 110% compared to a non-laddered IPO. The effects of spinning are insignificant once laddering is simultaneously considered. Our study lends further support to the laddering theory of Aggarwal et al. (2006) as a reason for IPO underpricing during the internet bubble.

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I. Introduction

During the 1998-2000 period first-day initial public offering (IPO) returns averaged 65%, compared to the long-run average for first day returns of 10% (Loughgran and Ritter (2004)). First day IPO returns during the internet bubble period were so large that the traditional explanations of IPO underpricing were no longer sufficient. Before 1998, explanations for IPO underpricing focused on the riskiness associated with the future earnings of issuer firms and "informational frictions" between the various parties involved in an IPO.[2] New theories which attempted to reconcile the seemingly inexplicable returns of the 1998-2000 period with economic theory point to the importance of market manipulation and the realignment of issuer firm incentives. In this paper we will examine two forms of market manipulation, spinning and laddering, and test the hypothesis that these illegal activities are primarily responsible for the abnormally large first-day IPO returns from 1998-2000.

Ritter and Beatty (1986) provide a theoretical model of IPO underpricing consistent with portfolio theory, positing that underpricing is positively related to the uncertainty associated with a firm's prospects. Additional risk must be offset by higher expected returns so underwriters may intentionally underprice to attract investors to the IPOs of especially risky firms. Ritter and Beatty (1986) hypothesize that more speculative ventures tend to have smaller IPO offerings and thus are more underpriced. Notably, the SEC requires more speculative ventures to provide detailed disclosures for the uses of funds raised by equity sales in the Use of Proceeds section of the filing. As predicted, they find that offer size is negatively associated with underpricing while the number of uses for IPO proceeds is positively associated with underpricing. Ritter (1984) uses similar logic in an attempt to explain the "hot issue market of 1980." Although he finds a correlation between risk and average initial returns in some sectors, he finds evidence that underwriters were simply exploiting issuers by underpricing in the natural resource sector. Barry et al. (1990) provide further evidence for this hypothesis by showing that the IPOs of older firms with respect to their date of formation tend to be less underpriced than those of newer firms. They argue that older companies have more established reputations and longer earnings histories and thus there is less uncertainty associated with future earnings. Unfortunately, simple models of issuer firm risk

2 In perhaps the first attempt to theoretically explain IPO underpricing, Baron (1982) argues that underwriters have superior information about capital markets and are compensated for it by issuers through underpricing. Rock (1984) suggests that the presence of "informed investors" forces underwriters to underprice new issues relative to their true value in order to ensure that uninformed investors purchase the issues. Welch (1989) argues that underpricing is utilized by high-quality firms in an attempt to distinguish themselves from low-quality firms for whom underpricing is relatively more costly.

fail to explain much of the jump in underpricing during the internet bubble period. Loughran and Ritter (2004) propose the "changing risk hypothesis" – that firms going public in the internet bubble period were unusually speculative ventures – but find that it explains only "a small part of the increase in underpricing."

Other explanations focus on the incentives of issuer firms, underwriters, venture capitalists, auditors and lawyers involved in IPOs. The grandstanding hypothesis proposed by Gompers (1996) suggests that young venture capital firms have strong incentives to rush IPOs to market in order to establish their reputations and increase the likelihood of raising money for follow-on funds. Therefore these firms are more willing to transfer wealth from themselves (pre-IPO investors) to the purchasers of newly issued securities through the practice of IPO underpricing. Lee and Wahal (2004) empirically test the Gompers' hypothesis over the period from 1980-2000 and report results in favor of the existence of grandstanding. Additionally, they find that IPOs backed by venture capital firms (or "VC-backed IPOs") in general had significantly larger underpricing than non-VC-backed IPOs during this period. Demers and Lewellen (2003) provide evidence that similar incentives may have been present for issuer firms during the internet boom due to substantial advertising and marketing benefits. They find that IPO underpricing is positively associated with both subsequent newspaper article mentions in the Lexis-Nexis database and with issuer firm website traffic.

Beatty and Welch (1996) find that high-quality auditors and well-compensated lawyers are both associated with less underpricing. Moreover, they find that the negative relationship between underwriter prestige and underpricing in the 1980s was actually reversed in the 1990s. Although Loughran and Ritter (2004) find that VC-backing and prestigious underwriters are both positively associated with underpricing during the bubble period, these explanations fail to explain the increase in underpricing in general from 1998-2000. For example, they find that non-VC backed IPOs and IPOs with low-prestige underwriters were still underpriced by over 30% during the bubble period, more than double the average underpricing from 1990-1998.

In response to the failure of traditional models of underpricing to explain the 1998-2000 period, Ljunqvist and Wilhelm (2003) argue that underpricing during the internet bubble is a function of increased ownership fragmentation, and smaller proportional CEO ownership stakes. In this formulation, CEOs and other issuer firm executives had weaker incentives to bargain with underwriters for higher prices because they held smaller proportional stakes in their firms. However, Loughran and Ritter (2004) argue that there is scant empirical evidence for this explanation and further note that although

their proportional shares were smaller, in terms of the total dollar value of holdings CEOs held more equity in their IPOs during the bubble period than they had in the previous three years.

More recent attempts have focused on aspects of what Loughran and Ritter (2004) call the "changing issuer objective function" hypothesis. They specifically refer to two separate changes in issuer objectives: spinning and analyst lust. Spinning refers to the practice of allocating intentionally underpriced IPO shares as a payoff to corporate clients, while analyst lust refers to the desire of issuer firms to receive favorable analyst coverage. An additional factor that likely contributed to underpricing during the late 1990s was tie-in agreements whereby purchasers agree to buy additional shares of an issue in the aftermarket in exchange for access to the IPO. Aggarwal et al. (2005) investigate this phenomenon, commonly referred to as "laddering", and find that laddered IPOs between 1998 and 2000 had seven-times higher first day returns relative to IPOs without tie-in agreements.

Although the spinning and laddering hypotheses have each been tested in isolation, no paper has attempted to determine the relative effects of these two actions on underpricing. We determine the impact of each action using a new data set that incorporates a variety of legal complaints. We hypothesize that laddering and spinning will both be positively associated with underpricing, and that the inclusion of these two variables will explain much of the extreme underpricing during the 1998-2000 period.

The paper is organized as follows: section II describes the basic types of IPO market manipulation examined in this paper; section III discusses the data and methodology used in this paper; section IV discusses the empirical results; and section V concludes.

II. Types of IPO Market Manipulation

2.1: The Spinning Hypothesis

The spinning hypothesis suggests that issuer firm executives and venture capital investors will hire underwriters that underprice in exchange for separate side payments made directly to the individual decision makers. Spinning is a process through which these side payments can be made. According to Liu and Ritter (2010), ``Spinning is the allocation by underwriters of the shares of hot initial public offerings (IPOs) to company executives in order to influence their decisions in the hiring of investment bankers and/or the pricing of their own company's initial public offering."

Ljungqvist and Wilhelm (2003) briefly mention the rise of directed share programs (DSPs), whereby issuers allocate a predetermined proportion of shares in an IPO to ``friends and family'' including employees of the underwriter, customers and strategic corporate partners. This practice is distinct from spinning in that it is the issuer and not the underwriter who is ``directing'' shares. Griffith (2003) points out that issuers control the allocation of a miniscule proportion of shares in an IPO through DSPs, as opposed to underwriters who control the vast majority of shares. Further, this practice, unlike spinning, is generally legal as long as it is in compliance with SEC and/or NASD rules. Ljungqvist and Wilhelm show that from 1996-2000 DSPs became increasingly popular, with the fraction of DSPs rising from 19% in 1993 to 91% in 2000. Additionally, DSPs consistently enter Ljungqvist and Wilhelm's regressions on underpricing with positive coefficients significant at the 5% level. Although this evidence does not directly confirm the spinning hypothesis, it is highly suggestive as issuers and underwriters likely face similar incentives to please potential clients, business partners, and others by providing access to severely underpriced IPOs.

Loughran and Ritter (2004) argue that the spinning hypothesis is broadly consistent with the evidence because top-tier underwriters were more associated with underpricing during the internet bubble period. They use top-tier underwriters as a proxy for ``the ability and willingness to spin.'' However, without directly observing which decision makers had access to spun IPOs, the links between spinning and underpricing remain tenuous. Liu and Ritter (2010) aim to verify the relationship between spinning and underpricing by using a sample of 56 IPOs in which executives were allegedly spun by the infamous investment banker Frank Quattrone. They find that the first day returns of these IPOs were 23% higher than non-spun IPOs with similar characteristics. Although they find that both spinning and all-star analyst coverage are positively and significantly correlated with underpricing, they argue that these two explanations account for only ``9% of the 65% average underpricing during the 1999-2000 bubble.''

In our work, due to the use of a larger dataset on spinning, and since we examine both spinning and laddering simultaneously, we believe these hypotheses may have more explanatory power than these authors have found.

2.2: Laddering Hypothesis

Aggarwal et al. (2005) examine the practice of laddering, in which IPO investors agree to purchase shares in the aftermarket of an IPO in exchange for being granted access by the underwriter to invest in the IPO at the offer price. Underwriters use laddering to create excess demand which serves to artifi-

cially inflate the price of the issuer firms stock in the very short run. Logically, if investors are willing to agree to pay a higher price than the offer price in the aftermarket, they must believe that the true value of the shares lies above the offer price as determined by the underwriter. In other words, laddering can only occur when an underwriter intentionally underprices an IPO relative to its knowledge of the available demand for the issuer firm's equity.

Aggarwal et al. show that during the period from 1998-2000, IPOs that were laddered exhibited significantly different returns than those that were not. Interestingly, they also find that laddered IPOs subsequently underperform compared to non-laddered IPOs in the long run. This corroborates the findings from Purnanandam and Swaminathan (2004) who suggest that first day underpricing is negatively associated with the long-run performance of IPOs. Finally, Hao (2007) proposes that more expected underpricing unrelated to laddering will result in increased laddering and thus even more underpricing. This positive feedback loop between underpricing and laddering may explain both the size and persistence over time of underpricing from 1998-2000.

The class action lawsuits filed in late 2000 from which we draw much of our data potentially imposed new costs on laddering and broke the positive feedback loop Hao refers to even before the SEC began investigating IPO malfeasance in 2003[3] and regulations were tightened in 2004.[4]

2.2.6: Recurring Trends

Within the Czech Republic, three commodities – nuclear reactors (84), electrical machinery (85), and vehicles (87) – account for the largest increase in exports as well as the imports. These findings corroborate a strong intra-industry trade that allows the Czech Republic to support a growth in exports with a growth in imports of the same commodities. For vehicles (87), however, the intra-industry trade masks Outward Processing Trade that can be explained with a deeper level of disaggregation. While, aircraft and spacecrafts (88) are exiting Czech Republic's trade structure as a whole, this commodity is one of the few drastic changes within the import trade structure.

III. Data and Methodology

In order to test our hypotheses, we use data from 4,717 IPOs from 1989-2009. IPO data is primarily from Thomson ONE Banker (T1B). We define

3 See http://www.finra.org/web/groups/industry/@ip/@reg/@guide/documents/industry/p010373.pdf.
4 See http://www.sec.gov/news/press/2004-145.htm.

underpricing as IPO Underpricing = $\frac{P_c - P_o}{P_o}$ where P_C is the price at the end of the first day of trading and P_O is the price designated by the underwriter for the IPO.

We test the impact of spinning and laddering[5] on IPO underpricing controlling for underwriter prestige[6], previous venture capital investment (from T1B), issuer firm age (from T1B), issue size (from T1B), industry earnings volatility and industry price earnings (PE) ratio (from COMPUSTAT).

Table 1. Summary Statistics for Regression Variables

VARIABLES	Mean	Median	Std. Dev.	Min	Max
IPO_Underpricing	0.2318	0.09	0.5064	-0.9982	7.095
Spinning	0.01931	-	0.139	0	1
Laddering	0.0634	-	0.2437	0	1
VC_Backed	0.2968	-	0.4569	0	1
Underwriter_rep	7.32	8	2.154	1	9
Industry_PE	52.85	36.78	53.928	3.606	296.48
Industry_EarningsVol	0.2956	0.2265	0.2865	0.0089	7.379
Age (Years)	15.01	7.937	20.345	0.0547	224.7
Size ($ Millions)	108.58	42	417.26	0.3795	17864

In order to create the dummy variables for spinning and laddering, data were pooled from a variety of sources including http://www.iposecuritieslitigation.com/, the U.S. Securities and Exchange Commission (SEC) and the Financial Industry Regulatory Authority (FINRA) complaints, class action lawsuits and previous published work. The majority of the data for laddering was obtained from 309 coordinated class action lawsuits filed in the United States District Court for the Southern District of New York beginning in 2000. These cases were collectively known as IPO Securities Litigation, 21 MC 92 (SAS), and were eventually settled for a total of $586 Million in 2009.[7]

The IPO's for each of the 309 issuer firms listed in the Consolidated

5 Source: http://www.iposecuritieslitigation.com/.
6 Source: http://bear.warrington.ufl.edu/ritter/ipodata.htm.
7 Source: http://online.wsj.com/article/SB125484583634868029.html.

Amended Complaints are considered to have been laddered in our data.[8] Additional data on laddering was gathered from SEC complaints against J.P. Morgan Securities Inc.[9], Morgan Stanley & Co Inc.[10], and Goldman, Sachs & Co.[11] Each of these three firms eventually reached settlements with the SEC numbering in the tens of millions of dollars.[12] As with the class action lawsuit, any IPOs mentioned in these complaints receive a 1 for our laddering dummy variable.

To create the dummy variable for spinning, we use a methodology similar to Liu and Ritter (2010) to identify IPOs for which executives either at the issuer firm or other corporate clients received side payments in the form of IPO shares in their personal brokerage accounts. Liu and Ritter (2010) assemble data from 1996-2000 on IPOs spun by a prominent investment banker, Frank Quattrone, while he worked at Deutsche Morgan Grenfell (DMG), Credit Suisse First Boston (CSFB), and Solomon Smith Barney (SSB). IPOs that were spun at DMG and CSFB are taken from Government Exhibit 2051 dated March 21, 2000 from the case against Quattrone. IPOs spun at SSB were taken from information supplied to the Office of the Attorney General of New York through a Freedom of Information Act request. We classify all 56 IPOs listed in Liu and Ritter's Appendix Table IA-1 as having been spun.[13] Further, we include the IPOs allegedly spun in a class action suit filed in the Northern District of California against CSFB which are not contained in Ritter and Liu's data.[14] It should be noted that all IPOs listed in the Northern District of California class action suit are classified as having been laddered and spun whether or not they are contained in Ritter and Liu's data as the case alleges that CSFB engaged in both practices. Finally, we include all IPOs allegedly spun in SEC complaints against Citigroup Global Markets Inc.[15], Robertson Stephens Inc.[16], and NASD's allegations against Piper Jaffray & Co.[17] To our knowledge, the data we have collected on spinning and laddering represent the most exhaustive dataset currently available (see Table 2).

8 http://www.iposecuritieslitigation.com/complaint.php3.
9 http://www.sec.gov/litigation/complaints/comp18385.htm.
10 http://www.sec.gov/litigation/complaints/comp19050.pdf.
11 http://www.sec.gov/litigation/complaints/comp19051.pdf.
12 http://www.sec.gov/litigation/litreleases/lr18385.htm and http://www.sec.gov/news/press/2005-10.htm.
13 http://bear.warrington.ufl.edu/ritter/work_papers/SpinningSept15_2009Appendices.pdf.
14 http://securities.stanford.edu/1025/CSFBC02-06/20010815_o01c_013151.pdf.
15 http://www.sec.gov/litigation/complaints/comp18111.htm.
16 http://www.sec.gov/litigation/complaints/comp17923.htm.
17 http://www.finra.org/Newsroom/NewsReleases/2004/P011463.

Table 2. Summary Statistics for Spinning and Laddering Dummy Variables

Manipulation Type	Number of IPOs	Mean Underpricing
Spinning Only	25	31.86%
Laddering Only	244	131.96%
Laddering and Spinning	72	134.46%
Neither	4,911	15.60%

The industry PE and industry earnings volatility variables are created using data from Compustat for the years 1987-2003. For industry PE (variable Industry_PE), we use the average of the price to earnings ratios of all of the firms with the same SIC code in the same year. We use the industry PE ratio from the previous year to ensure that all the information captured by our variable would have been available to the market at the time of the IPO.

Theoretically, the industry PE ratio should not enter significantly in our regressions. Underwriters use a variety of valuation methods when setting the offer price for an IPO including most commonly the dividend discount model (DDM), discounted free cash flow models, and valuations based on price/earnings and/or price/cash flow of comparable firms. Deloof et al. (2002) show that compared to the DDM, valuation methods such as the PE ratio tend to arrive at higher values. However, unless investors rely more on PE models than underwriters there should be no wedge between IPO offer prices and the closing price on the first day of trading based on industry PE. Kim and Ritter (1999) provide further evidence for why a simple measure such as industry PE should not affect underpricing:

> The difficulty of using comparable firm multiples for valuing IPOs, without further adjustments, leaves a large role for investment bankers in valuing IPOs. Because using the midpoint of the offer price range results in smaller prediction errors than using comparables, investment bankers apparently are able to do superior fundamental analysis. In addition, investment bankers are able to achieve additional valuation accuracy by canvassing market demand before setting a final offer price. While much attention has been focused on the wide variation between the offer price and subsequent market prices that occurs in practice, our results suggest that the pricing precision would be much worse if a mechanical algorithm was used instead.

Therefore, a significant positive relationship between industry PE and underpricing would suggest that naive investors may be overpaying for issues in highly valued or "hot" sectors compared to the more complex analyses of underwriters. This result would confirm Ljungqvist and Wilhelm's proposition that "investors were simply optimistic in the extreme," and the incentives of both issuer firms and underwriters were to "fan the flames of excessive optimism." Alternatively, a significant negative relationship would suggest that underwriters are relying more heavily on PE valuation models compared to investors who may be taking a more conservative DDM approach.

For industry earnings volatility (variable Industry_EarningsVol) we take the average of the standard deviations of quarterly earnings from the eight quarters in the previous two years from all companies with the same SIC code. We expect that industry earnings volatility will enter our regressions with a positive coefficient as investors should demand a premium for holding the equity of riskier ventures. If more IPOs occurred in industries with high earnings volatility from 1998-2000 and the coefficient is positive as expected, this would provide evidence in favor of Loughran and Ritter's "changing risk hypothesis" that IPO firms during this period were unusually risky.

Underwriter Reputation and Age are both taken from Jay Ritter's website.[18] The methodology for the Underwriter Reputation data amassed by Ritter is largely taken from Carter and Manaster (1990). For Age we simply take the difference in years between the founding date and the offer date. The variable Size refers to the dollar value of the IPO, which corresponds to the offer price times the number of shares issued. VC_backed is a dummy variable representing whether or not an issuer firm received funding from a venture capital firm prior to its IPO. Data for Size and VC_backed are both taken from T1B.

IV. Empirical Results

We perform regressions over two time periods: 1989-2009 and 1998-2000. Results are shown in Table 3 with the standard errors reported in parentheses.

18 http://bear.warrington.ufl.edu/ritter/ipodata.htm.

Table 3. OLS Underpricing Regressions Results: Dependent Variable IPO_Underpricing

	(1)	(2)	(3)	(4)
	1989-2009	1989-2009	1989-2009	1998-2000
Independent Variable				
Spinning	0.761***	0.0858	0.0726	0.0653
	(0.115)	(0.109)	(0.109)	(0.124)
Laddering	.	1.100***	1.036***	0.996
	.	(0.0663)	(0.0684)	(0.0703)
VC_Backed	0.0124	0.00454	0.00971	0.0278
	(0.0169)	(0.0146)	(0.0146)	(0.0566)
Underwriter_Rep	0.0201***	0.00484**	0.00393*	0.0226***
	(0.00285)	(0.00237)	(0.00235)	(0.00871)
Industry_PE	0.00178***	0.000727***	0.000596***	0.000655**
	(0.000210)	(0.000160)	(0.000159)	(0.000295)
Industry_Earnings_Vol	-0.000454	-0.0221	-0.0195	-0.0361
	(0.0193)	(0.0166)	(0.0166)	(0.163)
Age	-0.00238***	-0.00138***	-0.00132***	-0.00360***
	(0.000219)	(0.000172)	(0.000168)	(0.000751)
Size	1.06e-06	5.00e-06	2.71e-05	2.40e-06
	(9.16e-06)	(8.991e-06)	(9.02e-05)	(5.84e-06)
Constant	0.00627	0.112***	0.0917	0.0826
	(0.0222)	(0.0190)	(0.0193)	(0.0711)
	.	.	0.107***	.
Internet Dummy	.	.	(0.0191)	.
Observations	4,717	4,717	4,717	1,042
R-squared	0.115	0.334	0.338	0.322

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Regression 1 is the standard result for considering spinning in isolation of laddering. It shows that spinning is significant in explaining IPO underpricing. However, it leaves out laddering.

Regression 2 indicates that laddering, underwriter reputation, industry PE and age all significantly impact underpricing. As expected, laddering has a positive effect on underpricing. The laddering coefficient of 1.100 indicates that a laddered IPO is expected to be underpriced by an additional 110 percentage points compared to non-laddered IPOs, controlling for other factors.

This is a striking result especially considering that our variable for spinning is is no longer statistically insignificant at any confidence level and exhibits a coefficient of only 0.0858. All of the laddered IPOs in our data occurred during the period from 1998-2000; therefore, it appears likely that laddering was responsible for a large portion of the unusually high underpricing during this period.[19]

Contrary to Lee and Wahal (2004) we do not find a statistically significant relationship between venture capital backing and IPO underpricing, which may be driven by the fact that we use a different dataset to construct our VC dummy variable. As expected, we find a statistically significant positive relationship between underwriter prestige and underpricing. The coefficient of 0.00484 in regression 1 is somewhat difficult to interpret due to the construction of the Carter-Manaster underwriter ranking.

Therefore in regressions not reported in the table, we rerun regression 1 with a dummy variable with a value of one for ``top-tier'' underwriters with a Carter-Manaster rank of 8.0 or greater and zero otherwise in place of the original underwriter reputation variable. The top tier underwriter dummy variable enters with a coefficient 0.0256 and is statistically significant at the 5% level. Therefore top tier underwriters underprice by only approximately 2.56 percentage points more than their competitors.

We further examine only the 1998-2000 period with this variable, although do not report it in this paper. The coefficient for the top tier underwriter dummy increases to 0.0872 and remains statistically significant at the 5% level. Further, this is the only subperiod for which underwriter rank is statistically significant. This is consistent with the results from Loughran and Ritter (2004) who only find a statistically significant positive relationship between top tier underwriters and underpricing from 1999-2000.

The results of Regression 1 also indicate a statistically significant relationship between issuer firm age and underpricing, although the economic significance of the relationship is quite modest. In our sample the median age of a firm at the time of the IPO is just under 8 years. The 75th percentile age is 15.48 years. In terms of expected underpricing, our coefficient on firm age predicts that the 75th percentile firm in terms of age will be underpriced by 1.04% (-0.00138 x (15.48 - 7.937)) less than the median age firm. This relationship is somewhat stronger during the 1998-2000 period in which the same increase in age is associated with a 2.72% (-0.00360 x (15.48 - 7.937)) decrease in underpricing. The coefficient for issue size is positive but not sta-

19 One might argue that large underpricing was likely to lead to lawsuits, which is the majority of our sample. This would cause a simultaneity problem, however we would argue that the causation is primarily driven from laddering to underpricing. Also, the law suits could have been on other issues and not related to laddering per se.

tistically significant.

We also find a positive relationship between industry PE and underpricing which is statistically significant at the 1% level. A one standard deviation increase in industry PE results in a 3.92% (53.928 x 0.000727) increase in underpricing.

During the 1998-2000 period a one standard deviation increase in industry PE results in a 5.25% (83.57 x 0.000655) increase in underpricing and the relationship remains significant at the 5% level. Industry earnings volatility, however, does not have a statistically significant coefficient in regression 1. Contrary to theory, the coefficient on industry earnings volatility is negative in our main regression and many subsample regressions we conducted but not reported in the paper.[20]

V. Conclusion

Our results provide considerable evidence in support of the hypothesis put forth by Aggarwal et al. (2006) that laddering "explains most of the unusual IPO underpricing from the late 1990s." In total, we found that 316 IPOs were laddered between 1998 and 2000 compared to 819 that were not. For the 819 IPOs which were not laddered, mean underpricing was only 25.3% and median underpricing was only 10%. These figures compare to 17.7% mean underpricing and 6.9% median underpricing for the entire 1989-2009 period. In short, outside of laddering activity, IPOs during the internet bubble period were only partly different from IPOs in the broader 1989-2009 period.

This is not to say that the shares bought directly as a result of laddering agreements fully account for the increase in underpricing during the 1998-2000 period. On the contrary, we believe there are a number of behavioral explanations which help to explain the predictive strength of laddering in our regressions. First, as explained by Hao (2006) there is likely a positive feedback loop between expected underpricing and laddering. If investors believe that an offer price is too low, laddering will be more likely to occur, thus driving up the aftermarket price and creating an even wider gap between the offer price and the aftermarket price. The informational cascades discussed by Welch (1992) also provide insight on this matter. For example, if investors are misinterpreting laddering agreements as strong buy signals from supposedly informed investors, they may drive the price of an issue even higher than the value stipulated in laddering agreements.[21]

20 In a regression using only the period 2001-2009 this relationship becomes significant at the 5% level. Increasing earnings volatility by one standard deviation is associated with a one percentage point decrease in underpricing.

21 Of course, it is not clear that investors would have been aware of these agreements.

Further, we believe that the relationship discussed by Loughran and Ritter (2004) and Liu and Ritter (2010) between spinning and underpricing may actually be capturing the effects of laddering, which is omitted from their studies. If we perform a similar exercise and remove the laddering dummy variable from our main regression, the coefficient on our spinning dummy jumps from 0.0858 to 0.761 and becomes significant at the 1% level. When our laddering dummy is included, the spinning dummy is statistically insignificant at any confidence level. This suggests that underpricing during the internet bubble period was driven much more by manipulation in the aftermarket than the "changing issuer objective function" hypothesis of Loughran and Ritter (2004).

Perhaps our most interesting result is the finding that the PE ratio of firms within an issuer firm's industry has a statistically significant impact on IPO underpricing. This suggests that IPO investors were willing to pay relatively more for issues in industries that are highly valued by the market compared to what underwriters believe they are worth. This affect strengthened during the internet bubble period, and disappeared after the bubble burst in 2001.

In analysis not reported in this paper, we find that industry PE is no longer statistically significant during the 2001-2009 period. These findings correspond with Ljunqvist and Wilhelm's (2003) suggestion that "investors were simply optimistic in the extreme." However, they apply not only to the internet bubble period, but to the broader period from 1989-2000. During this period, the S&P 500 rose from 277.72 to 1320.28, meaning that a simple buy-and-hold strategy would have yielded over 15% per year not including dividends. The incredible bull market experience of 1989-2000 may have irrationally driven investors toward issues in hot sectors, similar to the phenomenon that Ritter (1984) discusses in the natural resource sector.

Our result is especially interesting when considering the long-run fair market value of IPO issues. Purnanandam and Swaminathan (2004) show that "IPOs are overvalued at the offer price, tend to run up in the after market and revert to fair value in the long run." This finding questions the very notion of IPO "underpricing." It appears that underwriters tend to fundamentally overestimate the value of an IPO even if the market believes this valuation to be too low. Purnanandam and Swaminathan (2004) suggest that investors' overconfidence about private knowledge of IPO firms may be responsible for initial aftermarket overvaluation. However, our results suggest that individuals may not even have any firm-specific information on which to trade.

On the contrary, for over a decade investors systematically overvalued IPO issues of firms simply because they operated in industries to which

the market attached high valuations. Underwriters may not have completely adjusted their models to account for buy-side irrationalities but in terms of long-run value they still overpriced somewhat. Underwriters threw fuel on the fire of investor overconfidence when they engaged in laddering agreements, but there is little evidence to suggest that they underpriced IPOs relative to fair value in the long-run during the period examined. This paper suggests that future studies should not ignore the incentives and behavior of IPO buyers, as first-day IPO performance is as much a function of their actions as underwriters and issuer firms.

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