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The marketing role of IPOs: evidence from internet stocks ☆

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Abstract

This paper explores the potential marketing benefits of going public and of IPO underpricing. We examine the impact of IPO underpricing on website traffic, which is a direct measure of product market performance for internet firms. If underpricing attracts media attention and creates valuable publicity, we expect an increase in web traffic following the IPO. We find that web traffic growth in the month after the IPO is positively and significantly associated with initial returns, and the effect is economically significant. We also investigate media reaction to initial returns for a broader sample of IPOs. The results suggest that the marketing benefits of underpricing extend beyond the internet sector and the "hot issues" market of the late 1990s.

JEL classification: G32; M41; M3

Keywords: IPO; Underpricing; Marketing; Internet; Web traffic

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1. Introduction

From the inception of the internet industry in the mid-1990s through February 2000, 373 internet companies went public in the US, raising proceeds of over $26 billion and leaving a total of approximately $27 billion on the table in the form of underpricing. By comparison, from the beginning of 1990 through to February 2000, almost 4,000 non-internet companies made initial public offerings (IPOs) on US exchanges, raising $262 billion in total proceeds and leaving approximately $38 billion on the table. "Money left on the table" is defined as the first-day price gain multiplied by the number of shares sold. The combined average (median) underpricing of 23% (8%) for all IPOs during this period represents a significant opportunity cost to the issuing companies and their shareholders.

The finance literature suggests a number of possible explanations for IPO underpricing, including (a) information asymmetry between investor groups (Rock, 1986), (b) a reward to investors for revealing their private information about the IPO (Benveniste and Spindt, 1989), (c) signaling by the issuing firms (Welch, 1989), and (d) prospect theory (Loughran and Ritter, 2002a).[1] In this paper, we investigate another possible benefit of IPO underpricing. We consider advertising and marketing benefits in the company's product markets. Anecdotal accounts, particularly in the recently emerged internet sector, suggest that companies enjoy significant increases in publicity surrounding their IPO. In writing about Netscape's initial offering, for example, a typical popular press account suggested that "the delirious Netscape IPO became a marketing tool unto itself, as valuable as the cash it brought to the company" (Kaplan, 1999, p. 250).[2] The anecdotes imply that a significant amount of valuable "free" publicity can be derived from going public and from underpricing stock at the time of initial public offering. In this paper, we empirically investigate the potential marketing role of IPOs and IPO underpricing.

We first focus on a sample of internet IPOs for which we have data on website traffic at the time of IPO. The data offer a unique and timely measure of marketing benefits. If underpricing attracts media attention and creates valuable publicity for issuing firms, this effect should be reflected in an increased number of website visitors following the IPO. Thus, we test whether, controlling for other determinants of web traffic, firms with higher initial returns experience higher traffic growth in the month after IPO. We also investigate whether the impact of initial returns on post-IPO web traffic is economically significant. Finally, we explore media reaction to initial returns for a broader sample of IPOs to test whether the marketing benefits of underpricing extend beyond the internet sector and the "hot issues" market of the late 1990s.

[1] Recent studies (Schultz and Zaman, 2001; Ljungqvist and Wilhelm, 2003) examine incentives to underprice during the hot-issues market of the late 1990s.

[2] See also Perkins and Perkins' (1999) account of Yahoo!'s IPO pricing deliberations, which apparently involved a conscious strategy of initial underpricing in order to generate publicity and boost Yahoo!'s brand recognition.

There are several advantages associated with using web traffic as a measure of the marketing benefits from IPOs for internet firms. First, unlike revenues, website traffic measures are available on a monthly rather than on a quarterly basis, which makes the effect of IPO-related publicity easier to detect. Second, within the internet sector, website traffic is considered an important indicator of corporate performance. Website traffic metrics are frequently cited as performance measures in the popular business press, in analysts' reports, and in internet companies' own voluntary disclosures at the time of their earnings announcements. Prior research establishes that internet traffic measures (such as the number of unique visitors to a company's website) are significantly associated with future revenues (Trueman et al., 2001) and with the contemporaneous market values (Hand, 2000; Rajgopal et al., 2000; Demers and Lev, 2001). Web traffic is valuable to internet companies because it generates sales and service revenues. Advertising revenues earned by internet firms also depend on the amount of traffic at their websites.

Consistent with our hypothesis, we find that the post-IPO growth in web traffic is positively associated with initial returns. The results are robust to the inclusion of other determinants of traffic growth, including marketing expense, prior traffic growth, IPO size, and the existence of a marketing-related strategic alliance. To investigate the economic significance of the results, we estimate the cost associated with gaining one additional website visitor through underpricing for an average internet firm in our sample. Our estimate is comparable in magnitude to the per-customer marketing expenses reported by the Wall Street Journal for several specific internet firms. The estimate is also consistent with the value of web traffic implied by several valuation studies (e.g., Rajgopal et al., 2000; Trueman et al., 2001). Thus, our evidence suggests that initial returns generate significant marketing benefits for internet firms, and that underpricing might be substantially less costly for these firms than suggested by the raw amount of money left on the table at IPO.

To investigate whether marketing benefits associated with going public extend beyond the hot market for consumer-oriented internet IPOs for which we have web-traffic data, we extend our analysis to a larger sample of internet companies and to a random sample of non-internet IPOs. Because direct measures of marketing benefits are not readily available for these samples, we identify an alternative indirect measure. Specifically, we explore *media exposure* around the time of issuing companies' IPOs. We use the number of media cites reported for the company in the Lexis-Nexis Major Newspapers Database as a proxy for media interest. For each of the internet and non-internet samples we find that the number of media cites increases significantly in the month of IPO. Further, for both samples, the post-IPO media exposure is positively and significantly associated with initial returns, after controlling for other potential determinants of media exposure. This evidence suggests that the marketing benefits of IPOs extend to a broader sample of issuing firms.

In a contemporaneous study, DuCharme et al. (2001) also examine the potential marketing role of IPOs. Their "branding hypothesis" investigates whether IPO underpricing is greater for the subsample of business-to-consumer (B2C) internet companies and whether post-IPO revenues increase with IPO underpricing. Their

evidence regarding the branding hypothesis is mixed. They find that underpricing is higher for B2C internet companies relative to other internet companies, but they do not find a significant association between underpricing and post-IPO sales revenue. Our monthly web-traffic data provides an alternative, shorter-window, and more direct measure of the marketing impact of underpricing. In a related study, Aggarwal, Krigman, and Womack (2002) also argue that extreme underpricing attracts media attention and creates publicity for the issuing firm. However, contrary to our paper, they do not investigate the link between the additional publicity and the product market demand. Instead, they focus on the effects of publicity on the investors' demand for the IPO stock.

Our study also relates to the growing literature on the interactions between financing and product markets. The early literature in this area focuses on the relation between debt levels and product market behavior (Maksimovic, 1988; Bolton and Scharfstein, 1990; Chevalier, 1995; Kovenock and Phillips, 1995). More recently, researchers examine the relation between venture capital financing and the product market strategies of start-up companies (Hellmann and Puri, 2000), as well as the product market benefits of corporate block owners (Allen and Phillips, 2000). Bushman and Smith (2001) discuss the effects of financial market characteristics on firms' performance.

The balance of this paper is organized as follows. In Section 2 we describe sample selection and data and present descriptive statistics for the samples. Section 3 examines the association between underpricing and web traffic for the subsample of internet companies for which we have traffic data. Section 4 presents evidence on the marketing benefits of underpricing for a larger sample of internet and non-internet IPOs. Section 5 concludes.

2. Data, sample, and descriptive statistics

2.1. Classification of internet firms

Internet companies are defined as firms that earn the majority of their revenues as a result of the existence of the internet. There does not currently exist a Standard Industrial Classification (SIC) code for internet companies, and therefore a listing of all internet IPOs was compiled from several sources. We began with the InternetStockList (provided by internet.com), a frequently cited list of currently trading internet companies. Because the InternetStockList exhibits a survivorship bias (i.e., only currently trading companies are included on the list), we also referred to the Morgan Stanley Dean Witter (MSDW) Technology and Internet IPO Yearbook. The MSDW yearbook provides a comprehensive listing of all technology and internet IPOs for the 1980 to 1999 period, including those that subsequently have been acquired. We examine separately B2C internet firms because they are expected to enjoy greater benefits from media and publicity than business-to-business (B2B) internet companies. We define internet firms as B2C if they fall into any of the following internet sectors: e-tail, content/communities, financial news/

services, portal, services, and advertising.[3] All the remaining internet companies are classified as B2B.

2.2. Internet sample for web-traffic regressions

The analysis involving web-traffic data is based on a sample of 55 internet IPOs for which we have web-traffic data at the time of the IPO. The data come from the Nielsen//NetRatings database and are available on a monthly basis starting in February 1999. Since we collect the data for five months surrounding the IPO, we begin the sample selection with a list of all internet IPOs that went public from April 1999 through December 2001. The initial list consists of 335 internet IPOs, excluding spin-offs, unit issues, and non-US IPOs. From this sample, we find traffic data for 55 IPOs. We lose the remaining observations because, as explained in more detail in Section 2.2, the Nielsen//NetRatings database includes only firms with relatively high levels of web traffic. Since web traffic is probably higher for consumer-oriented than for business-oriented firms, it is not surprising that most of our sample firms are B2C (only six out of the 55 firms are B2B). For comparison, the fraction of B2B firms in the population of 335 internet IPOs is as high as 53%. In Section 2.3, we show that our traffic sample is similar to the broader B2C population with respect to issue size, underwriter rank, initial returns, and other characteristics.

2.3. Internet and non-internet samples for media-mentions regressions

For the analysis of the IPO-related media interest, which does not involve web-traffic data, we can extend our sample to a longer period and a larger cross-section of firms. We construct two samples of internet and non-internet firms that went public from January 1990 through February 2000. According to the Securities Data Corporation (SDC) New Issues Database, 4,274 companies undertook initial public offerings during this period, excluding spin-offs, unit issues, and non-US IPOs. From this sample, 373 companies are classified as internet stocks (191 of them are B2C). We generate a sample of 220 non-internet IPO firms by randomly selecting from the population of 2,701 IPOs remaining in the SDC database after dropping internet firms and imposing data availability constraints.[4] We exclude observations with missing values for initial returns, filing range, proceeds, assets before IPO, net income and venture-capital dummy. On the basis of issue size, initial returns, industry composition, and underwriter rank, our random sample is similar to the underlying population.

[3] The Internet companies' industry segments were identified from the classification scheme provided by Wall Street Research Net © WSRN.com (http://www1.wsrn.com/icom_index/index.xpl), where available, or alternatively from the industry sector classification suggested by Morgan Stanley Dean Witter's Technology and Internet IPO Yearbook.

[4] It is worth noting that imposing this data availability constraint could induce a selection bias. Lowry and Schwert (2001) document that IPOs with complete data in the SDC database are more likely to occur in the second half of our sample period, tend to have higher initial returns and aftermarket volatility, and a lower number of shares offered than the entire population of IPO firms.

2.4. Data description

The daily stock prices are obtained from the Center for Research in Security Prices (CRSP) tapes. Information on IPOs is derived from the SDC New Issues Database. Data related to the announcement of strategic alliances come from the SDC Mergers and Acquisitions Database. For the internet sample, the pre-IPO financial statement variables are hand-collected from issuing companies' prospectuses and S-1 Registration filings.

Internet web-traffic data is derived from the Nielsen//NetRatings Audience Measurement Database. Nielsen//NetRatings, together with MediaMetrix and PC Data Online, are the leading providers of commercial web-traffic databases. We use the web-traffic metric referred to as "unique audience," which is the number of unique web surfers who have visited the internet company's website during the month. The Nielsen//NetRatings data is available on a monthly basis beginning with the month of February 1999. The database includes audience measures for all web properties that meet the statistical cutoff for that particular month.[5]

We use the number of media mentions in the Major Newspapers Database within the Lexis-Nexis Academic Universe as our proxy for the level of publicity in the months surrounding the IPO. The Major Newspapers Database includes all US newspapers that are listed in the top 50 by circulation in Editor and Publisher Year Book. Newspapers published outside of the US are included if they are both in the English language and listed as a national newspaper in Benn's World Media Directory or if they are one of the top 5% in circulation for the country. We acknowledge that this proxy is a noisy measure of total publicity because it excludes other sources of information, such as radio, television, and internet media.

2.5. Descriptive statistics

Fig. 1 presents a histogram of internet, non-internet technology, and all other IPOs for the sample period of 1990 through February 2000. The graph shows that the first internet company (AOL) went public in 1992, while the preponderance of internet IPOs took place during the "bubble period" of 1999. Non-internet technology and other IPOs similarly exhibit clustering patterns across time, consistent with those found in Lowry and Schwert (2002).

Table 1 compares characteristics of internet, non-internet technology, and all other IPOs for the period 1990 through February 2000. The table shows that internet companies experience considerably higher initial returns than other IPOs, earning mean (median) initial returns of 82% (52%), relative to 24% (12%) for non-internet technology firms and 10% (5%) for non-technology firms. For

[5] According to Nielsen//NetRatings, a web property meets the cutoff in any given month if a sufficient number of Nielsen//NetRatings' approximately 50,000 panel members visit the site, such that extrapolation to the population of web surfers as a whole can be reliably performed.

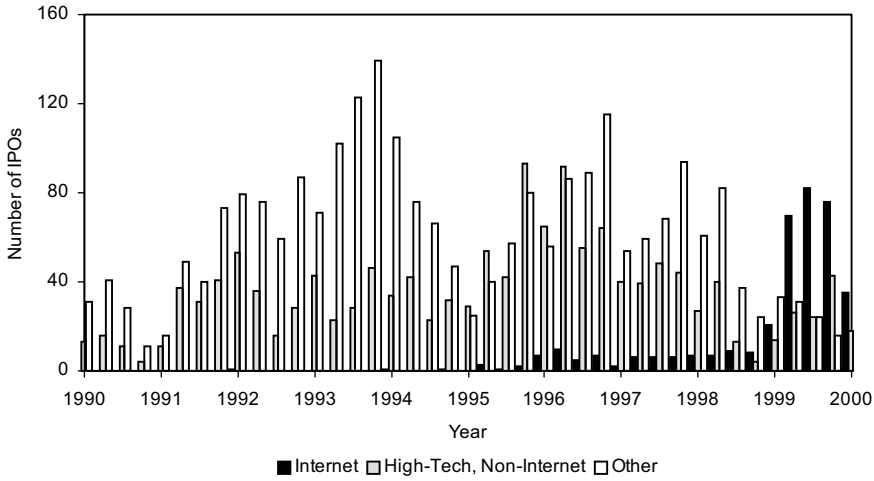

Fig. 1. Number of initial public offerings by calendar quarter. The sample consists of 4,274 US IPOs, excluding spin-offs and unit issues, from January 1990 through February 2000. We identify high-tech IPOs based on the Securities Data Corporation (SDC) classification. InternetStockList provided by internet.com and Morgan Stanley Dean Witter Technology and Internet IPO Yearbook are used to identify internet IPOs.

internet stocks, the offering price is set, on average, 24% above the midpoint of the initial filing range. By comparison, the mean (median) price update is only 3% (0%) for non-internet technology firms and –1% (0%) for non-technology firms. The price update is defined as: (offer price—midpoint of the filing range)/ midpoint of the filing range. Internet stocks exhibit significantly higher post-IPO volatility relative to non-internet companies. The median internet company raises more proceeds than a median non-internet firm. It is more common for internet and technology firms to have venture-capital (VC) involvement compared to other IPOs, and internet companies tend to use more highly ranked underwriters. Insiders retain somewhat higher percentage ownership in the internet than in the non-internet firms after the IPO. Both the mean and median internet company reported negative earnings for the fiscal year prior to the IPO. By comparison, the median return on assets (ROA) is positive for both non-internet samples.

Table 2 presents descriptive statistics for each of the four samples used in the regression analysis. The sample of 55 internet firms used in the web-traffic regressions, 49 of which are business-to-consumer, is similar to the population of B2C firms. The average offering in the traffic sample is somewhat larger, is underwritten by a more reputable underwriter, is more frequently backed by venture capital, and has lower initial returns than an average B2C firm in the population. However, the differences are not statistically significant. To be included in our web traffic sample, a firm must be covered by Nielsen//NetRatings. This requirement

Table 1
Descriptive statistics for internet, high-tech, and other IPOs
The sample consists of 4,274 US IPOs, excluding spin-offs and unit issues, from January 1990 through February 2000. PROC ($mil.) is the number of shares sold in the offering, excluding overallotment shares, times the offer price. ASSET ($mil.) are total assets before IPO. ROA is the net income before the IPO divided by total assets. VC is a dummy variable equal to one if the IPO is backed by venture capital. RANK are total proceeds of IPOs underwritten by the lead underwriter during the sample period in percent of total IPO proceeds. IRET = (closing price on the first trading day–offer price)/offer price. MONEY ($mil.) is the number of shares offered, excluding overallotment shares, times the difference between the first-day closing price and the offer price. VOLAT is the annualized standard deviation of stock returns computed from daily returns during the first 20 trading days after the IPO. UPDATE = (offer price–midpoint of the filling range)/midpoint of the filling range. RET 1 – 20 (2 – 20) are cumulative returns for the first 20 trading days after the IPO, including (excluding) the initial return. N is the number of all IPOs in each sample. Most variables have missing values for some IPOs.

	Internet		B2C		B2B		High-tech non-internet		Other	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
PROC	71.59	56.50	73.05	56.50	70.06	56.50	43.38	29.70	82.12	35.00
ASSET	69.18	18.30	97.06	19.50	39.74	17.50	88.15	15.40	457.16	28.85
ROA	−0.62	−0.36	−0.76	−0.35	−0.47	−0.36	−0.25	0.02	−0.05	0.04
VC	0.75	1.00	0.74	1.00	0.75	1.00	0.63	1.00	0.19	0.00
INSIDER	0.49	0.50	0.51	0.51	0.48	0.49	0.43	0.44	0.43	0.45
RANK	5.27	1.69	4.95	1.28	5.61	1.99	2.58	0.79	2.84	0.74
IRET	0.82	0.52	0.67	0.38	0.97	0.63	0.24	0.12	0.10	0.05
MONEY	72.34	26.68	55.79	20.50	89.81	35.25	14.71	2.71	6.73	1.00
VOLAT	1.41	1.34	1.42	1.27	1.41	1.36	0.75	0.67	0.46	0.44
UPDATE	0.24	0.19	0.20	0.14	0.28	0.25	0.03	0.00	−0.01	0.00
RET 1 – 20	1.11	0.75	0.87	0.44	1.36	1.08	0.33	0.18	0.11	0.03
RET 2 – 20	0.19	0.07	0.14	−0.03	0.23	0.14	0.06	0.02	0.01	0.00
N	373		191		182		1,442		2,459	

constrains the sample to firms with relatively high levels of web traffic and to firms that went public after March 1999.[6]

Table 2 also presents the patterns of media exposure surrounding the IPO. In each of the event months, the average media attention is significantly higher for internet companies than for non-internet firms, and it is higher for consumer-oriented B2C companies than for B2B firms. Not surprisingly, all samples experience an increase in media mentions in the month of IPO. For example, for the population of B2C internet stocks, the increase is from 1.96 in the month prior to IPO to 8.19 in the month of IPO ($t = 11.35$). Because the media data is highly skewed, the t-test uses

[6] The impact of this potential selection bias on our results is unclear. By selecting firms with high levels of web traffic, we probably bias our sample towards firms that are already better known to their potential customers than the average B2C IPO firm. For such firms, there may be less potential to gain *additional* customer visibility and website traffic at the IPO. Alternatively, firms with higher traffic and visibility could attract more media attention at the IPO because the offering is of interest to a broader audience. Thus, the marketing effects of underpricing could be stronger in our sample than for the average B2C IPO.

Table 2
Descriptive statistics for the regression samples
The sample of 373 internet IPOs and the sample of 220 non-internet IPOs are from January 1990 through February 2000. The sample of 55 internet IPOs with the available web-traffic data is from April 1999 through December 2001. MED(t) is the number of company's media mentions in month t after the IPO. IRET = (closing price on the first trading day—offer price)/offer price. PROC ($mil.) is the number of shares sold in the offering, excluding overallotment shares, times the offer price. RANK are total proceeds of IPOs underwritten by the lead underwriter during the sample period in percent of total IPO proceeds. VC is a dummy variable equal to one if the IPO is backed by venture capital. MARK is the ratio of marketing expense to revenues before the IPO. ALLIAN is a dummy variable equal to one if the issuer has entered a strategic alliance within 30 days after the IPO. TRAF(t) is the number of unique visitors in month t after the IPO.

	Traffic Regressions		Media Regressions: B2C		Media Regressions: B2B		Media Regressions: NON-INT	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
MED(-2)	2.00	1.00	1.87	0.00	1.01	0.00	0.35	0.00
MED(-1)	2.67	1.00	1.96	1.00	0.96	0.00	0.49	0.00
MED(0)	8.69	4.00	8.19	4.00	4.92	3.00	1.44	1.00
MED(1)	3.38	1.00	3.08	1.00	1.71	0.50	0.70	0.00
MED(2)	2.44	0.50	3.50	1.00	1.63	0.00	0.50	0.00
IRET	0.54	0.39	0.67	0.38	0.97	0.63	0.16	0.07
PROC	78.75	68.80	73.05	56.50	70.06	56.50	51.20	28.40
RANK	6.56	3.26	4.95	1.28	5.61	1.99	2.70	0.68
VC	0.80	1.00	0.74	1.00	0.75	1.00	0.37	0.00
MARK	3.99	1.31						
ALLIAN	0.27	0.00						
TRAF(-2)	860.02	379.00						
TRAF(-1)	898.00	412.00						
TRAF(0)	1,032.36	457.00						
TRAF(1)	1,044.55	431.00						
N	55		191		182		220	

log(1 + media). Interestingly, the post-IPO media levels remain significantly higher than they were before the IPO. This evidence suggests that the act of going public itself could have significant marketing benefits to the issuing firms.

3. Product market benefits of underpricing for internet IPOs

The descriptive statistics presented in the previous sections reveal that both internet and non-internet companies leave a considerable amount of money on the table at the time of IPO. The finance literature suggests a number of possible explanations for underpricing, including winner's curse, signaling, and rewards to investors for revealing private information about the IPO. In this section, we investigate whether increased product market demand is one additional benefit of IPO underpricing.

3.1. IPO underpricing and post-IPO web traffic

To examine the benefits of IPO-related publicity, we focus on a sample of 55 IPO firms in the internet sector for which we have monthly measures of the number of unique visitors to the companies' websites. Web traffic is considered to be an important measure of corporate performance within the internet sector. Web-traffic metrics are frequently cited as measures of internet companies' performance in the popular business press, in analysts' reports, and in internet companies' own voluntary disclosures at the time of their earnings announcements. Recent studies show that web traffic is associated with internet companies' future revenues (Rajgopal et al., 2000) and contemporaneous market values (Hand, 2000; Rajgopal et al., 2000; Demers and Lev, 2001).

We hypothesize that initial returns will be positively related to the growth in web traffic immediately following the IPO. High initial returns attract media interest, and the increased publicity can induce potential new customers to visit the company's website. A nonmutually exclusive alternative is that higher initial returns generate additional traffic independent of the increased media coverage. Stoughton et al. (2001) suggest that high initial returns at the time of IPO could cause an upward revision in the consumers' perception of the quality of the issuing company's product.[7] Similarly, Nelson (1970, 1974, 1978) and Milgrom and Roberts (1986) suggest that firms use advertising or any other observable expenditure (such as leaving money on the table at IPO) to signal the quality of a newly introduced experience good to prospective consumers, even though the advertisement itself has little or no informational content.

[7] Stoughton et al. (2001) model the interaction between consumers and investors of a start-up firm that introduces a new product to consumers. The firm is initially privately held and decides whether to go public or remain private. The authors suggest that consumers infer the quality of the product from the firm's decision to go public *and from the subsequent stock price*. The decision to go public signals product quality because it indicates that the firm is willing to subject itself to the scrutiny of outside analysts.

Table 3
Correlation matrix for the regression samples
The sample of 373 internet IPOs and the sample of 220 non-internet IPOs are from January 1990 through February 2000. The sample of 55 internet IPOs with the available web-traffic data is from April 1999 through December 2001. MED(t) is the number of company's media mentions in month t after the IPO. IRET = (closing price on the first trading day — offer price)/offer price. PROC ($mil.) is the number of shares sold in the offering, excluding overallotment shares, times the offer price. RANK are total proceeds of IPOs underwritten by the lead underwriter during the sample period in percent of total IPO proceeds. VC is a dummy variable equal to one if the IPO is backed by venture capital. MARK is the ratio of marketing expense to revenues before the IPO. ALLIAN is a dummy variable equal to one if the issuer has entered a strategic alliance within 30 days after the IPO. TRAF(t) is the number of unique visitors in month t after the IPO. TRAFG(t) = (TRAF(t)−TRAF(t−1))/TRAF(t−1).

Panel A: 55 internet IPOs with available web-traffic data (traffic regressions)

	MED(−1)	MED(0)	MED(1)	IRET	PROC	RANK	VC	MARK	ALLIAN	TRAF(0)	TRAFG(−1)	TRAFG(0)	TRAFG(1)
MED(−1)	1.00	0.79	0.73	0.49	0.58	0.28	0.12	−0.09	−0.07	−0.06	−0.10	−0.11	0.08
MED(0)		1.00	0.72	0.37	0.63	0.33	0.15	−0.12	−0.04	−0.03	−0.12	−0.03	0.05
MED(1)			1.00	0.66	0.47	0.24	0.13	−0.08	0.00	−0.07	−0.07	0.13	0.14
IRET				1.00	0.36	0.31	0.21	−0.22	−0.03	0.00	−0.08	−0.03	0.24
PROC					1.00	0.39	0.34	−0.08	−0.11	−0.02	−0.13	−0.01	0.04
RANK						1.00	0.37	−0.20	−0.10	0.32	−0.15	0.05	−0.06
VC							1.00	0.06	0.10	0.16	−0.22	0.17	−0.08
MARK								1.00	−0.11	0.02	−0.11	0.10	0.23
ALLIAN									1.00	0.00	−0.06	−0.07	0.06
TRAF(0)										1.00	−0.10	−0.08	−0.17
TRAFG(−1)											1.00	−0.25	−0.39
TRAFG(0)												1.00	−0.18
TRAFG(1)													1.00

Panel B: 373 internet IPOs (media regressions)

	MED(−1)	MED(0)	MED(1)	IRET	PROC	RANK	VC
MED(−1)	1.00	0.61	0.60	0.16	0.25	0.22	0.11
MED(0)		1.00	0.85	0.31	0.15	0.20	0.10
MED(1)			1.00	0.23	0.15	0.19	0.09
IRET				1.00	0.19	0.25	0.16
PROC					1.00	0.31	0.06
RANK						1.00	0.15
VC							1.00

Panel C: 220 non-internet IPOs (media regressions)

	MED(−1)	MED(0)	MED(1)	IRET	PROC	RANK	VC
MED(−1)	1.00	0.30	0.40	−0.07	0.02	0.04	0.02
MED(0)		1.00	0.37	0.59	0.17	0.10	0.04
MED(1)			1.00	0.15	0.20	0.04	0.01
IRET				1.00	0.07	0.08	0.14
PROC					1.00	0.36	−0.09
RANK						1.00	0.14
VC							1.00

To investigate the marketing benefits of underpricing, we regress the percentage growth in web traffic in the month after IPO on initial returns and other determinants of web traffic. The control variables included in the model are discussed in detail in Section 3.2, and Table 4 presents the regression results. Since we do not have strong prior beliefs about the functional form of the relation between initial returns and traffic growth, the regressions in the first two columns of Table 4 simply assume that the relation is linear. However, one could conjecture that very high (e.g., above the median or extreme) levels of underpricing attract the most media attention and therefore provide a large post-IPO boost to traffic. In the third and fourth columns of Table 4, the initial return is replaced by a dummy variable indicating IPO underpricing that is greater than the sample median. Consistent with our hypothesis, we find a positive and significant association between initial returns and post-IPO traffic growth under all specifications. For the linear model reported in column 1, the coefficient on initial returns is positive and significant with a t-statistic of 2.73.[8] Results for the specification using a dummy variable indicating high initial returns are similar but slightly more significant (t-statistic of 3.13), as reported in column 3. We obtain similar but less significant results when a dummy variable indicating extreme underpricing (i.e., above the third quartile or eighth decile) is used as the explanatory variable.

Since our main hypothesis is that high initial returns generate web traffic *through their impact on publicity*, we test whether changes in publicity are directly associated with changes in web traffic. The traffic-growth regressions in the second, fourth, and fifth columns of Table 4 include the changes in media mentions in the month of IPO (ΔMED(0)) and after the IPO (ΔMED(1)) as independent variables.[9] When initial returns are excluded from the model, the coefficients on both media measures are positive and significant, which is consistent with our hypothesis. Interestingly, when initial returns *and* media measures are included, only the initial returns variable remains significant. This suggests that initial returns proxy for IPO-related publicity that is not captured by the number of newspaper cites (e.g., radio, television, internet media). Alternatively, initial returns may have a direct impact on consumer demand that is unrelated to publicity. This latter explanation is consistent with the models by Milgrom and Roberts (1986) and Stoughton et al. (2001).

The finding of a positive relation between IPO underpricing and post-IPO changes in web traffic suggests at least two possible interpretations. The first interpretation, which is consistent with our hypothesis, is that IPO initial returns enhance the firm's visibility and reputation in their product markets, leading to an increase in the number of visitors to the company's website. An alternative interpretation is that

[8] The regressions are screened for influential observations. Observations are considered influential if the absolute value of the studentized residual is greater than three and/or if the value of the Cook's distance is greater than one (Belsley et al. 1980; and Neter et al. 1996). No influential observations are identified from this screen.

[9] In unreported regressions, we also include ΔMED(-1). The coefficient on this lagged media measure is not significant and its inclusion does not affect any of the results.

Table 4
OLS regressions of web-traffic growth in the month after the IPO
The sample consists of 55 internet IPOs from April 1999 through December 2001. The dependent variable is the growth in web traffic in the month after the IPO (TRAFG(1)); TRAFG(t) = (TRAF(t)–TRAF($t-1$))/TRAF($t-1$). TRAF(t) is the number of unique visitors in month t after the IPO (thousands). INITIAL RETURN = (Closing price on day one after the IPO−offer price)/offer price. ΔMED(t) is the change in the number of company's media mentions from month $t-1$ to month t. MARK is the ratio of marketing expense to revenues before the IPO. ALLIAN is a dummy variable equal to one if the issuer has entered a strategic alliance within 30 days after the IPO. LPROC is the natural logarithm of the total IPO proceeds in $mil. VC is a dummy variable equal to one if the IPO is backed by venture capital. RANK are total proceeds of IPOs underwritten by the lead underwriter during the sample period in percent of total IPO proceeds. The t-statistics are in parentheses. ***, **, * indicates statistical significance at the 1%, 5%, 10% level based on a two-sided test.

	IRET = initial return		IRET = 1 if initial return > median		
INTERCEPT	0.78*	0.82	0.84*	0.86*	0.63
	(1.69)	(1.63)	(1.86)	(1.75)	(1.22)
IRET	0.17***	0.15**	0.31***	0.28**	
	(2.73)	(2.16)	(3.13)	(2.56)	
ΔMED(0)		0.01		0.01	0.02*
		(1.03)		(0.91)	(1.76)
ΔMED (1)		0.01		0.01	0.02*
		(1.06)		(0.95)	(1.87)
TRAFG(−1)	−0.16***	−0.17***	−0.15***	−0.16***	−0.17***
	(−4.12)	(−4.18)	(−4.05)	(−4.10)	(−4.17)
TRAFG(0)	−0.30**	−0.35***	−0.25**	−0.30**	−0.40***
	(−2.63)	(−2.82)	(−2.22)	(−2.39)	(−3.09)
MARK	0.01**	0.01**	0.02**	0.02**	0.01*
	(2.36)	(2.27)	(2.58)	(2.47)	(1.79)
ALLIAN	0.05	0.03	0.09	0.07	0.01
	(0.45)	(0.27)	(0.86)	(0.64)	(0.13)
LTRAF(0)	−0.07*	−0.07*	−0.08**	−0.08**	−0.06
	(−1.74)	(−1.76)	(−2.17)	(−2.12)	(−1.55)
LPROC	−0.05	−0.05	−0.06	−0.06	0.00
	(−0.48)	(−0.46)	(−0.66)	(−0.59)	(0.03)
RANK	0.00	0.00	0.00	0.00	0.00
	(−0.20)	(−0.10)	(−0.27)	(−0.17)	(0.14)
VC	−0.15	−0.14	−0.13	−0.12	−0.12
	(−1.16)	(−1.03)	(−1.02)	(−0.93)	(−0.88)
Adj. R^2	0.31	0.30	0.34	0.33	0.24

IPO initial returns anticipate the post-IPO increases in website traffic, and that this endogeneity generates the positive association between traffic changes and IPO underpricing. In order for this latter interpretation to hold, however, one must assume that the secondary market is able to anticipate post-IPO traffic that the issuing company's management, underwriters, and pre-IPO shareholders did not foresee (or at least that they did not fully price) when they set the offer price. We investigate this alternative interpretation in Section 3.4. First, we run a Hausman test for endogeneity of initial returns in the traffic regression. Second, we explore whether

information about future traffic growth is partially incorporated into the offer price. Based on both tests, we find no evidence of an endogeneity bias in the web-traffic regressions.

3.2. Other determinants of web traffic

In the regressions reported in Table 4, we control for other possible determinants of web-traffic growth, including size (measured as the natural log of IPO proceeds), marketing expenditures (scaled by revenues) during the period immediately before IPO, and a dummy variable (ALLIAN) that is set equal to one if the issuing company entered into any strategic alliances during the 30 days post-IPO.[10] We also investigate the role of several IPO related variables. Specifically, we include proxies for the lead underwriter (RANK) and a dummy variable indicating VC participation (VC) in the IPO. Consistent with prior IPO studies (e.g., Megginson and Weiss, 1991), we calculate RANK as total proceeds of all IPOs underwritten by the lead underwriter during the sample period stated as a percentage of aggregate IPO proceeds during the same period. None of the IPO related variables are important determinants of changes in web traffic in any of the regressions. Consistent with expectations, marketing expenditures are positively associated with web-traffic changes.

The inclusion of the alliance dummy is motivated by several recent studies. First, Schultz and Zaman (2001) show that internet companies are much more likely to enter into strategic alliances than companies from a matched sample of non-internet IPOs. Second, Rajgopal et al. (2000) find that a dummy variable for a B2C company's involvement in an affiliate program is a significant determinant of the unique visitors to B2C companies' websites. Our findings are not quite consistent with those of previous studies. The initiation of a strategic alliance around the time of IPO is positively associated with post-IPO traffic growth, but not significantly so in any of the regression specifications.

The coefficients on lagged traffic-growth rates are negative and significant. One possible explanation for this result is that our traffic-level estimates, provided by the Nielsen//NetRatings database, are measured with error and this error could generate negative serial correlation in traffic-growth rates, as reflected in Panel A of Table 3. We also include the *level* of web traffic in the month of IPO, measured as the natural log of traffic in month zero, as an explanatory variable. The level of the pre-IPO traffic could proxy for the scale or stage of the internet company's operations, which in turn could affect the expected level of growth in web traffic independent of the IPO event. The level of traffic in the month of IPO (LTRAF(0)) has a negative and significant coefficient in each of the traffic-growth regressions except for the regression that excludes initial returns. The negative coefficient on LTRAF(0) is

[10] We performed sensitivity checks using dummy variables for strategic alliances entered into during the 30 days prior to the IPO and during the 60 days surrounding the IPO date and find that our results with respect to alliances are generally unchanged. None of the other results reported in the table are affected by the alternative specifications for the alliance dummy.

consistent with declining traffic-growth rates as web properties attain higher overall levels of web surfers at their sites.[11]

3.3. Economic significance of the marketing benefits from underpricing

The evidence in the previous section suggests that underpricing has marketing benefits in the form of increased website traffic for internet firms. However, underpricing also involves a substantial opportunity cost to issuers. In this section, we estimate the implicit cost involved in attracting one additional visitor to the company's website through underpricing for our sample of 55 internet firms. This analysis should help us to understand whether marketing benefits could provide a significant motive for underpricing for internet firms.

The cost of underpricing corresponds to the amount of money left on the table at the time of IPO. The average company in our sample raised approximately \$79 million in total proceeds. This suggests that the average cost to issuing firms of 1% in incremental underpricing is \$0.79 million. The coefficient on initial returns (IRET) in the traffic regressions in Table 4 implies that an increase in underpricing by one percentage point increases website traffic, on average, by 1,754 unique visitors. Thus, the implied average cost involved in attracting a unique visitor is approximately \$450. However, an implicit assumption in this calculation is that the marketing benefits are the *only* motive for underpricing. Since we ignore all other potential motives, for example those related to information asymmetries in the IPO market, our estimate of \$450 substantially overstates the per-visitor cost, and we therefore interpret it as an upper bound.

Despite the fact that our figure probably overstates the underpricing-related cost of a new visitor, it is highly comparable in dollar value to estimates provided by prior academic studies and in the financial press. For example, Thurm (2001) reports that MotherNature spent about \$500 to \$1000 to acquire one new customer through banner ads (Wall Street Journal, May 14, 2001, p. R13). Smith (2000) writes that, "six major online brokers have managed to persuade new customers to open accounts at a mean cost of between \$200 and \$400, according to Morgan Stanley" (Wall Street Journal, May 16, 2000, p. C1).[12] Several academic studies provide estimates of the market values of website traffic. For example, Rajgopal et al. (2000) report that acquirers of B2C internet companies in the 1990s paid approximately

[11] In unreported regressions, we include a dummy variable indicating IPOs with issue dates in year 2000 and, alternatively, a dummy variable indicating whether an IPO took place after the crash in March 2000. Both dummy variables are negative and the post-crash dummy is statistically significant, but their inclusion has no significant effect on the results. Finally, we include an interactive term of the post-crash dummy with the initial return to test whether the association between traffic growth and initial returns changed after the crash. The interactive term is negative but is not statistically significant.

[12] Branstan (1999) reports estimates of about \$65 per customer for eToys Inc. and Drugstore.com (Wall Street Journal, Nov. 22, 1999, p. R42). She points out, however, that these figures are understated because they include only the sales and marketing expenses as reported in financial statements, but exclude other marketing costs such as offering customers discounts or free shipping. She writes, "Drugstore.com spent only \$63 in the third quarter for each new customer. But that ignores the fact that the company sold about 27% of itself to Amazon.com, in part to get traffic from that popular site."

$494 to buy one additional website visitor in the market for corporate control. Several cross-sectional studies (for example, Trueman et al., 2001; and Rajgopal et al., 2000) show that website traffic is significantly associated with the market values for internet firms. The coefficients from these market-value regressions also suggest per-visitor values in the magnitude of several hundred dollars.

In sum, our estimate of the per-visitor acquisition cost from underpricing is very similar in dollar value to internet firms' cost-per-customer from more direct marketing expenses. The underpricing cost-per-customer figure is also consistent with estimates of the market values of web traffic implied by prior academic studies. It is worth noting, however, that the indirect cost of traffic from leaving money on the table at IPO and the direct cost of expending cash for advertising and marketing may not be comparable on a dollar-for-dollar basis. This is because marketing expenditures for print or television advertisements, for example, would probably be more targeted and would also be tax-deductible. On the other hand, since most internet companies are not profitable, the tax deductibility of the direct expenses doesn't offer a significant real benefit. Overall, our evidence suggests that, after accounting for the benefits of increased website traffic, underpricing is significantly less costly to issuers than suggested by the raw amount of money left on the table at IPO.

3.4. The relation between initial returns and web traffic revisited

In Section 3.1, we interpret the positive association between initial returns and the post-IPO traffic growth as evidence that IPO underpricing leads to higher traffic growth. However, the finding is also consistent with initial returns predicting traffic growth. This second interpretation requires that the secondary market has more informed forecasts of website traffic than the issuing company's management, pre-IPO shareholders, and underwriters. This seems implausible for the sample of young, intangible asset-driven companies that have little or no track record. It is possible, however, that issuing companies or their underwriters do not fully incorporate information about future web traffic into the offering price, and initial returns reflect this omitted information.

This partial adjustment of the offering price is consistent with the Benveniste and Spindt (1989) model, which predicts that the IPO price update will not fully reflect the positive private information learned by the underwriter during the pricing process.[13] In our setting, the model implies that the offer price adjusts only partially to any positive news about future web traffic that is learned by the underwriter between the time of original filing and the date of the IPO. If the post-IPO traffic growth that was not fully priced into the offer price was anticipated by the market at

[13] In the US market, the IPO pricing process usually begins several months prior to the offering at the time that the issue is originally filed with the SEC. The preliminary IPO prospectus that firms register with the Securities and Exchange Commission (SEC) includes a range of prices within which the underwriter expects to price the issue (the filing range). The IPO price update is defined as (offer price – midpoint of the IPO filing range)/midpoint of the IPO filing range.

the time of the IPO, we would observe a positive association between this post-IPO traffic growth and initial returns.

We address the potential endogeneity problem in the traffic regressions in two ways. First, we estimate a 2-stage least squares (2SLS) model of initial returns and post-IPO traffic growth, and we run a Hausman test for the endogeneity of initial returns. Second, we investigate whether there is evidence of a partial adjustment of the offer price to the traffic information. Specifically, we test whether the post-IPO traffic growth is associated with the IPO price update. The first-stage of the 2SLS procedure involves regressing initial returns on the standard IPO characteristics including logarithm of total proceeds, underwriter rank, and the VC dummy. Alternatively, we also include gross spread, logarithm of total assets, aftermarket volatility, and price update. In the second stage, we run a web-traffic regression similar to that in column 1 of Table 4, replacing the initial return with the fitted values and the residuals from the first-stage regression. The unreported results suggest that the association between initial returns and the subsequent traffic growth is entirely due to the *unexpected* portion of initial returns. This is not surprising given that approximately 90% of the variation in initial returns in our sample is unexpected. This low explanatory power is somewhat smaller than, but consistent with, prior studies that use larger samples (e.g., Lowry and Schwert, 2001; Loughran and Ritter, 2002b). A Hausman test for the endogeneity of initial returns rejects the hypothesis that the initial return variable is endogenous: the Hausman m-statistic is not significant in any of the specifications.

As an additional robustness check, we investigate whether there is evidence of a partial adjustment of the offer price to the post-IPO traffic information. Table 5 presents regressions of the IPO price update on traffic growth measures and several control variables identified by prior research. We find no evidence of an association between the price update and post-IPO traffic growth. This finding is inconsistent with a partial adjustment of the offering price to information about future web traffic learned during the filing period. In sum, the two-stage analysis and the price-update regressions provide no evidence of an endogeneity problem in the traffic regressions. The positive coefficient on initial returns in these regressions seems more consistent with the initial returns inducing an increase in web traffic rather than predicting future traffic growth. It is also possible, however, that both the Hausman test and the price-update regressions have too little power to detect the endogeneity bias.

The coefficients on the standard control variables in the price-update regressions reported in Table 5 are generally consistent with those in prior studies (e.g., Lowry and Schwert, 2001; Loughran and Ritter, 2002b). We find that underwriter rank and offer size (LSHOFF, measured as the natural logarithm of the number of shares offered) are positively associated with the price update, although the coefficients are generally not significant. The coefficient on the cumulative pre-IPO return on the Nasdaq market (NASDAQ) is positive and (in two out of three regressions) significant. The negative coefficient on the variable NASDAQ+, which equals to NASDAQ when the market return is positive and equals to zero otherwise, suggests that the offer price adjusts more strongly to negative than to positive news about the

Table 5
OLS regressions of the price update
The sample consists of 55 internet IPOs from April 1999 through December 2001. The dependent variable is PRICE UPDATE = (offer price − midpoint of the filing range)/midpoint of the filing range. LMED(t) is the natural logarithm of the number of company's media mentions in month t after the IPO. LTRAF(t) is the natural logarithm of the number of unique visitors in month t after IPO (thousands). LSHOFF is the natural logarithm of the number of shares offered in the IPO. RANK are total proceeds of IPOs underwritten by the lead underwriter during the sample period in percent of total IPO proceeds. VC is a dummy variable equal to one if the IPO is backed by venture capital. NASDAQ is the return on Nasdaq Composite Index between the filing date and the offer date. NASDAQ$^+$ equals to NASDAQ when NASDAQ is positive, and it equals zero otherwise. The t-statistics are in parentheses. ***, **, * indicates statistical significance at the 1%, 5%, 10% level based on a two-sided test.

INTERCEPT	−2.64	−1.09	−1.13
	(−1.34)	(−0.57)	(−0.48)
LMED(-2)		0.11	0.11
		(1.66)	(1.48)
LMED(-1)		0.10	0.10
		(1.67)	(1.54)
LMED(0)			0.00
			(−0.03)
TRAFG(-1)	0.03	0.05	0.05
	(0.60)	(0.96)	(0.94)
TRAFG(0)	0.03	0.08	0.08
	(0.20)	(0.64)	(0.63)
TRAFG(1)	0.10	0.11	0.11
	(0.64)	(0.78)	(0.77)
LTRAF(0)	0.06	0.05	0.05
	(1.31)	(1.27)	(1.25)
LSHOFF	0.15	0.04	0.04
	(1.19)	(0.32)	(0.28)
RANK	0.01*	0.01	0.01
	(1.90)	(1.23)	(1.22)
VC	0.03	0.07	0.07
	(0.19)	(0.49)	(0.47)
NASDAQ	3.63	4.04*	4.04*
	(1.54)	(1.80)	(1.78)
NASDAQ$^+$	−3.55	−3.90*	−3.90*
	(−1.45)	(−1.68)	(−1.66)
Adj. R^2	0.09	0.19	0.17

stock market. In addition to the standard control variables, we also explore the role of pre-IPO media attention as a possible determinant of the IPO price update. We find some evidence that firms that receive more media attention during the filing period also experience higher price adjustments from the midpoint of the filing range to the offer price. The coefficients on the media mentions in each of the first and second months prior to the IPO, LMED(-1) and LMED(-2), respectively, are positive and jointly significant. The p-values from F-tests on the two media variables are 0.02 and 0.09 for the regressions in columns 2 and 3 of Table 5, respectively. One

possible interpretation of this result is that the pre-IPO media interest is correlated with positive news generated during the filing period about the company's value, and the underwriter factors this positive information into the offer price.

4. IPO underpricing and media exposure

Previous sections show an economically significant association between IPO underpricing and post-IPO traffic growth for internet firms. In this section we provide some preliminary evidence that the potential marketing benefits associated with going public extend beyond the hot market for consumer-oriented internet IPOs. We explore the IPO marketing benefits for the population of internet companies and for a random sample of non-internet firms. Because timely direct measures of product market performance are not readily available for these samples, we identify an alternative indirect measure of the marketing impact of IPOs. Specifically, we measure media exposure around the time of issuing companies' IPOs as the number of media cites reported for the company using the Major Newspapers Database in the Lexis–Nexis Academic Universe. We choose this indirect measure rather than the alternative of using published quarterly revenue figures because the wide windows created by the quarterly financial reporting convention would significantly reduce the power of tests.

4.1. Media response to underpricing for internet and non-internet IPOs

We first investigate the explanatory role of initial returns for media mentions in each of the months surrounding the month of IPO. We hypothesize that the number of media mentions of issuing companies in the popular press will be positively associated with the extent of their IPO underpricing, after controlling for other expected determinants of media exposure. We first test this hypothesis separately for each of a random sample of 220 non-internet IPOs and the populations of B2C and B2B internet IPOs, respectively, before combining the samples in order to draw statistical comparisons across the three groups.

The regression results for the separate media mention analysis of each subsample are presented in Table 6. The results for all three samples suggest that, consistent with our hypothesis, initial returns are significantly positively associated with the number of media mentions in leading newspapers in the month of IPO. However, the persistence of this effect differs across the three sets of companies. For the B2C internet stocks, the initial returns are significantly positively associated with media exposure in each of the three months surrounding the IPO. By contrast, for the remaining two samples, this significant positive association can be found only for the IPO month. Thus, underpricing appears to have a longer lasting impact on media exposure for the consumer-oriented B2C internet stocks than for a random sample of IPOs and for the population of less consumer-oriented B2B IPOs.

Table 6
OLS regressions of the IPO-related media exposure for the non-Internet, B2B, and B2C samples
The regression samples consist of 220 non-internet IPOs, 191 B2C internet IPOs, and 182 B2B internet IPOs, respectively. The sample period is from January 1990 through February 2000. LMED(t) is the natural logarithm of the number of company's media mentions in month t after the IPO. IRET = (closing price on the first trading day−offer price)/offer price. LPROC is the natural logarithm of the total IPO proceeds in $mil. RANK are total proceeds of IPOs underwritten by the lead underwriter during the sample period in percent of total IPO proceeds. VC is a dummy variable equal to one if the IPO is backed by venture capital. SECT is a dummy variable equal to one if the issuer is in the etail, content/community, or portal B2C sector. HT is a dummy variable equal to one if the IPO is classified as high tech by SDC. The t-statistics are in parentheses. ***, **, * indicates statistical significance at the 1%, 5%, 10% level based on a two-sided test.

	Non-Internet			B2B			B2C		
Dependent variable	LMED(-1)	LMED(0)	LMED(1)	LMED(-1)	LMED(0)	LMED(1)	LMED(-1)	LMED(0)	LMED(1)
INTERCEPT	0.20*	0.21*	−0.19	0.54**	0.49*	−0.28	−0.47	0.10	−0.32
	(1.82)	(1.71)	(−1.55)	(2.00)	(1.67)	(−0.92)	(−1.45)	(0.32)	(−1.18)
IRET	−0.12	0.41***	0.14	0.05	0.25***	0.03	0.19***	0.30***	0.17***
	(−1.64)	(5.05)	(1.64)	(1.28)	(5.39)	(0.63)	(3.07)	(5.15)	(3.05)
LPROC	0.01	0.08**	0.12***	−0.10	0.13*	0.06	0.15*	0.18**	0.01
	(0.28)	(2.07)	(3.28)	(−1.33)	(1.66)	(0.73)	(1.77)	(2.18)	(0.12)
RANK	0.00	0.00	−0.01	0.01**	0.01	0.01	0.00	0.01*	0.01
	(−0.19)	(0.12)	(−1.37)	(2.48)	(0.79)	(1.00)	(0.13)	(1.69)	(1.04)
VC	0.03	−0.10	0.09	−0.04	−0.11	−0.02	−0.02	0.06	−0.01
	(0.40)	(−1.23)	(1.12)	(−0.45)	(−1.03)	(−0.15)	(−0.14)	(0.49)	(−0.12)
SECT							0.34***	0.38***	0.14
							(3.26)	(3.84)	(1.60)
HT	0.01	0.12	−0.17**						
	(0.09)	(1.54)	(−2.17)						
LMED(-2)	0.28***	0.36***	0.17*	0.41***	0.38***	0.42***	0.35***	0.28***	0.19***
	(3.77)	(4.13)	(1.83)	(5.63)	(4.49)	(4.59)	(4.95)	(4.06)	(2.91)
LMED(-1)		0.31***	0.19**		0.15*	0.18**		0.30***	0.27***
		(3.96)	(2.37)		(1.84)	(2.19)		(4.32)	(4.27)
LMED(0)			0.10			0.23***			0.38***
			(1.52)			(3.03)			(5.90)
Adj. R^2	0.05	0.29	0.16	0.19	0.40	0.37	0.29	0.54	0.62

4.2. Other determinants of IPO-related media exposure

Consistent with the previously reported web-traffic regressions, we also investigate the media-generating role of several IPO-related variables. We expect more media attention for larger IPOs, for IPOs underwritten by more reputable underwriters, and for issues backed by venture capitalists. High prestige underwriters and VCs could be more heavily followed by the popular press, thus contributing positively to the media coverage of their portfolio companies' IPOs. High prestige underwriters are also more likely to select more established IPO firms that attract greater public interest (Megginson and Weiss, 1991). To control for these effects, we include the natural log of proceeds (LPROC) as a proxy for the issue size, a dummy variable indicating VC participation in the IPO (VC), and a proxy for the prestige of the lead underwriter (RANK).

Consistent with our expectations, larger offerings receive more publicity at the time of IPO. The coefficient on LPROC in Table 6 is positive and significant for all three samples in the month of IPO. Underwriter rank (RANK) is positively associated with media mentions in the month of IPO for B2C stocks, but is not a significant determinant of media for either B2B or non-internet firms. Contrary to expectations, VC involvement with the issuing company is not significantly associated with media mentions for any of the three samples.

In order to control for the most consumer-oriented sectors within the internet sample, we create a sector dummy variable (SECT) that is set equal to one if the issuing firm is in the e-tail, content/community, or portal B2C sectors of the internet industry. Consistent with expectations, we find that the sector dummy variable is a positive and significant determinant of media mentions in the month of IPO and in the month prior to IPO. The findings suggest that companies in the e-tail, content/community, and portal sectors experienced a heightened level of media attention prior to, and during, their public offerings relative to other B2C internet companies. Finally, the positive and significant coefficients on the prior months' levels of media exposure in all regressions suggest, not surprisingly, that media exposure levels are subject to positive serial correlation.[14]

4.3. Combined media regressions

In Table 7 we present the results of media regressions for the combined internet and non-internet observations, which allow us to draw statistical comparisons across the three samples. The negative coefficients on the B2B and non-internet (NONINT) dummies suggest that B2C internet companies experience higher media exposure in the month of IPO relative to the less consumer-oriented B2B internet companies and the sample of non-internet firms. However, the difference between the B2B and B2C samples is not significant. In unreported regressions, we define the B2C sample more narrowly to consist of only the most consumer-oriented e-tail, content/community,

[14] In unreported regressions, we included year dummies as a robustness test. The year dummies are jointly significant but their inclusion has no significant effect on the results.

Table 7
OLS regressions of the IPO-related media exposure for the internet sample and the combined sample
The internet sample consists of 373 internet IPOs and the combined sample consists of 593 internet and non-internet IPOs. The sample period is from January 1990 through February 2000. LMED(t) is the natural logarithm of the number of company's media mentions in month t after the IPO. IRET = (closing price on the first trading day − offer price)/offer price. B2B is a dummy variable equal to one if the issuer is a B2B internet firm. NONINT is a dummy variable equal to one if the issuer is not an internet firm. LPROC is the natural logarithm of the total IPO proceeds in $mil. RANK are total proceeds of IPOs underwritten by the lead underwriter during the sample period in percent of total IPO proceeds. VC is a dummy variable equal to one if the IPO is backed by venture capital. The t-statistics are in parentheses. ***, **, * indicates statistical significance at the 1%, 5%, 10% level based on a two-sided test.

	Internet			All		
Dependent variable	LMED(-1)	LMED(0)	LMED(1)	LMED(-1)	LMED(0)	LMED(1)
Intercept	0.17	0.43*	−0.30	0.23*	0.61	−0.34**
	(0.76)	(1.95)	(−1.50)	(1.74)	(4.46)	(−2.52)
IRET	0.17***	0.30***	0.17***	0.18***	0.30***	0.20***
	(3.14)	(5.34)	(3.20)	(3.70)	(5.99)	(4.06)
NONINT				−0.03	−0.47***	0.13*
				(−0.48)	(−6.39)	(1.86)
B2B	−0.05	−0.12	0.04	−0.06	−0.12	0.03
	(−0.62)	(−1.35)	(0.50)	(−0.75)	(−1.51)	(0.38)
NONINT*IRET				−0.31***	0.11	−0.16
				(−2.99)	(1.04)	(−1.62)
B2B*IRET	−0.14**	−0.08	−0.16**	−0.14**	−0.07	−0.17***
	(−2.05)	(−1.12)	(−2.44)	(−2.29)	(−1.14)	(−2.78)
LPROC	0.02	0.15***	0.03	0.00	0.10***	0.06**
	(0.33)	(2.62)	(0.56)	(0.06)	(3.06)	(1.97)
RANK	0.01*	0.01*	0.01	0.01*	0.01*	0.00
	(1.76)	(1.67)	(1.22)	(1.73)	(1.73)	(0.74)
VC	−0.02	−0.02	−0.01	0.00	−0.02	−0.01
	(−0.31)	(-0.19)	(−0.10)	(0.02)	(−0.37)	(−0.13)
LMED(-2)	0.41***	0.36***	0.28***	0.39***	0.36***	0.27***
	(8.18)	(6.59)	(5.24)	(9.68)	(8.12)	(6.06)
LMED(-1)		0.28***	0.25***		0.29***	0.25***
		(5.38)	(5.04)		(6.81)	(5.90)
LMED(0)			0.34***			0.27***
			(6.96)			(6.92)
Adj. R^2	0.24	0.46	0.53	0.24	0.55	0.48

and portal B2C sectors (i.e., consistent with the SECT dummy introduced in Table 6). When this narrow definition is used, the coefficient on the B2B dummy in month zero is negative and statistically significant at the 1% level in both the internet-only and the combined-sample regressions.

The preceding evidence suggests that the *level* of media attention in the IPO month is higher for the consumer oriented B2C companies relative to the B2B or non-internet firms. Interestingly, however, *media response to underpricing* is similar across the three samples in the month of IPO, as evidenced by the insignificant coefficients

on the interactive terms B2B*IRET and NONINT*IRET in the second and fifth columns of Table 7. Finally, the combined regressions confirm the previous findings that the publicity associated with hot IPOs lasts longer in the B2C sector than in the other two samples. The coefficients on the B2B*IRET and NONINT*IRET interactive terms in the regressions for months –1 and +1 are negative and, in three out of four cases, significant. The coefficients on the remaining control variables in the combined regressions in Table 7 are consistent with those for the previously reported separate samples. All the coefficients on the interactive terms are similar when the narrower definition of B2C firms is used.

In summary, B2C internet companies experience higher media levels in the month of IPO relative to the population of B2B internet companies and a random sample of non-internet firms. This result is not surprising given the media hype that surrounded the internet sector in the late 1990s. Within the internet sector, the consumer-oriented firms are probably more interesting to a broader audience and are consequently covered more broadly by the media. In addition, if publicity is more valuable to B2C firms, these firms are more likely to seek media exposure. Interestingly, however, all three groups of IPOs exhibit a positive and significant media response to IPO underpricing. Overall, the evidence presented in Tables 6 and 7 suggests that the marketing benefits of underpricing extend beyond the much-publicized B2C internet sector and across a longer time period than just the hot market for IPOs in the late 1990s.

5. Summary and conclusion

This study provides an investigation of the marketing role of IPOs and IPO underpricing. Companies leave a significant amount of money on the table at the time of their initial public offerings. Numerous theories try to explain this empirical regularity, including information asymmetry between investor groups, signaling of firm quality, prospect theory, and rewards to investors for revealing their private pre-IPO demand information. We contribute to the IPO underpricing literature by showing another possible motivation for IPO underpricing. We consider advertising and marketing benefits in the company's product markets.

We first examine the impact of IPO underpricing on the website traffic of internet companies, which is a direct measure of product market performance for internet firms. We find that underpricing is positively associated with post-IPO growth in web traffic, after controlling for other determinants of traffic growth. We further provide an economic quantification of the underpricing costs and traffic-growth benefits associated with the mean internet company's IPO. Our results suggest that there are significant product market benefits of going public and underpricing to traffic-intensive internet firms.

To investigate whether the marketing benefits of underpricing extend to a broader sample of IPOs, we examine the entire population of internet IPOs as well as a random sample of non-internet issuing firms from the 1990 through February 2000 time period. For these broader samples, we examine the association between

post-IPO media exposure, an indirect measure of marketing benefits, and IPO underpricing. We find that media mentions in the month of IPO are positively associated with underpricing for both samples. Overall, our evidence suggests that there are marketing benefits associated with going public and with IPO underpricing, and these benefits extend beyond the internet sector and the hot issues market of late 1990s.

References

Aggarwal, R., Krigman, L., Womack, K., 2002. Strategic IPO underpricing, information momentum, and lockup expiration selling. Journal of Financial Economics 66, 105–137.

Allen, J., Phillips, G., 2000. Corporate equity ownership, strategic alliances, and product market relationships. Journal of Finance 55, 2791–2815.

Belsley, D., Kuh, E., Welsch, R., 1980. Regression Diagnostics. Wiley, New York.

Benveniste, L., Spindt, P., 1989. How investment bankers determine the offer price and allocation of new issues. Journal of Financial Economics 24, 343–361.

Bolton, P., Scharfstein, D., 1990. A theory of predation based on agency problems in financial contracting. American Economic Review 80, 93–106.

Bushman, R., Smith, A., 2001. Financial accounting information and corporate governance. Journal of Accounting and Economics 32, 237–333.

Chevalier, J., 1995. Capital structure and product-market competition: empirical evidence from the supermarket industry. American Economic Review 85, 415–435.

Demers, E., Lev, B., 2001. A rude awakening: internet shakeout in 2000. Review of Accounting Studies 6, 331–359.

DuCharme, L., Rajgopal, S., Sefcik, S., 2001. Lowballing for 'Pop': The case of internet IPO underpricing. Unpublished working paper. University of Washington.

Hand, J., 2000. The role of accounting fundamentals, web traffic, and supply and demand in the pricing of US Internet Stock. Unpublished working paper. University of North Carolina.

Hellmann, T., Puri, M., 2000. The interaction between product market and financing strategy: The role of venture capital. Review of Financial Studies 13, 959–984.

Kaplan, D., 1999. The Silicon Boys and Their Valley of Dreams. Wm. Morrow and Company, New York.

Kovenock, D., Phillips, G., 1995. Capital structure and product-market rivalry: How do we reconcile theory and evidence? American Economic Review 85, 403–408.

Loughran, T., Ritter, J., 2002a. Why don't issuers get upset about leaving money on the table in IPOs? Review of Financial Studies 15, 413–444.

Loughran, T., Ritter, J., 2002b. Why has IPO underpricing changed over time? Unpublished working paper. University of Notre Dame and University of Florida.

Lowry, M., Schwert, G.W., 2001. Biases in the IPO Pricing Process. Unpublished working paper. Pennsylvania State University and University of Rochester.

Lowry, M., Schwert, G.W., 2002. IPO market cycles: bubbles or sequential learning? Journal of Finance 57, 1171–1200.

Ljungqvist, A., Wilhelm, W., 2003. IPO pricing in the dot-com bubble: Complacency or incentives? Journal of Finance, forthcoming.

Maksimovic, V., 1988. Capital structure in repeated oligopolies. Rand Journal of Economics 19, 389–407.

Megginson, W., Weiss, K., 1991. Venture capitalist certification in initial public offerings. Journal of Finance 46, 879–903.

Milgrom, P., Roberts, J., 1986. Price and advertising signals of product quality. Journal of Political Economy 94, 796–821.

Morgan Stanly Dean Witter, 1999. Technology and Internet IPO Yearbook, (6th edition). Morgan Stanly Dean Witter, New York.

Nelson, P., 1970. Information and consumer behavior. Journal of Political Economy 78, 311–329.

Nelson, P., 1974. Advertising as information. Journal of Political Economy 81, 729–754.
Nelson, P., 1978. Advertising as information once more. In: Tuerck, D.G. (Ed.), Issues in Advertising: The Economics of Persuasion. American Enterprise Institute, Washington, DC.
Neter, J., Kutner, M., Nachtsheim, C., Wasserman, W., 1996. Applied Linear Statistical Models, 4th Edition. Irwin, Chicago.
Perkins, A., Perkins, M., 1999. The Internet Bubble: Inside the Overvalued World of High Tech Stocks. Harper, New York.
Rajgopal, S., Kotha, S., Venkatachalam, M., 2000. The relevance of web traffic for internet stock prices. Unpublished working paper. University of Washington and Stanford University.
Rock, K., 1986. Why new issues are underpriced. Journal of Financial Economics 15, 187–212.
Schultz, P., Zaman, M., 2001. Do the individuals closest to internet firms believe they are overvalued? Journal of Financial Economics 59, 347–381.
Stoughton, N., Wong, K.P., Zechner, J., 2001. IPOs and product quality. Journal of Business 74, 375–408.
Trueman, B., Wong, M.H.F., Zhang, X.-J., 2001. The eyeballs have it: Searching for the value in internet stocks. Journal of Accounting Research 38, 137–163.
Welch, I., 1989. Seasoned offerings, imitation costs, and the underpricing of initial public offerings. The Journal of Finance 44, 421–449.