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Online Investment Banking Phase I: Distribution via the Internet and Its Impact on IPO Performance

Richard B. Carter
Department of Finance
Iowa State University
Ames, IA 50011-2063

Troy J. Strader
Management Information Systems
Iowa State University
Ames, IA 50011-2063
tstrader@iastate.edu

Sree Nilakanta
Management Information Systems
Iowa State University
Ames, IA 50011-2063

Abstract

In the past few years, there has been a growth in Internet markets run by online investment bankers, where companies and investors can buy and sell initial public offerings (IPOs) of corporate stock. In this study, we confine our examination to the first of what we anticipate will be several phases in the evolution of Internet IPOs: the online distribution of shares. This implies the beginning of a general

disintermediation in the IPO process where traditional roles of investment banks are being circumvented via the Internet as participants search for greater market efficiency. This is an important research area because potentially it affects all public companies, or companies considering going public, the investment banking industry, and all stock investors.

We address two research issues not considered by previous studies. What factors affect organizational choice of online vs. traditional IPO distribution? What are the financial performance differences for IPOs distributed using online and traditional processes? These issues were addressed using company characteristic and financial performance data from 27 IPOs from the last half of 1998. We find that the Internet IPO firms are larger, have younger CEOs, choose more reputable investment banks and are more likely to be involved in a Web-based business, directly employing the Internet in their product or service, than the firms that choose the traditional method of going public. In addition, market performance, both initially and over the first three months of trading, is significantly greater for Internet IPOs.

Keywords: Electronic commerce, electronic market, initial public offering (IPO), investment banking, financial performance

I. INTRODUCTION

In the past few years, there has been a growth in Internet markets run by online investment bankers, or "e-managers" (Dorsey 1998), where companies and investors can buy and sell initial public offerings (IPOs) of corporate stock. Tully (1999b) suggests that investment banking is particularly suited for the Internet. In fact, by early 1999, the mechanics of Internet IPOs have quickly progressed from the first phase, a partial distribution of IPO shares directly to investors via the Internet, to the actual determination of the offer price and the allocation of shares through an online auction process. Ultimately, this suggests disintermediation in IPO marketing as the need for brokers to sell and deliver the IPO and investment banks to solicit offers from their clients is eliminated.

In phase I, Internet markets have provided companies with a choice of whether to use a traditional investment banker or a banker providing the new online services to distribute some portion of their IPO. When companies are considering an IPO, they must first evaluate the financial issues to decide whether it is a viable financing option, and then they must identify which channel(s) they wish to use to distribute the IPO. In this paper, we focus on the second decision. While a study of the full spectrum of Internet IPO mechanics is interesting and vital, we have chosen to confine our research to the first phase of the Internet IPO evolution, partial online distribution, in an effort to establish a foundation of information from which to examine future phases. Hence, in the remainder of the paper, when we refer to Internet IPOs, we are strictly referring to firms whose shares are partially distributed online. This study has an interdisciplinary focus, combining both information systems and finance research issues.

Past information systems research has focused on economic analysis of the general impact of electronic markets (Bakos 1991; Benjamin and Wigand 1995; Malone et al. 1987, 1989; Rayport and Sviokla 1994). Because online financial product and service markets are a relatively new phenomenon, a limited amount of research has been conducted related to the impact of these new information technology enabled channels on financial industries, such as banking, real estate, and insurance (Barrett and Walsham 1999; Crowston and Wigand 1999; Ramaswami et al. 1998; Salam and Zurada 1999). In this study, we address two research issues not considered by previous studies for the new phenomenon of online distribution of initial public offerings. What factors affect organizational choice of online vs. traditional IPO distribution? What are the financial performance differences for IPOs distributed using online and traditional processes? In the broad scope of electronic commerce research, our study falls within the electronic commerce application area of the Applegate et al. (1996) electronic commerce research framework and the consumer interface area of the Shaw et al. (1997) research framework.

In the following sections, we describe the traditional and online IPO processes, discuss the methodology used to address our research issues, and present our findings and conclusions including the implications for IPO participants. This is an important research area because potentially it affects all public companies, or companies considering going public, the investment banking industry, and all stock investors. It is also important because of the large amounts of money typically involved in IPOs. This is indicated by the growth in online stock trading, of which IPOs are one component. Online trades accounted for 17% of total retail trades in 1997 (Dreyfuss 1998) and increased to 22% by the first half of 1998 (Robinson 1999).

II. TRADITIONAL IPO PROCESS

The traditional IPO process involves the issuing firm, an investment bank that acts as an intermediary between the seller and buyers, and a select group of, typically, larger investors. The investment bank provides services such as pricing the stock, forming syndicates of investment banks and their brokerage arms to distribute shares, providing access to a select group of large investors to facilitate distribution, and, if need be, price support in the IPO after-market by placing its own buy orders for the stock. Prior to the offer, the investment bank contacts its buying clientele and explains the details of the offer and the selling company. During this time, the investment bank assesses interest in the IPO and takes preliminary subscriptions for shares. The bank then uses this information to determine the price and the number of shares to sell. Because many IPOs are over-subscribed, the bank pro-rates the shares during the final distribution based on the original subscriptions. This service comes at a price, however, as the investment bank receives a commission, typically based on the amount of money raised in the IPO.

This process has been used for IPOs for well over a century, but some questionable activities have evolved during that time. There is the practice of *spinning*, where the investment bank allocates shares to favored or potential

customers in hopes of winning future business. One could argue that by spinning, investment banks preclude the average investor from some potentially attractive IPOs. Several securities firms are currently under investigation by the Securities and Exchange Commission (SEC) for such practices (Bransten and Wingfield 1999). There is also *underpricing*. The stock price run-up of the average IPO on the first day of trading is so great that it appears that investment banks are often setting the offer price too low. Theories have emerged to explain the existence and magnitude of underpricing and defend it as an efficient way to clear the IPO market (Carter and Manaster 1990). However, there is still a real possibility that many companies are being sold too cheaply.

Consider the case of Theglobe.com, a Website builder that debuted in February 1999. Theglobe's bankers, Bear Stearns and Volpe Brown Whelan, underwrote its shares for $9, raising $27.9 million in capital. On the first day of trading, the price rose to $63.50. Had Theglobe sold the IPO for $63.50, rather than $9, the company would have collected not $27.9 million but $197 million—seven times the money to build the brand and develop new products (Tully 1999a). Given these transaction costs and a less than open IPO market, a new information technology enabled IPO may offer a solution.

III. NEW IPO PROCESS ENABLED BY INTERNET MARKETS

The primary difference between the traditional and online IPO process is the role of the intermediary. Bakos (1998) identified eight functions of a market that are facilitated through intermediaries. They include determination of product offerings, search, price discovery, logistics, settlement, trust, legal, and regulatory. The differences in the anticipated phases in the diffusion of online IPO processes can be described using these intermediary roles. The phases occur as the participants in the process search for greater market efficiency.

The roles of intermediaries in phase I, partial share distribution via the Internet, include providing market access and IPO information (search), and IPO

share offer price information (price discovery), as well as informing the investor that the intermediary feels that the selling company is reputable (trust). For phase II, price determination via the Internet, the search and trust roles are similar, but the share price is determined not by an offer price but through an auction or negotiation mechanism. The final phase phase, III, is disintermediation, where the IPO process intermediary is no longer necessary. This phase will only take place when the trust between the share buyer and seller can be facilitated without an intermediary.

While changes in online investment banking are rapidly occurring, our focus is confined to the initial phase of these changes: online distribution of the IPO. This relatively new IPO process involves the same seller but a different form of intermediary. The *online* investment bank provides an Internet-based IPO offering a more open IPO market with access to a larger number of smaller investors. Bob Lessin, CEO of Wit Capital, identified this as a primary goal: to level the Wall Street playing field by giving the little guy, individual investors, a chance to invest in a company when it first offers shares to the public and before the stock actually begins trading in the markets (Dorsey 1998). Wit Capital allows the investor to subscribe to shares at the offer price via the Internet, using Wit Capital's homepage to peruse pertinent documents concerning the issuing firm. While only a small portion of shares is now allocated to those online investment banks in the distributing syndicate, it appears to be expanding (Smith 1999).

The next phase of the online IPO process has been developed by William Hambrecht, owner of W. R. Hambrecht & Co. Using Mr. Hambrecht's plan, dubbed *OpenIPO*, investors submit bids for the number of shares they would take and at what price. After a few weeks of taking bids, the offering price is set at the lowest price at which all shares can be sold. Those bidding above the offering price will get all the shares they asked for at the offering price; those bidding at the offering price will get a portion of their bid; and those bidding less than the offer price will not get any shares. No more than 10% of the shares sold can go to a single bidder, and

Hambrecht reserves the right to limit the purchase of anyone seeking to buy more than 1% (Bransten and Wingfield 1999).

IV. METHODOLOGY

DATA

All firms going public were identified via information from IPO.Com, Inc. IPO.Com, Inc provides offer dates, SIC codes, a business description, IPO registration form and file dates, and the offer price. Firms that used the Internet to distribute their IPO were identified using various issues of the *Wall Street Journal.* We found nine firms issuing their initial public stock offering in this manner between July 16, 1998 (Broadcast.Com, Inc.), and December 14, 1998 (Infospace.Com, Inc.). In comparison, there were 84 IPOs in total between July 16, 1998, and December 14, 1998, according to IPO.Com, Inc. We confined the IPOs to only those issued in 1998 to ensure that we would have at least three months of stock price data from which to work.

Comparable IPOs that were offered without the benefit of the Internet were chosen in two ways. First, we selected an event time-matched firm for each Internet IPO. The offering for these firms was within one day of the Internet IPO's offering and most (seven) were on the same day. We then selected a second group of IPOs matched first by two digit SIC code and then by their offer date, getting as close to the Internet IPO's offering date as possible. Nine firms were selected using each method, for a total of 27 firms.

To examine the differences between the firms that choose the Internet to market their IPOs and those that use the traditional method, we collected a number of firm and market characteristic variables. Most of the data for each firm were collected from the original IPO prospectus (forms S-1 or S-2), including the managing underwriter, the firms' most recently reported net income, revenues, the age of the firm at the time of the offer, and the CEO's age and salary. Information regarding the high and low price range of the offer was found in the first or second

amendment to the original S-1 or S-2. Additional offer-related information was taken from the post-offer filing of form 424B. These data include the final offer price, the number of shares offered, the number of outstanding shares after the offer, the total expenses paid by the issuing firm, the underwriter's commission or discount, the book value of the firm, and the number of shares offered by private shareholders. All of these documents are available on the EDGAR database from the Securities and Exchange Commission.

Security price and daily volume information from the offering day through 60 post-offer trading days were collected from Yahoo, Inc., with random verification using various issues of the *Wall Street Journal*. Each IPO's offering day return was calculated as (P1-P0)/P0, where P0 is the original offer price as stated in the final prospectus. Each subsequent day's return was then calculated in a similar manner and cumulative returns were simply the sum of the daily returns through any particular day. We used the cumulative returns for the first five trading days as the initial return and the cumulative return for the next 55 trading days as the after-market return. The daily trading range was calculated as (Ph-Pl)/Pl where Pl is the low price for the day and Ph the high price. The standard deviation of daily returns, the average daily volume and the average daily price range were all estimated using data from day 6 through day 60. Because underwriters often purchase shares in the first few days of trading to support the offer price, the observations during this time period may be misleading. Hence, we use days 6 through 60 to estimate daily variables in an effort to eliminate any bias.

Finally, we used the zero to nine point scale developed by Carter and Manaster (1990) and updated by Carter, Dark and Singh (1997) to quantify underwriter reputation. The most prestigious underwriters are given a nine and the least prestigious are given a zero. According to Carter and Manaster, underwriters of high reputation are noted for choosing lower risk, larger firms than their less prestigious counterparts and for being better at distributing the IPO. For four firms, the underwriters were not listed in either paper and we used a zero for their reputation, assuming that lack of information about these underwriters was indicative of a lack of prestige.

METHODS AND RESULTS

Descriptive statistics for daily returns, daily trading volumes, and daily trading ranges for all 27 IPOs and for each sub-set of nine IPOs are found in Table 1. In Panel A, means and standard deviations for all 60 trading days are presented. The Internet IPOs posted the largest mean total cumulative return (3.09%) followed by the time-matched IPOs (-0.03%), while the smallest return was posted for the SIC-matched firms (-0.16%). The differences between these returns are not significant, however. The Internet IPOs also had the highest daily share volumes and trading ranges and these amounts were both significantly higher than either of the other firm groups.

Similar statistics for the first five trading days (the initial return) and for days 6 through 60 (the after-market return) are found in Panels B and C, respectively. As in Panel A, the Internet offerings had significantly higher totals in each category with the exception of the initial return. Charts of cumulative daily returns for all three sub-sets of firms from the offer through day 60 and for day 6 through 60 are found in Figures 1 and 2, respectively. It is apparent from these charts that the Internet IPOs out-perform the regular IPOs both from the offer day and in the post-offer after-market.

Table 2 presents Spearman correlation coefficients, testing the independence of daily after-market cumulative returns, volumes, and trading ranges for a portfolio of all IPOs and for portfolios of each sub-set. The coefficient estimates for the full sample are found in Panel A and coefficient estimates for the Internet IPOs, the SIC-matched IPOs and the time-matched IPOs are found in Panels B through D, respectively. Spearman rank correlation was used to prevent any bias that may occur in a small sample from one or two outliers and because we are making no assumptions about the distributions of the underlying populations of these variables (for justification for the use of the Spearman rank correlation technique, see Conover 1980).

Table 1. Cumulative Daily Returns, Daily Volumes and Daily Trading Ranges: Internet IPOs vs. SIC-Matched and Time-Matched Traditional IPOs

	All IPOs		Internet IPOs			SIC-Matched IPOs			Time-Matched IPOs	
	Mean	Std	Mean	Std	t test	Mean	Std	t test	Mean	Std
Panel A: Total Cumulative Return (Days: Offer through +60)										
Daily Returns (%)	0.95	10.94	3.09	18.53	1.42	-0.16	2.97	0.28	-0.03	1.96
Daily Volumes (shares)	408.11	665.45	949.58	863.35	6.66***	158.84	318.22	0.86	115.91	220.70
Daily Trading Range (%)	9.05	4.38	13.22	4.25	7.43***	8.62	2.22	8.99***	5.31	1.77
Panel B: Initial Return (Days: Offer through +5)										
Daily Returns (%)	9.77	36.68	26.83	62.95	0.99	1.77	7.86	0.24	0.88	2.63
Daily Volumes (shares)	1439.2	1685.0	2895.1	2164.0	1.93*	882.62	870.16	0.69	540.03	670.97
Daily Trading Range (%)	13.02	8.11	22.28	9.52	3.78***	9.52	2.01	1.39	7.24	3.05
Panel C: After-Market Return (Days: Offer +5 through Offer +60)										
Daily Returns (%)	0.14	2.53	0.92	3.22	2.30**	-0.34	2.16	0.56	-0.12	1.89
Daily Volumes (shares)	318.67	489.53	788.87	630.88	17.1***	93.05	40.47	2.01**	77.35	41.26
Daily Trading Range (%)	8.73	4.99	12.45	4.83	8.08***	8.53	2.25	9.26***	5.14	1.54
Note: Significance at the 10%, 5%, and 1% levels is indicated by one, two and three asterisks, respectively.										

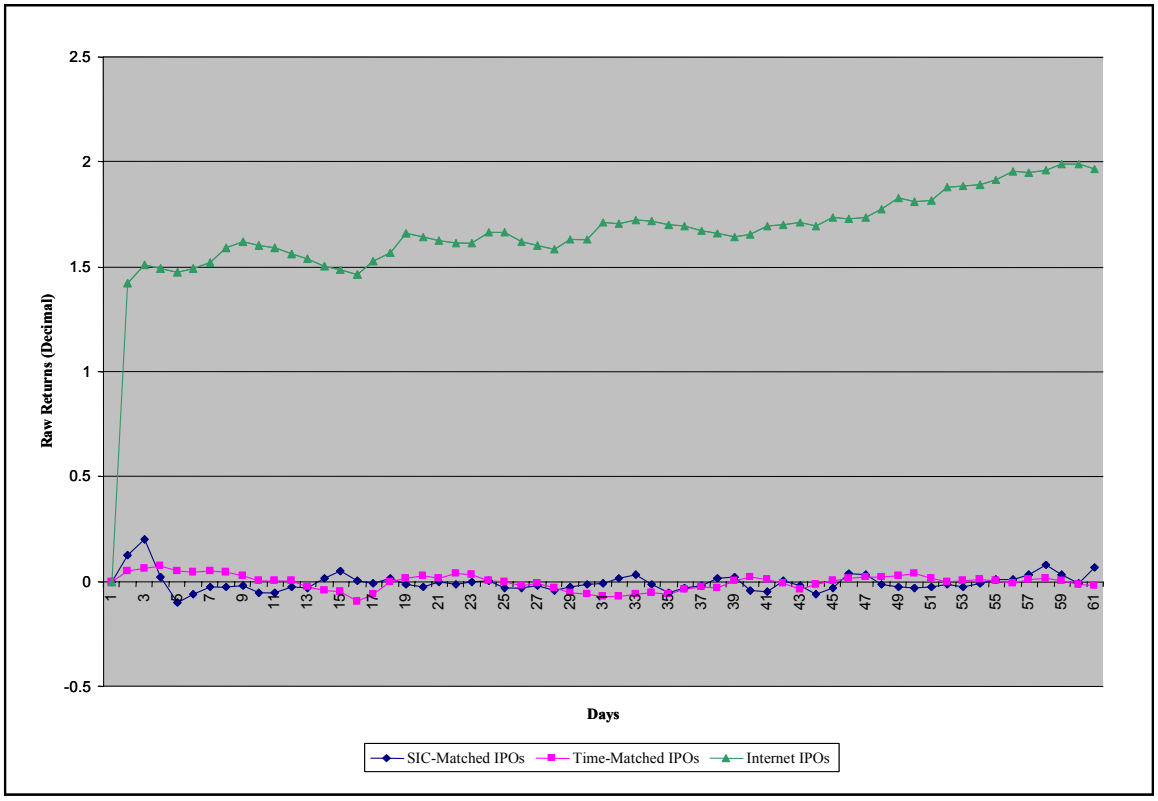

Figure 1. Cumulative IPO Returns from Day 0 Through Day 60

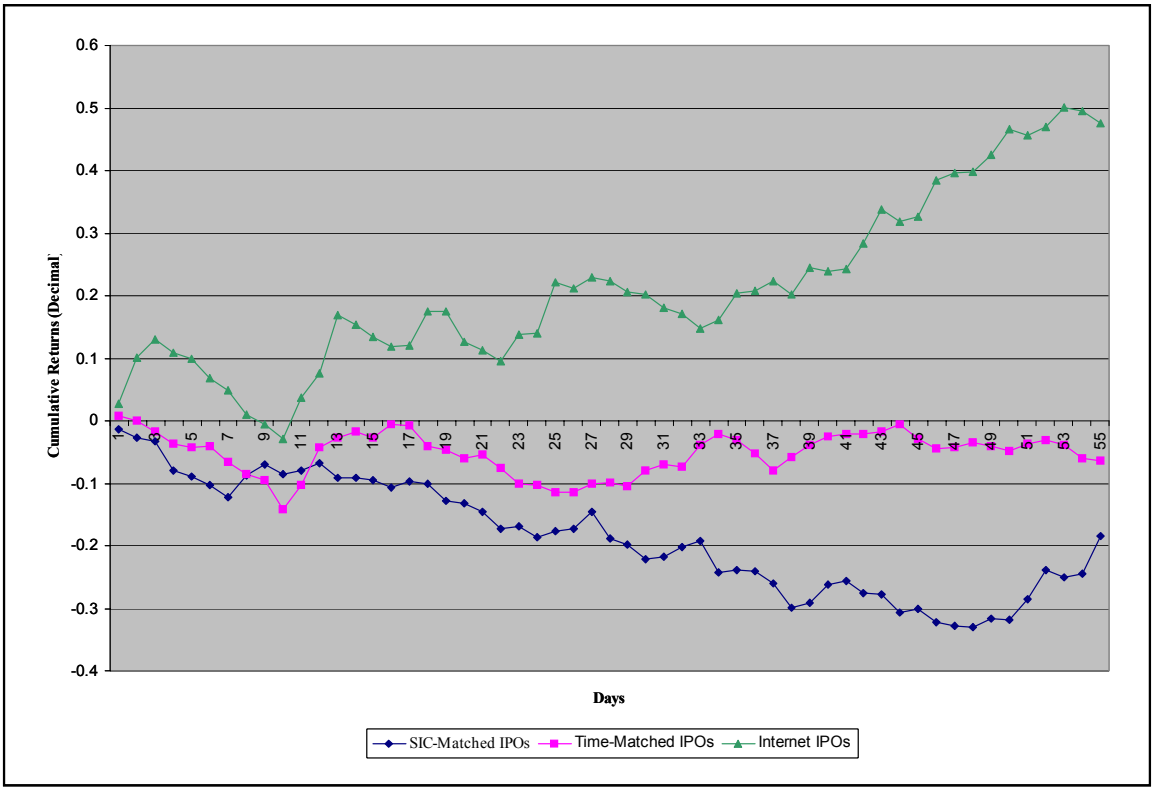

Figure 2. Cumulative IPO Returns from Day 6 Through Day 60

Table 2. Spearman Correlations[1]

	Daily Volumes[3]	Daily Trading Range[3]
Panel A: All IPOs		
Daily After-Market Cumulative Returns (%)[2]	0.124	0.066
Daily Volumes (shares)	1.000	0.694***
Panel B: Internet IPOs		
Daily After-Market Cumulative Returns (%)	0.419***	0.240*
Daily Volumes (shares)	1.000	0.439***
Panel C: SIC-matched IPOs		
Daily After-Market Cumulative Returns (%)	0.061	-0.129
Daily Volumes (shares)	1.000	0.067
Panel D: Time-matched IPOs		
Daily After-Market Cumulative Returns (%)	-0.145	-0.077
Daily Volumes (shares)	1.000	0.309**

[1]Significance at the 10%, 5%, and 1% levels is indicated by one, two, and three asterisks, respectively.
[2]Daily after-market cumulative returns is the daily, relative price change for the appropriate portfolio of stocks aggregated in event time from offer day + 5 through offer day + 60.
[3]Volumes and trading range (each day's (high – low price)/low price) are the daily observations for the appropriate portfolio of stocks aggregated in event time from offer day + 5 through offer day +60.

Interestingly, with the exception of the correlation between the daily returns and the trading ranges for the time-matched IPOs, only the Internet IPO variables are significantly correlated. All three of the variables are positively correlated with one another.

Descriptive statistics for all of the variables collected are found in Table 3. The statistics are presented for all 27 IPOs and for the nine Internet IPOs and the 18 traditionally distributed IPOs. For each variable, both a t test of the difference in means and an F test using the Wilcoxon rank-sums test of the difference in samples are presented for the Internet and regular IPOs. As was the case with the Spearman correlations, the non-parametric Wilcoxon test was included to prevent outlier bias for a small sample and to avoid any distribution assumptions. The Wilcoxon test was chosen over other similar nonparametric tests because of its power-efficiency (for justification for the use of the Wilcoxon rank-sums technique, see Conover 1980).

Table 3. Descriptive Statistics for 27 IPOs Issued Between July 16, 1998, and December 14, 1998

	All IPOs		Internet IPOs		Traditional IPOs		Difference in Samples	
	Mean	Std	Mean	Std	Mean	Std	t test[1]	F stat[2]
Market Value ($000s)[3]	292,877	265,334	491,821	292,949	193,405	189,362	3.21***	2.91***
Revenues ($000s)	400,844	783,120	138,479	388,130	532,026	901,330	1.58	2.03**
Net Income ($000s)	-4,083	9,512	-2,669	4,254	-4,789	11,326	0.70	0.08
Age of Firm (years)	6.67	9.74	3.33	1.66	8.33	11.62	1.79*	1.10
Book to Market (%)	55.41	142.26	13.96	10.25	76.14	171.86	1.53	3.11***
CEO Age (years)	44.30	8.80	38.11	7.52	47.39	7.83	2.94***	2.65***
CEO salary ($000s)	264.07	184.45	234.44	166.89	278.89	195.52	0.58	0.77
Offer Size ($000s)	52,478	43,177	48,861	22,311	54,286	51,054	0.38	0.78
Underwriter Reputation[4]	6.92	3.37	8.81	0.33	5.98	3.81	3.13***	2.22**
Underwriter Discount[5]	7.26	0.92	7.00	0.01	7.39	0.01	1.46	0.82
File to Offer (days)	97.19	52.83	92.80	34.44	99.38	60.79	0.36	0.21
Insider (%)[6]	5.62	9.09	2.37	5.13	7.25	10.29	1.33	1.05
Expenses ($000s)[7]	2,689.56	6,304.13	1,261.11	423.18	3,404.78	7,686.17	1.18	0.95
Initial Return (%)[8]	48.87	116.80	134.17	176.44	6.22	20.90	2.17*	2.55**
Cumulative Return (%)[9]	7.86	0.60	50.77	75.64	-13.60	37.09	2.41**	2.24**
Std Dev of Return (%)[10]	6.83	3.87	9.89	3.93	5.29	2.87	3.47***	2.78***
Relative Offer Spread[11]	0.30	2.67	1.78	3.38	-0.44	1.94	2.18**	2.23**
Daily Volume (shares)	318.67	489.53	788.87	630.88	83.57	60.37	3.35***	3.42***
Daily Trade Range (%)[12]	8.73	4.99	12.45	4.83	6.88	4.02	3.17***	2.81***

[1]Significance at the 10%, 5%, and 1% levels is indicated by one, two, and three asterisks, respectively.
[2]Result of the Wilcoxon Rank Sums test.
[3]As of the fifth day following the IPO.
[4]Reputation is measured via Carter/Manaster Tombstone Ranking (see Carter et al. 1995). It is discrete where nine is most prestigious and zero least.
[5]The discount (commission) is measured relative to the offer price.
[6]Insider is the percentage of the offer represented by the firm's private shareholders.
[7]Expenses is the total expenses of the offer incurred by the issuing firm.
[8]Initial return is the cumulative relative price change for the first five days of the offering.
[9]Cumulative return is the cumulative relative price change from day six following the offer to day 60.
[10]The standard deviation of the return is measured from day 6 to day 60.
[11]Relative offer spread is the offer price less the average of the maximum and the minimum possible offer price as listed in the preliminary prospectus.
[12]Trading range is the difference between the day's high and low price relative to the low price.

It appears that the firms that selected the Internet for IPO distribution are significantly larger in terms of market value than firms choosing traditional distribution venues. The Internet firms also used more reputable underwriters and their CEO was significantly younger. Other than these three variables, however, no other unequivocal differences appear for any of the other fundamental firm characteristics.

For each of the market variables—returns, standard deviation of returns, trading volumes, and trading ranges—the Internet IPOs are significantly greater. Perhaps the most interesting difference is the relative spread variable. This is calculated as the actual offer price less the expected offer price. The expected offer price is estimated as the median of the price range as proposed in the amendments to the original prospectus. This is the price range the underwriter quotes its clients during pre-offer book building. The negative relative spread figure for the regular IPOs indicates that the offer price was set lower than the underwriters expected. The positive figure for the Internet IPOs, however, suggests that the underwriters set the offering price above what they had originally expected to offer. According to the "partial adjustment phenomenon" as proffered by Hanley (1993), this positive spread is an indication that the offer is probably underpriced in terms of market value and should experience significant run-up in the early after-market.

The Spearman correlation coefficients for the firm and market characteristic variables are presented in Table 4. Both initial returns and after-market returns are related to many of the same characteristics. Both are positively related to Internet distribution, underwriter reputation, after-market volatility (standard deviation), daily volume, and daily trading range. Additionally, both are negatively related to CEO age and the book to market ratio. In addition to the variables described above, we included a dummy variable (Web-based) where a one indicates that the firm engages in a business that directly employs the Internet in its product or service. Interestingly, the initial return appears related to this variable and to the relative spread. Because Web-based products and services are new, they are risky in

nature. Hence, the investment bank is likely to discount the offer price considerably to ensure an efficient market clearing. It may also suggest that the purchasers of IPOs, the underwriter's clients, find the Web-based firms attractive enough to bid-up the price both during pre-offer solicitations and during the first few hours and days of secondary market trading.

Use of the Internet to market the IPO is positively related to the relative spread, underwriter reputation, after-market volatility, daily volume, and daily trading range. Hence, better underwriters are first to take advantage of this new marketing medium and, assuming that all 27 firms are qualitatively similar, the results imply that use of the Internet to market IPOs increases volatility and volume. On the negative side, Internet IPOs have fewer sales, lower book to market, and younger CEOs. It suggests that these IPOs are of a more speculative nature—yet speculative firms do not generally go to the most prestigious investment banks (see Carter and Manaster 1990).

In an effort to identify key relationships between market performance and the various market and firm characteristics, and to reveal their marginal contribution to the relationship, we used an ordinary least squares regression technique. These regressions are found in Table 5. Initial returns (Panel A) and after-market returns (Panel B) were regressed on Internet (a dummy variable where a one represents firms using the Internet to market their IPOs), underwriter reputation, book to market ratios, CEO age, the standard deviation of return, average daily volumes, average daily trading ranges, and Web-based. The raw independent variables are found in the first regressions in each panel. Other firm and market characteristic independent variables were included in subsequent regressions but they altered neither the adjusted R^2 nor the identified relationships reported.

Table 4. Spearman Correlation Coefficients[1]

	Cumulative Return Days 6-60	Internet (1=yes)	Sales	Net Income	Offer Size	Age of Firm	Insider [2]	Underwriter Reputation [3]
Initial Return Days 1-5	0.293	0.504***	-0.277	-0.233	-0.183	-0.153	-0.215	0.349*
Cumulative Return 6-60	1.000	0.444**	-0.302	0.049	0.153	-0.336*	-0.114	0.354*
Internet (1=yes)		1.000	-0.403**	0.020	0.061	-0.221	-0.210	0.440**
Sales			1.000	0.044	0.585***	0.113	0.233	0.094
Net Income				1.000	-0.035	0.051	-0.057	-0.075
Offer Size					1.000	-0.071	0.300	0.480**
Age of Firm						1.000	0.218	-0.363*
Insider							1.000	0.300
Underwriter Reputation								1.000

	Book to Market	CEO Age	Std Return	Volume	Trading Range[4]	Web-based[5]	Spread[6]
Initial Return Days 1-5	-0.669***	-0.451***	0.438**	0.510***	0.524***	0.503***	0.475**
Cumulative Return 6-60	-0.361*	-0.435**	0.356*	0.518***	0.412**	0.332	0.201
Internet (1=yes)	-0.615***	-0.526***	0.550***	0.676***	0.555***	0.567***	0.443**
Sales	0.291	0.225	-0.383**	-0.201	-0.378*	-0.343*	-0.308
Net Income	0.233	0.373*	-0.342*	-0.349*	-0.343*	-0.194	-0.225
Offer Size	0.162	-0.149	0.037	0.307	0.084	0.086	-0.022
Age of Firm	0.191	0.477**	-0.328*	-0.248	-0.384	-0.256	-0.209
Insider	0.218	-0.148	-0.096	0.059	0.167	-0.301	-0.013
Underwriter Reputation	-0.496**	-0.560***	0.406**	0.610***	0.445**	0.534***	0.478**
Book to Market	1.000	0.672***	-0.598***	-0.617***	0.590***	-0.377*	-0.465**
CEO Age		1.000	-0.498**	-0.630***	-0.489***	-0.303	-0.399**
Std Return			1.000	0.829***	0.974***	0.475***	0.318
Volume				1.000	0.829***	0.526***	0.489***
Trading Range					1.000	0.561***	0.328*
Web-based						1.000	0.411**

[1]Significance at the 10%, 5%, and 1% levels is indicated by one, two, and three asterisks, respectively.
[2]Insider is the percentage of the offer represented by the firm's private shareholders.
[3]Underwriter reputation is a discrete variable where nine is most prestigious and zero is the least.
[4]Trading range is the difference between the day's high and low price relative to the low price.
[5]Web-based is a binary variable where a one represents firms whose product or service directly employs the use of the Internet.
[6]Spread indicates the difference between the offer price and the expected offer price as indicated in the preliminary prospectus.

Table 5. Ordinary Least Squares Regression Analysis

	Intercept	Internet (1=yes)	Under-writer Rep.	Book to Market	CEO Age	Std Return[1]	Daily Volume[1]	Trading Range	Web-based (1=yes)
Panel A: Cumulative Return from Offer through First Five Days Regressed on Use of Internet to Facilitate IPO Sales and Additional Variables									
Coefficient	3.813	1.347	-0.080	0.201	-0.083	-7.476	-0.001	14.396	-1.192
t stat		2.92***	-1.83*	1.96*	-2.21**	-0.63	-0.01	1.66	-2.22**
						Adj R^2	0.457	F stat[2]	3.73***
Coefficient[3,4]	-0.605	1.549	-0.016	0.038	-0.079	-5.715	-0.003	15.029	-1.219
t stat		3.23***	-0.36	0.96	-1.96*	0.48	-0.48	1.74*	-2.26**
						Adj R^2	0.457	F stat	3.73
Panel B: Cumulative Return from Offer Day +5 through Day 60 Regressed on Use of Internet to Facilitate IPO Sales and Additional Variables									
Coefficient	-0.319	-0.332	0.013	0.030	-0.001	-7.342	0.001	3.032	0.353
t stat		-1.35	0.59	1.18	-0.08	-0.80	8.13***	0.44	1.35
						Adj R^2	0.589	F stat	5.66***
Coefficient[3,4]	-0.321	0.016	0.016	0.022	-0.005	-7.638	0.001	3.294	0.380
t stat		-1.42	0.71	1.22	-0.35**	-0.80	7.57***	0.49	1.46

[1]These variables are estimated over days offer +five through +60.
[2]Significance at the 10%, 5%, and 1% levels is indicated by one, two, and three asterisks, respectively.
[3]Underwriter reputation is the residual from a regression where reputation is regressed on Internet, CEO age, Std Return, Volume, Trading Range, and Web-based.
[4]CEO age is the residual from a regression where CEO Age is regressed on Internet, Reputation, Std Return, Volume, Trading Range, and the Web-based dummy variable.

It is apparent from the results that the important factor in initial return is the use of the Internet (the coefficient is positive and significant at better than 1%). Moreover, this is not simply a function of its line of business given that the Web-based dummy variable is included in the regression and it too is significant and negative. This could be explained by the underwriter's discounting the offer price in an effort to clear the market (see Carter and Manaster 1990). The underwriter may have believed the market would be unreliable given the newness of an Internet offering. The other variable that is significant is CEO age, which implies that the offer price was set lower for Internet offerings with younger CEOs. Again, this could be explained by the underwriter's discounting of the offer price due to a suspect firm characteristic.

Because of strong inter-relationships among the independent variables, as demonstrated in Table 4, we used a two-stage model for the second regression in Panel A. Underwriter reputation became the error term after being regressed on the Internet dummy, CEO age, the standard deviation of return, the average daily volume, the average trading range, and a Web-based line of business dummy variable. CEO age became the error term after being regressed on the Internet dummy, underwriter reputation, the standard deviation of return, the average daily volume, the average trading range, and the Web-based dummy. The results of the second stage are found in the second regression in Panel A. This technique failed to alter the important results of the earlier regression.

In Panel B, similar regressions were estimated for the after-market return. The only variable that was consistent in both regressions was the average daily trading volume. The coefficient suggests that increases in volume are accompanied by increased prices. This is consistent with earlier work (Karpoff 1987). However, it may also be evidence that use of the Internet increases trading and thereby trading efficiency. In the two-stage model, regression 2, the one coefficient that changes from the first regression is CEO age. While consistent in sign—negative—the coefficient becomes significant in the second regression and suggests that the market reacts favorably to offerings with the younger CEOs. This implies that investors bid up the after-market price of firms with younger CEOs because of the potential for long-term profits. Lewellen et al. (1987) explain that younger CEOs are less likely to make myopic investment decisions for their firms.

In an effort to explain the use of the Internet to market IPOs, we used a logistic regression. In such a model, the dependent variable is binary. We regress the Internet dummy on underwriter reputation, book to market, CEO age, standard deviation of return, the log of sales, the relative spread, and the Web-based business dummy. There are three regressions presented in Table 6. In the first, all seven independent variables are included in the model. None of the coefficients are significant and the model itself is only significant at the 10% level. In the second

regression, we only employed CEO age, standard deviation of return, and the Web-based business dummy. While the model is significant at the 1% level, none of the coefficients are significant. In an effort to remove multicollinearity among the variables, we employed a two-stage model as described above. Standard deviation of return became the error term when regressed on CEO age and the Web-based business dummy. The second stage of this model is regression number 3. We found that both the CEO age and the Web-based business dummy variable were significant, suggesting that younger CEOs were more likely to choose this method of marketing the IPO and that firms familiar with the Internet were more likely to use it.

Table 6. Logistic Regression Analysis Using the Internet to Market IPOs

Dependent Variable: 1 = Internet IPO; 0 = Otherwise[1]									
Regression	Intercept	Under-writer Rep.	Book to Market	CEO Age	Std Return	Log Sales	Spread	Web-based (1=yes)	X^2
1	-1.893	0.645	-6.156	-0.095	9.804	-0.007	-0.020	1.845	13.98*
		0.22	0.66	0.61	0.135	0.00	0.00	0.92	
2	3.192			-0.144	21.409			2.36	13.44***
				2.27	0.91			2.60	
3	6.347			-0.186	21.409			3.09	13.45***
				3.99**	0.99			5.08**	

[1]Significance at the 10%, 5%, and 1% levels is indicated by one, two, and three asterisks, respectively.
[2]Underwriter reputation is a discrete variable where nine is most prestigious and zero is the least.
[3]In Regression 3, Std Return is the residual of a regression where Std Return is regressed on CEO Age and Web-based.

V. SUMMARY AND CONCLUSIONS

Raising equity in public markets involves many choices for the issuing firms. Among these choices is how much stock to offer and at what price. They must also decide whether to use an investment bank to underwrite the issue and, if so, which investment bank. Traditionally, the underwriter pre-sells the entire offer to its clients, thus determining an optimal offer price and the demand for the issue. However, this

traditional method has led to some questions as to some of the practices of the underwriter. For example, is the offer price discounted in an effort to satisfy the underwriter's preferred customers? Deep discounting suggests that the firm may not have received an optimal price for its stock.

Recently, the IPO process has experienced some significant changes involving the Internet. In the first phase, a portion of the issue is distributed via the Internet. In the second phase, the offer price and the investors have also been determined through some form of online auction mechanism. This may result in a more efficient offer price for a company's IPO and certainly implies a gradual disintermediation process as the need for brokerage and other solicitation activities of investment banks is mitigated.

These changes have added one more choice for the issuing firm to make when going public: whether to use online investment banking for their IPO. In this research, we limited our focus to the first phase of the Internet IPO evolution and sought to determine what factors are important in making the decision to use online investment banking. In addition, we examined the financial performance differences between IPOs that were sold via the Internet versus those sold through the traditional method. If Internet IPOs do not run-up as much as the traditional IPOs, it might suggest that online banking reduces offer price discounting and suggests that it is a more efficient means of selling equity for the issuing firm.

We compared a sample of Internet IPOs with a contemporaneous sample of traditional IPOs, half matched within one day of the issue day and half matched by the first two digits of the SIC code. We found that the Internet IPO firms were larger, had younger CEOs, and chose more reputable investment banks than the firms that chose the traditional method of going public. We found consistent results with a logistic regression model where firms with younger CEOs and those involved in a Web-related business were the most likely to use the Internet to sell their equity issue.

The Internet IPOs also had greater cumulative returns, daily trading ranges, and daily share volumes than the traditional IPOs. The higher returns for the Internet IPOs suggests one of two things. Either their underwriters are still discounting the offer price relative to the market value of the firm or the underwriters are not good at pricing these firms. Given that the Internet IPO underwriters are some of the best, we would contend that the former explanation is more likely. Finally, the standard deviation of after-market returns was also significantly higher for the Internet IPOs, suggesting that they are considerably more risky than the traditional IPOs.

In terms of performance, we found that use of the Internet was positively related to the initial return, but we found that the initial return was negatively related to CEO age and Web-related business activities. Assuming that the positive market response simply reflects more offer price discounting by the underwriter, this result suggests that the underwriter is discounting to reflect the large amount of risk inherent in this new way of selling IPOs and the younger CEOs. In terms of longer-term after-market performance, only the daily volume was related, suggesting that higher volumes accompany higher returns. This is a common finding in previous work (Karpoff 1987).

Because this study involves a very recent development in financial markets, the sample size is small. Hence, any conclusions must be tempered by the possibility that this sample is not representative of the population of IPOs. Future studies of phase II or phase III online IPO processes will have considerably more data available. However, our findings are, in general, consistent with previous work and engender quite reasonable explanations. In the final analysis, our study simply says that Internet IPOs, while new, are not that different from traditional IPOs and the variables that explain differences in market performance are more related to fundamental characteristics of the firm, the CEO, the line of business, and the inherent risk than the micro-structure of Internet activity.

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VII. ABOUT THE AUTHORS

Richard B. Carter is a professor of Finance at Iowa State University. He received his Ph.D. in Finance from the University of Utah in 1987. His research interests include capital acquisition, agency costs, and small business. He can be reached by e-mail at rbcarter@iastate.edu.

Troy J. Strader is an assistant professor of Management Information Systems at Iowa State University. He received his Ph.D. in Business Administration (Information Systems) from the University of Illinois at Urbana-Champaign in 1997. His research interests include electronic commerce, strategic impacts of information technology, and information economics. He can be reached by e-mail at tstrader@iastate.edu.

Sree Nilakanta is an associate professor of Management Information Systems at Iowa State University. He received his Ph.D. from the University of Houston in 1986. His research interests include organizational and technology issues of implementing MIS and decision support systems (ODSS), specifically, organizational memory (knowledge management), integrating database management and warehouse with these, and areas of technology innovation. He can be reached by e-mail at nilakant@iastate.edu.

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