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Original Paper

The Day Ahead: IPO Today, Acquired Tomorrow?

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Abstract

We study the double exit phenomenon—new IPO firms get acquired quickly in the M & A market. In this paper, we attempt to discern the distinct characteristics of new public firms that made them acquired soon after their IPOs. Specifically we find that double exit firms are those backed by venture capital. Double exit firms generally have prestigious investment banks underwrite their IPOs. High technology firms are more likely to be taken over soon after their IPOs. Also, double exit firms have higher level of intangible assets. We suggest that IPO may play an important role in firms' following acquisition incidence. First, IPO helps to reduce ex ante transaction costs between firms and financial markets, such as raising external capitals. Second, IPOs wink signals concerning the quality of the firm.

Keywords

initial public offering, merger and acquisition, double exit strategy

1. Introduction

"The time between an IPO and merger is getting shorter all the time. Yesmail.com (Nasdaq: YESM) goes public in September and is bought in December by CMGI (Nasdaq: CMGI), …When you look at e-Greetings regulatory filings you have to wonder why it even bothered with an IPO" (Note 1).

Press constantly reports firm's decision between an IPO and takeover. In another more well known example, analysts articulate that "Online payment company PayPal is trying to test the dismal initial public offering waters, and some analysts are speculating that its filing may serve as a tool to get its finances out in front of potential acquirers, including rival e-Bay" (Note 2). Paypal launched its 70-million dollars IPO in February 2002, and five months later it announced that it was being acquired by Ebay with a price tag of 1.5 billion dollars.

For founders, venture capitalists, early stage investors, who wish to cash out and diversify their risks, choosing an optimal exit strategy is a complex undertaking. They consider traditional strategies, either Initial Public Offerings (IPO), or acquisition by another firm in the Merger and Acquisition (M & A) market. However, the above corporate anecdotes highlight a dual path strategy, which has become more popular among firms—riding on the excitement of IPO and simultaneously posturing for potential bidders in the post-IPO market (Note 3) (Hereinafter referred to as double exit firms).

As most of the previous paper in this area examines IPO or takeover as a separate and independent path for private firms, the increasing number of double exit firms shows the evidence that firms are seeking

the connection between the IPO market and M & A market. Instead of being simply pigeonholed into one choice, entrepreneurs can create valuable options for themselves. They probably use IPO as an intermediate strategic step to reach their ultimate goal of being acquired (Note 4).

While no firm will reveal its exact motivation of going public is to be taken over, neither can researchers test the intention empirically because firms either can seek potential bidders or are being sought out, we are not suggesting getting acquired is double exit firms' motivation behind their IPOs. An important question that follows is why those double exit firms are quickly acquired after becoming public even if being taken over is not the primary motive for an IPO, what intrinsic characteristics of the double exit firms make them an attractive takeover target in the M & A market. A similar research was conducted by Reuer and Shen (2004). They compare firms with "sequential divestiture through IPOs" with "outright divestiture of private firms", and argue IPO can ameliorate the costs due to information asymmetries in M & A market.

In this paper we propose that IPO, as an information dissemination tool and a signaling tool, can help some firms to increase their visibility, and reinforce their identity. Particularly, when target firms are unable to demonstrate their quality or credibility, going public can mitigate the effect of information asymmetry and enhance the likelihood of being acquired by prospective bidders. Our research contributes to the literature in a number of ways. It provides empirical evidence to explain the dual exit phenomenon. In addition, it further supports previous research on how IPO market and M & A market are closely connected. Finally, it complements the entrepreneurial literature that IPO offers a valuable option for insiders to eventually sell out their firms.

The remainder of this article is organized as follows. Section 2 reviews various theories related to IPO and M & A markets, and develops hypotheses. Section 3 describe our data and sample, and explain the construction of empirical proxies used in this research. Section 4 presents our empirical test results. Section 5 concludes.

2. Literature Review and Hypothesis Development

The theory on double exit strategy is not new. Zingales (1995) proposes a framework that IPO is a mechanism employed by an initial owner to maximize his wealth. The owner sells cash flow rights in a firm in IPO to dispersed shareholders to maximize his sales proceeds. Then he can eventually sell the control rights by directly negotiating with a potential bidder. A particular combination of firm control and dispersed ownership will decide whether the firm should stay private or go public. Consistent with this argument, Pagano, Panetta, and Zingales (1998) find high turnover of control in newly public Italian firms, and Rydqvist and Hogholm (1995) analyze Swedish data to show a key motivation of IPOs is to relinquish the control rights.

In Hsieh, Lyanders and Zhdanov's (2008) real option based model, they link firms' going public decision with their subsequent acquisition activities. By going public, managers learn the true value of their own firm. Thus, an IPO allows a firm to exercise its acquisition option to optimize the value of the takeover gain. Celikyurt, Sevilir, Shivdasani (2008) show a higher amount of acquisition activities by newly public firms. While they look at the role of IPO from the acquiring firms' perspective, a complementary view can be taken by examining the role of IPO for target firms.

Brau and Fawcett (2006) report survey results from CFOs that the most cited motives for IPO were the creation of publics shares for use in future acquisitions and establishing a market value for the firm. Public company's stock can be used as buyers' currency, as well as seller's currency. An established market value is equally important for bidders and targets. Rosen, Smart and Zutter (2005) find that

banks which go public are more likely to become takeover targets than a control group of banks which stay private.

Previously there are two papers that directly investigate the payoffs of the dual path strategy. Brau, Sutton, and Hatch (2010) study two groups of entrepreneurial firms. One group goes through the regulatory IPO filing process, but later withdraws their IPO filings and subsequently gets acquired (the dual tracking firms). Another group successfully makes their IPO debut, and then is taken over soon afterwards in the public market (the double exit firms). They find those firms are venture capital backed, underwritten by prestigious investment banks, and they receive significantly higher takeover premium than private firms (22-26% for dual tracking firms and 18-21% for double exit firms respectively). But surprisingly "there is no premium benefit in actually completing the IPOs as compared to simply filing and then withdrawing the IPO". Similarly, Lian and Wang (2007) examine 132 dual tracking firms and ask the question why a private firm file for IPO and incur additional costs while it actually sells itself in a takeover. They find that those dual tracking targets sell at a 58 percent acquisition premium relative to comparable private target that never file IPO. Those dual tracking firms simply enjoy the greater valuation by exhibiting the "almost public" image. They argue that "bidders are willing to value these 'almost public' withdrawn-IPO targets as similar to public targets and to pay more for dual tracking firms than for similar pure private targets".

Based on the previous theoretical background and empirical evidence, we predict the following hypotheses:

Hypothesis 1: The likelihood that an IPO firm will become a double exit firm is positively related to underpricing.

Hypothesis 2: The likelihood that an IPO firm will become a double exit firm is positively associated with the reputation of the underwriters of IPO.

While we focus on IPO to discern some of the distinct features of a double exit firm, we also wish to test the effect of some of the properties that are inherent in the firm. Every IPO involves underwriters, but not all of them are backed by Venture Capitals (VCs). The presence of VC can also signal the quality of the private firm in a number of ways. Venture capitalists are highly selective in funding proposals. VCs not only invest their fund in the firm but also participate in firms' operations, such as, serve on the boards, formulate business strategies, and hire top management.

Hypothesis 3: The likelihood that an IPO firm will become a double exit firm is greater with the presence of a venture capitalist.

Hypothesis 4: The likelihood that an IPO firm will become a double exit firm is greater if the firm is a high-tech firm.

3. Method

3.1 Data

We obtain the data used in this study from several databases. Our IPO sample comes from Securities Data Company (SDC) databases on U.S. Global New Issues. It covers all U.S. IPOs issued from 1985 to 2005. We apply the common standards used in many other research on IPOs by excluding unit offering, closed-end funds, Real Estate Investment Trust (REIT), spin-offs limited partnerships, and previous leverage buyouts. We also eliminated financial institutions (SIC codes between 6000 and 6999), and very small issues with an offer price under $5.

Moreover, the IPO firm must be available on the Compustat annual industrial database for the fiscal year prior to the IPO offering, to assure that the accounting information necessary to study firm's

characteristics before IPO. To get data on stock prices, returns, and shares outstanding, we also require the firm should be on the University of Chicago Center for Research in Security Prices (CRSP) database during the first calendar month following the IPO. This results in a final sample of 4,732 IPOs.

The sample of acquisitions is collected from SDC U.S. Mergers and Acquisitions database. We only include 100% acquisitions by U.S. public firms from 1985 to 2007. Using a 6-digit CUSIPs to match the IPO sample and acquisition sample, we identified 494 double exit firms, firms that are acquired within three years of their IPO issuance. We also use the Venture Capital Backing flag in SDC to distinguish between VC backed and non-VC backed IPOs.

Table 1 panel A reports the year distribution of the firms that went public between 1985 and 2005. Our aggregate sample consists of 4,732 initial public offerings, with 494 firms acquired within three years of their IPOs, roughly 10.44%. 1996 was the year with largest number of IPOs (563) and 2003 was the year with the smallest (47). The largest year for IPOs that were acquired within three years was also 1996 with 78 double exit firms. Panel B compares double exit firms with private firms as acquisition targets during 1985 to 2007. Panel C shows the timing between IPO and acquisition, among our 494 double exit firms, 37 firms were acquired within 6 months after their IPOs, 84 within 6 to 12 months, 186 within 12 to 24 months, and 187 within 24-36 months.

Table 1. Panel A—Distribution by IPO Years

IPO Filing Year	All IPOs Issued	Double Exit Firms	Percentage
1985	97	10	10.31%
1986	260	13	5.00%
1987	218	8	3.67%
1988	74	4	5.41%
1989	63	3	4.76%
1990	81	5	6.17%
1991	206	11	5.34%
1992	315	21	6.67%
1993	395	30	7.59%
1994	324	36	11.11%
1995	356	59	16.57%
1996	563	78	13.85%
1997	380	45	11.84%
1998	235	23	9.79%
1999	413	70	16.95%
2000	324	35	10.80%
2001	63	9	14.29%
2002	59	6	10.17%
2003	47	7	14.89%
2004	134	15	11.19%
2005	125	6	4.80%
Total	4732	494	

Panel B—Distribution by Target Firms

Year M & A Announced	Target=double exit firms	Percentage	Target=private firms	Percentage	Total M & A deals
1985	2	1.02%	66	33.50%	197
1986	4	1.25%	170	53.29%	319
1987	9	3.17%	144	50.70%	284
1988	18	7.17%	115	45.82%	251
1989	9	3.63%	132	53.23%	248
1990	3	1.54%	117	60.00%	195
1991	4	1.54%	161	61.92%	260
1992	5	1.33%	257	68.35%	376
1993	10	1.76%	408	71.96%	567
1994	27	3.35%	548	68.07%	805
1995	37	4.52%	527	64.43%	818
1996	50	4.60%	765	70.38%	1087
1997	59	3.87%	1112	73.01%	1523
1998	69	4.20%	1205	73.30%	1644
1999	64	5.12%	829	66.37%	1249
2000	50	4.30%	820	70.45%	1164
2001	40	5.90%	416	61.36%	678
2002	29	4.96%	410	70.09%	585
2003	14	2.30%	413	67.93%	608
2004	8	1.11%	532	73.79%	721
2005	12	1.52%	607	76.93%	789
2006	9	1.12%	617	76.46%	807
2007	8	1.42%	419	74.29%	564
Obs	494		10790		15739

Panel C—Double Exit Firms' IPO and Acquisition Timing

Between IPO Issue Date and MA Announcement Date	Double Exit Firms
0-6 months	37
6-12 months	84
12-24 months	186
24-36 months	187
Total	494

Table 2 panel A shows the industry distribution based on 2-digit SIC level. As can be seen from the table, manufacturing sector (1,915 firms, 40.47%) and service sector (1,627 firms, 34.38%) constitute the majority of our IPO samples. In Panel B, our high-tech firms include those with primary three-digit SIC codes of 357, 367, 369, 382, 384, and 737, based on Field and Hanka (2001) (Note 5), and they represent 28.51% of the total IPO sample with 1,353 firms. Among 494 double exit firms, 219 (approximately 43%) are in the defined hi-tech sectors. Panel C shows at 2-digit SIC code industry level, most of the double exit firms (66.35%) are acquired by firms within the same industry, while 54.79% of private firms are acquired by public firms in their own industry. At 4-digit SIC code

industry level, there are still more double exit firms acquired by industry peers than are private firms (39% vs. 32%). This evidence suggests that double exit firms relatively stand out in horizontal mergers.

Table 2. Panel A—Industry Distribution of IPOs

Industry	SIC Code	ALL IPOs Issued	(pct)	Double Exit IPOs	(pct)
Agriculture, Forest, Fishing	01-09	16	0.34%	3	0.61%
Mining	10-14	109	2.30%	16	3.24%
Construction	15-17	57	1.20%	4	0.81%
Manufacturing	20-39	1915	40.47%	167	33.81%
Transportation	40-49	380	8.03%	43	8.70%
Wholesale	50, 51	205	4.33%	14	2.83%
Retail	52-59	423	8.94%	36	7.29%
Financial	60-69	0	0.00%	0	0.00%
Services	70-80	1431	30.24%	196	39.68%
Legal, educational, social, other services	81-96	196	4.14%	15	3.04%
Total		4732	100.00%	494	100.00%

Panel B—Distribution by High Technology Firms

	All IPOs Issued	Double Exit Firms
357 computer and office equipment	137	9
367 electronic components and accessories	182	28
369 miscellaneous electrical machinery, equipment, and supplies	20	0
382 laboratory apparatus and analytical, optical, measuring, and controlling instruments	75	7
384 surgical, medical, and dental instruments and supplies	171	33
737 computer programming, data processing, and other computer related	768	142
Subtotal	1353	219

Panel C—Target and Acquirer Industries

Target and acquirer in the same industry	Target=double exit firms	pct	Target=private firms	pct
by 2-digt SIC codes	328	66.35%	5912	54.79%
by 3-digt SIC codes	276	56.02%	4856	45.00%
by 4-digt SIC codes	193	39.01%	3352	31.57%

3.2 Model Specification and Measures of Firm Specific, Industry Specific, Information Asymmetry, and Control Variables.

In this part we discuss the model specification, and construction and measurement of the different variables of our interest.

Based on the hypotheses developed in section 2, we estimate the following maximum likelihood probit model of the probability of getting acquired soon after IPO. Individual firms are indexed *i* for each year *t*, in the sample:

$$Pr\ (Double\ Exit\ Firm_{i,t}=1)=F\ (\beta_0+\beta_1\ IPO\ underpricing_i+\beta_2\ IB\ reputation_i+\beta_3\ VC\ backed_i+\beta_4\ High\text{-}Tech_i+\beta_5\ Control\ Variables_{i,t-1}+\varepsilon)$$

where the dependent variable Double Exit firm takes a value of one if the firm is acquired in year t within the three years following its IPO, and zero otherwise. F (·) is the cumulative distribution function of a standard normal variable (Note 6). All variables will be discussed below. At any time t, the sample includes all firms that are still public at that point in time, and the firms that get acquired in that year. After a firm gets acquired with three years, that firm is dropped from the sample. For firms that are acquired within three years of IPO, they each will have 4 firm-year observations in our sample.

To test H1, we define *Underpricing* as the difference between first trading day close price and offer price, scaled by the offer price. As suggested by prior research, information asymmetry is assumed in most explanations for underpricing of IPOs. We expect double exit firms are those with higher degrees of information asymmetry, and IPO is employed as a signal to mitigate the effect of information asymmetry.

Based on H2, the variable *Prestigious IB* assumes a value of one if the IPO's lead underwriter is a prestigious investment bank with score no less than 7.5, zero otherwise. According to Loughran and Ritter (2004), the investment bank scores range from 1 to 9, with the higher value indicating a more reputable underwriter. The important certification role for investment banks in the IPO process suggests that double exit firms are more likely to be those underwritten by high-tiered investment banks.

To test H3, *VC Backing* is a dummy variable, one if the IPO is backed by venture capitalists, zero otherwise. Venture capitals typically reject 98% of the proposals, and their core capability is their skill to identify young firms with novel technologies that have the potential to generate abnormal returns. At an early stage, VCs also take an active role in managing the firm. Thus, we expect double exit firms are more likely to be those backed by venture capitals.

Finally to test H4, *Hi-Tech* is a dummy variable equal to one if the firm's primary three-digit SIC codes is 357, 367, 369, 382, 384, or 737, zero otherwise. Firms operating in high-tech industries usually spend heavily on research and development to keep pace with modern trends. However, high spending on research and development does not necessarily guarantee "more creativity, higher profit or a greater market share" (Note 7), which provides another ex ante valuation challenge. High-tech IPOs generally receive very favorable perceptions from investors, especially during the internet bubble period (Maksimovic & Pichler, 2001; Brau, Francis, & Kohers, 2003). They are also popular acquisition candidates in the M & A market. Kohers and Kohers (2000) find the acquisition premium for high-tech targets were significantly larger than that for non-high-tech firms. Under our hypothesis, high tech firms have a greater incentive to go public in the first place because IPO can not only reduce information asymmetry between hi-tech firms and financial market (high intangible assets, high growth potential, high capital spending, and high R & D investment), but also signal the quality of their products or services, and enhance their visibility and reputation (Brau, Francis, & Kohers, 2003; Brau

& Fawcett, 2006).

Typically, an IPO allows insiders to gradually relinquish their ownership and cash out part of their stake. Firm insiders can design an IPO to result in various level of corporate control or liquidity. Following, Brau, Francis, Kohers (2003), *Insider Ownership* is the percentage of the ownership of the firm not offered in IPO (i.e., 1—the ratio of total IPO shares divided total numbers of share outstanding after IPO). *Liquidity* is the ratio between secondary shares in the IPO to total shares. Selling considerable secondary shares or reducing stock ownership usually send negative signals to the investors because by doing so entrepreneurs and other top management in the firm, in turn, reduces their incentives to expend effort to maximize firm value (Jensen & Meckling, 1977).

In addition to the variables discussed above, we also incorporate a number of control variables, at firm level, industry level and macroeconomic level, which have been found significant by prior research in affecting firm's decision to go public.

Size is the natural logarithm of the firm's total assets (Note 8). Firm size usually reflects different degrees of information asymmetry. Large firms generally get more media attention and analysts coverage, so that their value is easier to identify. Besides, IPOs involve explicit high cost (Holmstrom & Tirole, 1993; Pagano & Roell, 1998; Ritter, 2008), and only big firms can enjoy economy of scale (Jensen & Ljungqvist, 1996). Then smaller firms or firms with high intangible assets tend to go public to reveal their value, and to signal their quality by enduring the cost, and undergoing the scrutiny of SEC, financial analysts, and a broad base of shareholders. To control for firm's debt level, we compute *Debt* as the ratio of the firm's long-term debt to total assets. Firms with debt can credibly show that they have already been undergone the close monitoring of lenders. *Intangibility* is calculated as 1—the ratio of net property, plant and equipments divided by total assets. Intangible assets, such as, copyrights, trademark, goodwill, etc., often cannot be physically measured. Therefore, firms with higher intangible assets face greater valuation uncertainty, thus imposing a greater challenge for corporate raiders. Again we expect Intangibility to have a positive relationship with the probability of double exit.

To capture the firm's future growth prospects, we use the market value of the firm's common stock versus book value to construct *Market-to-Book*. *CAPEX* is the ratio of the firm's capital expenditure scaled by total assets. *ROA* measures the return on asset, which is the firm's EBITDA divided by total assets. Consistent with previous literature, we also constructed FCF to address a possible acquisition reason—the free cash flow problem. Jensen (1986) noted the agency costs associated with free cash flows, which allowed firms' managers to finance projects with negative NPVs. Following Mehran and Peristiani (2009), *FCF* is the net cash flow (after-tax operating income before depreciation) minus cash and preferred dividends and interest payments, normalized by total assets.

Next, we define three proxies to examine the effect of industry environment. *HHI* is the Herfindahl index, which captures the degree of competition within an industry. This index is constructed by summing up the squared sales of all firms of a particular industry at the 2-digit SIC code. The higher the index, the higher the industry concentration. Literature is mixed on the effect of industry concentration on acquisitions. High industry concentration provides an environment unconducive to firm survival or further consolidation due to antitrust concerns. Thus, IPO would be too costly, and firms would opt for a direct merger in high concentration industries. However, high degree of industry competition also implies a larger set of potential acquirers and reduced information asymmetry. The role of industry concentration thus becomes an empirical issue. To determine if there is a leading firm in the industry, we define a *Big Player* dummy variable which is equal to one if there is a public company with more than 30% market share at the time of acquisition in the same industry, and zero otherwise. Following

Chemmanur Nandy and He (2009), we use the industry average standard deviation in analysts' forecast, to proxy for the information asymmetry within a particular industry. The variable *STDEV* is constructed by using the analyst' forecast on EPS from I/B/E/S. The variable *Analyst N* is the industry mean of number of analysts following one firm.

Finally, we present two market-timing variables that have been hypothesized to influence the likelihood of acquisitions. Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) claim that merger waves are triggered by stock market overvaluation. On the contrary, Mitchell and Mulherin (1996) relate the clustering of merger activities to periods of economic contractions. To control for the time varying effect of the equity market, we use *CRSP_VW* as the lagged annual return of value weighted CRSP market index return. Two alternative measures are motivated by the observed merger waves over time (Jared, 2004; Duchin & Schmit, 2007), the number and the total deal value of mergers, in each industry as defined by 2-digit SIC code, over the past 12 months. To capture the intensity of merger activities in the same industry over the past year, *Merger Intensity N* is the logarithm of (1 plus) the accumulated number of deals in acquirer's industry over the previous 12 months. *Merger Intensity AMT* is the logarithm of (1 plus) the accumulated value of mergers measured by the deal value in the acquirer's industry over the year prior to the merger (Note 9). To capture the interaction of hi-tech firms and the internet bubble time period, we create a dummy variable equal to one, if it is a high-tech firm that went public in 1999 or 2000, zero otherwise.

4. Results

4.1 Univariate Tests

Table 3 provides the descriptive statistics for the two subsamples of double exit firms and mature public firms respectively. Table 3 further presents the p-value of the two sample t-test for the differences in mean and Wilcoxon-Mann-Whitney test for the differences in underlying distributions of all variables in interest. All reported statistics are measured one fiscal year before their IPOs. Consistent with hypothesis H1, we see that the double exit firms are more severely underpriced in their IPOs. The average underpricing for double exit firm is 27.3%, while that of mature IPOs is 21.2%. Hypothesis H2 predicts that double exit firms are more likely backed by venture capitalists. In Table 3, on average 55.1% of the double exit firms are backed by venture capitalists, 12.3% higher than firms that remain public three years after IPO. Moreover, 77.9% Double exit firms are underwritten by prestigious investment banks, 14.4% higher than rest of the IPO firms, which confirms hypothesis H3. Finally, 44.3% of the double exit firms are from hi-tech industries, which is about 12.5% higher than mature IPOs. Double exit firms also have a higher proportion of high tech firms that went public during 1999-2000, the internet bubble period (14.5% vs. 7.6%). The acquisition soon after their IPOs appears to ride the merger wave in their industries. In summary, the results of the univariate tests strongly support the predictions of our 4 hypotheses. In the next subsection, we will examine whether these results hold in a multivariate framework.

Table 3. Univariate Tests

	Mature IPOs			Double Exit IPOs				
	N	Mean	Median	N	Mean	Median	Diff in Means	Diff in Medians
Size-Log(Assets)	4238	3.613	3.490	494	3.640	3.340	-0.027	0.150
Size-Log(Sales)	4238	3.700	3.799	494	3.627	3.483	0.073	0.316***

Underpricing	4238	0.212	0.078	494	0.273	0.107	-0.061***	-0.029***
VC Backing	4238	0.428	0.000	494	0.551	1.000	-0.123***	-1.000***
Prestigious IB	4238	0.635	1.000	494	0.779	1.000	-0.144***	0.000***
Hi Tech	4238	0.319	0.000	494	0.443	0.000	-0.125***	0.000***
Liquidity	4238	0.124	0.000	494	0.117	0.000	0.007	0.000
Insider Ownership	4238	0.667	0.704	494	0.674	0.719	-0.007	-0.015***
Fcf	4238	-0.308	-0.014	494	0.674	0.719	-0.982	-0.733***
Market-to-book	4238	2.012	2.266	494	0.734	0.346	1.278	1.920
Debt	4238	0.264	0.120	494	0.250	0.098	0.014	0.022
Intangbillity	4238	0.747	0.822	494	0.758	0.834	-0.011	-0.012
Capex	4238	0.093	0.055	494	0.093	0.056	0.000	-0.001
Rnd	4238	0.163	0.000	494	0.189	0.030	-0.026	-0.030***
Roa	4238	-0.110	0.127	494	-0.170	0.091	0.060	0.036***
HHI	4238	0.083	0.058	494	0.076	0.050	0.007	0.008***
Big Player	4238	0.123	0.000	494	0.077	0.000	0.046***	0.000***
Stdev	4238	0.046	0.000	494	0.077	0.000	-0.031	0.000
Analyst N	4238	0.003	0.000	494	0.004	0.000	-0.001***	0.000
Hitech Bubble	4238	0.076	0.000	494	0.145	0.000	-0.070***	0.000***
Merger Intensity by deal numbers	4238	2.838	2.708	494	3.427	3.637	-0.589***	-0.929***
Merger Intensity by deal Amt	4238	11.938	12.338	494	12.961	13.922	-1.023***	-1.584***
CRSP_vw	4238	0.187	0.212	494	0.191	0.223	-0.005	-0.011

4.2 Multivariate Tests

Table 4 presents the maximum likelihood estimates of the Probit model. In Panel A, the explanatory variables are limited to firm specific variables. In Panel B, we supplement the model by adding industry level variables. Finally, Panel C includes market timing variables as well as firm specific and industry specific variables of Panels A and B, as hypothesized in the previous section.

In Panel A, with firm level variables, three of our hypothesized variables, *VC Backing*, *Prestigious IB*, *Hi Tech* are significant, except for *Underpricing*. The coefficient on is negatively related to the probability of becoming a double exit firm, which is inconsistent with H1. Consistent with H2, *VC Backing* has a positive effect on the likelihood of being acquired. In all specifications, the coefficients of *VC Backing* are positive and significant at the 1% level. The odds ratio indicates that given everything else equal, with the presence of VC, the probability of getting acquired is about 30% higher. Consistent with H3, *Prestigious IB* also has a positive effect on the likelihood of being acquired. In all specifications, the coefficients of *Prestigious IB* are positive and significant at the 1% level. The chance of being taken over for firms underwritten by a prestigious investment bank stand is 70% higher. Consistent with H4, *Hi Tech* has a positive effect on the likelihood of being acquired. In all specifications, the coefficients of *Hi Tech* are positive and significant at the 1% level. Being a hi-tech firm, its visibility lead to the likelihood of getting acquired 40% higher, vis-à-vis non hi-tech.

In specification 1 and 2, we omit *Market-to-book* and *Rnd* respectively due to the presence of *Hi Tech* dummy because hi-tech firms usually have high growth opportunities and/or intensive input in R & D.

However, the results for key variables are robust.

One firm level control variable, Intangibility, is positive and significant at 10% level across all specifications. This further confirms our previous analysis that firms unable to reveal their quality or credibility, those with high level of intangible assets, those in hi-tech industries, can enhance their visibility through IPO, and subsequently get acquired in the M & A market.

The coefficient on *Size* suggests that the double exit firms are actually not smaller than mature IPOs, but it is insignificant. Double exit firms have higher Debt level and higher capital spending but neither of the variables is significant. Market to book ratio is insignificant, since it is a proxy for both growth opportunities and asymmetric information, which may be well captured by the *Hi Tech* dummy. *Fcf* also has positive coefficient, consistent with previous research results that firms with high level of free cash flow will more likely to be on the radar of corporate raiders. However, it is statistically insignificant.

In summary, the results in Panel A strongly supports our hypotheses that firms backed by venture capitalists, underwritten by prestigious investment banks, and rooted in hi-tech sectors are more likely to become double exit firms.

Panel B regressions augment Panel A by introducing industry specific characteristics. The industry distribution in Panel C of Table 2 sheds light on the possible influence of a particular industry environment. We comparing regression 1 in Panel B with regression 1 in Panel A, the coefficient on the hypothesized variables have similar direction, magnitude and significance in both regressions.

The coefficient on *HHI* is positive, the coefficient on *Big Player* is mixed, and the coefficient on *Stdev* is negative. However, their effects are not obvious. We offer several possible explanations. First, the *Hi Tech* dummy already captures some of the common industry characteristics. Second, the industry distribution between targets and acquirers in Panel C of Table 2 already shows the targets were typically in the same industry as the acquirers, which sheds light on the possibility that acquirers know better about their own industry environment. The coefficient of *Analysts N* is positive and significant, since our high tech industries are all within manufacturing and service sectors, two sectors well sought after by market analysts.

The regressions in Panel C includes market timing variables along with firm specific and industry specific variables from Panel A and Panel B. In Panel C regressions we use CRSP value weighted return to control for the market fluctuation instead of year dummies. While the effect of *VC Backing*, *Prestigious IB*, and *Hi Tech* remains quantitatively and qualitatively significant, the likelihood of becoming a double exit firm is significantly positively related to the lagged annual stock market return and industry wide merger waves, which further supports findings highlighted by Shleifer and Vishny (2003) and Rhodes-Kropf and Vishwanathan (2003) that merger waves are correlated with high stock market valuations. The clustering of merger activities within industries precedes some IPO firms' quick acquisition by other public firms suggests the merger waves display a pattern with long swings.

In summary, the empirical evidence from the multivariate probit analysis in Table 4 shows that why double exit firms are so quickly acquired is broadly consistent with the hypotheses in Section 2. We find that the proxies for quality of the IPO firms, measures of asymmetric information, and market conditions have a very significant impact on the probability of double exit.

While we find no evidence of a positive relationship between underpricing and the incidence of double exit firms across all the specifications, we attempt to examine the phenomenon in greater details. We first narrow down the IPO-acquisition window to 1 year, and re-estimate the models. However, there is still no evidence that underpricing plays an important role in increasing the chance of acquisition.

Therefore we eliminate the possibility that the effect of underpricing is only transient. If people do not have short memories for firm's underpricing in IPO, why are acquirers not particularly interested in IPOs that are highly underpriced? As previous literature generally considers underpricing as a degree of information asymmetry between firm and outsiders, our findings here do not lend support to this view. If IPO serves as a signal, at least in the eyes of firms buying new IPO firms, the quality is better conveyed by the presence of prestigious investment banks involved in IPOs. This leaves one caveat for future research.

Table 4. Multivariate Regression

Panel A.

	Reg.1		Reg.2		Reg.3		Reg.4	
	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio
Underpricing	-0.098	0.907	-0.140	0.869	-0.108	0.897	-0.092	0.912
	(0.111)		(0.100)		(0.111)		(0.112)	
VC Backing	0.236***	1.267	0.392***	1.481	0.272***	1.313	0.293***	1.340
	(0.108)		(0.104)		(0.111)		(0.116)	
Prestigious IB	0.54***	1.716	0.394***	1.483	0.566***	1.761	0.575***	1.778
	(0.138)		(0.129)		(0.140)		(0.141)	
Hi Tech	0.318***	1.375	0.366***	1.442	0.338***	1.403	0.354***	1.425
	(0.113)		(0.107)		(0.114)		(0.115)	
Size	0.033	1.034	0.145***	1.157	0.019	1.020	0.019	1.020
	(0.044)		(0.034)		(0.044)		(0.044)	
Debt	0.200	1.222	-0.436**	0.646	0.168	1.183	0.143	1.154
	(0.248)		(0.220)		(0.251)		(0.255)	
Intangibility	0.577*	1.782	0.447*	1.564	0.58*	1.787	0.595*	1.814
	(0.355)		(0.334)		(0.354)		(0.355)	
Market-to-book	0.001	1.001			0.001	1.001	0.001	1.001
	(0.001)				-0.001		(0.001)	
Capex	1.153	3.169	0.665	1.946	1.043**	2.839	1.077*	2.938
	(0.608)		(0.562)		(0.607)		(0.604)	
Roa	-0.027	0.973	-0.108	0.898	-0.078	0.925	-0.079	0.923
	(0.219)		(0.152)		(0.190)		(0.194)	
Rnd			-1.009***		-0.737	0.478	-0.698	0.497
			(0.343)		(0.429)		(0.432)	
Fcf	0.152	1.165	0.057	1.059	0.110	1.116	0.111	1.118
	(0.176)		(0.138)		(0.160)		(0.161)	
Insider Ownership							-2.359	0.698
							(0.435)	
Liquidity							0.006	1.007
							(0.255)	
Year Dummies	yes		yes		yes		yes	
Number of Obs	12771		17505		12771		12344	
Pseudo R^2	0.04		0.054		0.0428		0.0436	

Note. Heteroskedasticity corrected robust standard errors, are in parentheses. ***, **, * indicated significance at the 1,5,10 percent level respectively.

Panel B.

	Reg. 1		Reg. 2		Reg. 3		Reg. 4		Reg. 5	
	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio
Underpricing	-0.108	0.898	-0.108	0.898	-0.035	0.965	-0.035	0.965	-0.161	0.851
	(0.112)		(0.111)		(0.118)		(0.118)		(0.117)	
VC Backing	0.276**	1.318	0.270**	1.311	0.169	1.184	0.165*	1.180	0.246**	1.279
	(0.112)		(0.111)		(0.124)		(0.124)		(0.113)	
Prestigious IB	0.567***	1.764	0.563***	1.756	0.469***	1.599	0.47***	1.601	0.585***	1.795
	(0.140)		(0.140)		(0.153)		(0.153)		(0.142)	
Hi Tech	0.347***	1.416	0.336***	1.400	0.412***	1.510	0.407**	1.504	0.313***	1.368
	(0.115)		(0.115)		(0.130)		(0.131)		(0.115)	
Size	0.021	1.022	0.020	1.021	-0.058	0.943	-0.061	0.941	-0.066	0.936
	(0.045)		(0.045)		(0.060)		(0.060)		(0.048)	
Debt	0.163	1.177	0.165	1.180	0.399	1.492	0.403	1.497	0.298	1.347
	(0.252)		(0.251)		(0.283)		(0.282)		(0.248)	
Intangibility	0.591**	1.807	0.583*	1.792	1.092**	2.981	1.078**	2.939	0.571	1.771
	(0.353)		(0.354)		(0.456)		(0.456)		(0.360)	
Market-to-book	0.001	1.001	0.001	1.001	-0.001	1.000	-0.001	1.000	-0.001	1.001
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Capex	1.055**	2.872	1.048*	2.852	1.553**	4.726	1.531**	4.621	0.899	2.458
	(0.605)		(0.607)		(0.893)		(0.898)		(0.641)	
Roa	-0.086	0.918	-0.078	0.924	-0.486	0.615	-0.473	0.623	-0.112	0.894
	(0.192)		(0.190)		(0.304)		(0.303)		(0.193)	
Rnd	-0.700	0.497	-0.741*	0.476	-1.354	0.258	-1.395	0.247	-0.784*	0.456
	(0.428)		(0.430)		(0.429)		(0.430)		(0.430)	
Fcf	0.115	1.122	0.109	1.116	0.004	1.004	-0.004	0.996	0.134	1.144
	(0.162)		(0.160)		(0.223)		(0.221)		(0.163)	
HHI	0.661	1.938			1.040	2.831			0.713	2.042
	(0.728)				(0.850)				(0.727)	
Big Player			-0.033	0.968			0.170	1.186		
			(0.206)				(0.247)			
Stdev					-0.031	0.969	-0.032	0.968		
					(0.039)		(0.039)			
Analysts_n									0.089***	1.094
									(0.015)	
Pseudo R^2	0.043		0.0428		0.052		0.053		0.053	

Note. Heteroskedasticity corrected robust standard errors, are in parentheses. ***, **, * indicated significance at the 1,5,10 percent level respectively.

Panel C.

	Reg. 1		Reg. 2		Reg. 3		Reg. 4		Reg. 5	
	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio
Underpricing	-0.107	0.898	-0.001	0.998	-0.108	0.897	-0.060	0.941	-0.099	0.905
	(0.111)		(0.099)		(0.109)		(0.103)		(0.107)	
VC Backing	0.276**	1.318	0.247**	1.280	0.222**	1.249	0.218**	1.244	0.183**	1.201
	(0.112)		(0.111)		(0.110)		(0.110)		(0.111)	
Prestigious IB	0.567***	1.764	0.511***	1.668	0.534***	1.707	0.544***	1.724	0.573***	1.774
	(0.140)		(0.140)		(0.140)		(0.140)		(0.143)	
Hi Tech	0.349***	1.418	0.359***	1.433	0.061**	1.063	0.248**	1.282	0.204**	1.227
	(0.123)		(0.119)		0.126		(0.119)		(0.120)	
Size	0.021	1.022	0.006	1.069	0.044	1.045	0.038	1.039	-0.062	0.939
	(0.045)		(0.043)		(0.043)		(0.043)		(0.047)	
Debt	0.163	1.177	0.134	1.144	0.153	1.166	0.101	1.107	0.259	1.296
	(0.253)		(0.256)		(0.254)		(0.254)		(0.248)	
Intangibility	0.591*	1.807	0.781**	2.184	0.380	1.463	0.501	1.651	0.474	1.607
	(0.353)		(0.352)		(0.360)		(0.362)		(0.368)	
Market-to-book	0.001	1.001	0.001	1.001	0.001	1.001	0.001	1.001	0.001	1.001
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Capex	1.054*	2.872	1.179**	3.254	0.935	2.545	0.952	2.591	0.835	2.306
	(0.605)		(0.584)		(0.604)		(0.594)		(0.632)	
Roa	-0.086	0.918	-0.110	0.896	-0.085	0.918	-0.061	0.940	-0.067	0.935
	(0.192)		(0.289)		(0.202)		(0.210)		(0.217)	
Rnd	-0.700	0.497	-0.521	0.593	-0.523	0.593	-0.633	0.531	-0.748	0.473
	(0.428)		(0.461)		(0.414)		(0.431)		(0.438)	
Fcf	0.116	1.123	0.051	1.053	0.091	1.096	0.049	1.051	0.066	1.069
	(0.162)		(0.149)		(0.153)		(0.141)		(0.146)	
HHI	0.661	1.937	-0.486	0.615	0.715	2.045	0.910	2.486	1.004	2.730
	(0.728)		(0.828)		(0.760)		(0.783)		(0.776)	
Analysts_n									0.089	1.093
									(0.015)	
Hitech Bubble	-0.009	0.991	0.096	1.101	-0.162	0.850	(0.070)	0.932	(0.042)	0.959
			(0.195)		(0.198)		(0.200)		(0.201)	
CRSP_vw			0.929***	2.534	0.922***	2.515	0.945***	2.574	1.031***	2.806
			(0.351)		(0.340)		(0.344)		(0.350)	
Merger Intensity N					0.267***	1.307				
					(0.046)					
Merger Intensity Amt							0.108	1.114	0.105***	1.111
							(0.030)		(0.03)	
Pseudo R^2	0.043		0.0237		0.0344		0.0304		0.0374	

Note. Heteroskedasticity corrected robust standard errors, are in parentheses. ***, **, * indicated significance at the 1,5,10 percent level respectively.

5. Discussion and Conclusion

This study examines the double exit phenomenon—new IPO firms get acquired quickly in the M & A market. Previous theory has provided framework that insiders can maximize total proceeds by first selling cash flow rights in IPO and subsequent selling the control rights. It is widely known that private targets receive a significant price discount while public targets are selling at a premium.

In this study, we attempt to discern the distinct characteristics of new public firms that made them acquired soon after their IPOs. Specifically we find that double exit firms are those backed by venture capital. Double exit firms generally have prestigious investment banks underwrite their IPOs. High technology firms are more likely to be taken over soon after their IPOs. Also, double exit firms have higher level of intangible assets.

We suggest that IPO may play an important role in firms' following acquisition incidence. First, IPO helps to reduce ex ante transaction costs between firms and financial markets, such as raising external capitals. In the M & A market particularly, among all public firms, those with severe information asymmetry problems will most benefit from going public. As information asymmetry typically prevails the M & A market, IPO can reduce asymmetric information problem by disclosing accounting information, undergoing SEC scrutiny and analyst coverage. Second, IPOs wink signals concerning the quality of the firm.

Our results supplement a number of previous researches. In Brau and Fawcett (2006), CFOs cite the top two reasons to go public are to create public shares for use in future acquisition and to establish a market value for the firm. While recent empirical papers investigate IPO firms as acquirers (Cxxx, 2009; Hovakimian & Hutton, 2009), we provide a complementary look by examining IPO firms as M & A targets. While it is hard to argue that double exit firms go public to become targets in acquisitions, IPO indeed increases their probability of being acquired. Especially for high tech firms, IPO serves as a visibility-enhancing strategic move. IPO also alleviates the valuation uncertainty problem for both the sellers and bidders.

Literature has widely emphasized the certification role of venture capital. VCs' involvement during the early stage of a firm's business life has been long documented, and our result further shows that it has far reaching consequence in firms' transition later to both IPO market and M & A market.

Due to the asymmetric information, signaling theory continues to be an inseparable component of IPOs. Consistent with previous research (Brau & Fawcett, 2003), using a top investment banker is the one of the strongest signals sending by the firm. Certification by a prestigious investment bank facilitates the subsequent takeover of double exit firms.

As IPOs are generally treated as an independent decision, our findings of the timing of double exit incidences shed light on the possible connection between the IPO market and the M & A market. IPOs are not the final destination for entrepreneurs, top managers, and venture capitalists.

We are left with the puzzle of why those firms go IPO in the first place. It would also be interesting to see whether the signals sent by IPOs have any impact of the payment methods in M & A. Investment banks play an important role in firms IPO, acting as merger advisors, either for target firms or acquiring firms. Our hope is that this paper will encourage a more thorough and robust line for future research.

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Notes

Note 1. CNet news, 12/19/1999.

Note 2. E-Commerce Times, 2/15/2002.

Note 3. Fitch and Benjamin, 1998, Gomez, 1999, Thurm, 2000, Huf, 2000.

Note 4. Mitchell and Mulherin (1996) provide evidence that there is clustering of mergers over time. The anecdote mentioned above also suggested that IPO waves precede acquisition waves.

Note 5. SDC provides description on firm's business description, and their indicator of "high technology" turns out to be unreliable as shown by Field and Hanka 2001.

Note 6. We will present the results from the hazard analysis in the next subsection.

Note 7. From Wiki, “Research and Development”.

Note 8. All dollar amounts are adjusted by 2007 dollar.

Note 9. All dollar amounts are adjusted by 2007 dollar.