

Lecture 13

IPOs

Why do firms go public?

Life cycle theories

- It is easier for a potential acquiror to spot a potential takeover target when it is public. Zingales (1995).
- Entrepreneurs regain control from venture capitalists (VC) at IPO. Black and Gilson (1998). A different angle in Chemmanur and Fulghieri (1999).
 - Pre-IPO “angel” investors or VC hold undiversified portfolios.
 - Since it is expensive to go public and proprietary data may be revealed, early on a firm will be private.
 - Then, diversified investors, who value more the firm than the undiversified owners, take control of firm. (Leland and Lyle (1977)).

Valuation theories

- Holmstrom and Tirole (1993) and Bolton and Von Thadden (1998): public companies subject themselves to monitoring by outsiders (for example , investment banks, auditors, analysts, investors, SEC), activities which might enhance the value of the firm.

- Amihud and Mendelson (1988): IPOs make firm shares more liquid, which also increases firm value.

- Firms can learn from the information contained in stock prices.
 - “Information spillovers” to managers/investors. High prices may signal increased growth opportunities. Subramanyam and Titman (1999), Schultz (2000).

- Signals stability and dependability to customers and suppliers
 - Maksimovic and Pichler (2001): a high public price can attract product market competition

Market-Timing Theories

- Firms issue equity when it is “convenient” –when equity is overvalued.
 - Bayless and Chaplinsky (1996): When cost of equity is low, firms have a “window of opportunity.”
 - Choe, Masulis, and Nanda (1993): During good economic times, firms projects have high expected CFs. Asymmetry of information is reduced. Thus, firms avoid issuing in periods where few other good-quality firms issue. (A signaling story).

Estimation Technique

- Event studies + regression of CARs on firm characteristics:

$$CAR_{i,t} = f(X_{i,t} + \text{FF factors}_{i,t}) + \varepsilon_{i,t},$$

where $f(\cdot)$ is usually a linear function, and $X_{i,t}$ are firm characteristics.

- The usual issues apply:
 - CAR or BAR?
 - Endogeneity.
 - Misspecification (functional form, omitted variables)
 - Measurement error.

Evidence

- Formal theories of IPO difficult to test. We observe only the firms that go public. There is no “control” group.
- Pagano, Panetta, and Zingales (1998) with a unique data set of Italian firms find that larger companies and with high MB ratio are more likely to go public. They also find, IPOs reduce cost of credit. IPO follows high investment and growth (not viceversa).
- Lerner (1994) studies U.S. biotech IPOs. MB ratio has a significant effect on IPO decisions.
- Baker and Wurgler (2000) find that when investors are optimistic (higher previous returns), IPOs happen.
- Lowry (2002) finds that investor sentiment (measured by the discount on closed-end funds), growth opportunities, and adverse selection considerations all are determinants of aggregate IPO volume.

Costs of going public

- IPO creates substantial fees
 - Legal, accounting, investment banking fees are often 10% of funds raised in the offering
- Greater degree of disclosure and scrutiny
- First day under-pricing (usual result)
- Market cycles in IPOs valuations

Direct and Indirect Costs of IPOs

Proceeds (in millions of dollars)	Gross Spreads (in %)	Other Expenses (in %)	Total Direct Costs (in %)	Average Initial Return (in %)	Average Direct & Indirect Costs (in %)	Number of IPOs	Interquartile Range of Spread (in %)
2-9.99	9.05	7.91	16.96	16.36	25.16	337	8.00-10.00
10-19.99	7.24	4.39	11.63	9.65	18.15	389	7.00-7.14
20-39.99	7.01	2.69	9.70	12.48	18.18	533	7.00-7.00
40-59.99	6.96	1.76	8.72	13.65	17.95	215	7.00-7.00
60-79.99	6.74	1.46	8.20	11.31	16.35	79	6.55-7.00
80-99.99	6.47	1.44	7.91	8.91	14.14	51	6.21-6.85
100-199.99	6.03	1.03	7.06	7.16	12.78	106	5.72-6.47
200-499.99	5.67	0.86	6.53	5.70	11.10	47	5.29-5.86
500-up	5.21	0.51	5.72	7.53	10.36	10	5.00-5.37
Totals:	7.31	3.69	11.00	12.05	18.69	1767	7.00-7.05

Direct and Indirect Costs (in %) of Equity IPOs from 1990 to 1994

Based on: Lee, Lochhead, Ritter, and Zhao (1996)

Step 1: Selecting an underwriter

- Criteria:
 - Reputation of the analyst covering the firm
 - Performance of past IPOs
 - Not a criteria: fees! (7% of capital raised)
- Hi-Tech IPOs are often underwritten by a consortium
 - Technology specialist plus large underwriter, “bulge bracket”

Step 2: Tasks of the underwriter

- Due Diligence
- Determine the offering size
- Prepare the marketing material
- Prepare regulatory filings (S-1) together with the legal representation of the firm

Step 3: Marketing the offering

- “Red Herring”: Circulate a preliminary prospectus to potential investors.
- Road-Show.
- Book-building: Collect information about the demand from potential investors to set the price and size of the offering.
 - “Firm commitment offerings”: Investment bank commits to sell the shares at the set price

Step 4: The offering

- The underwriter buys the shares from the company at a fixed price and immediately sells it to investors at the IPO price
- “Green Shoe” option:
 - Clause in the underwriter agreement specifying that in case of exceptional public demand the issuer will authorize additional shares for distribution by the underwriter at the offering price (usual is over-allotment option of 15%)

Step 5: Aftermarket activities

- Short covering:
 - Underwriter shorts the stock prior to the IPO. If the share price rises after the IPO, underwriter uses over-allotment option to cover the short, if the price falls it buys stocks in the market
- “Pure” stabilization bids
 - Underwriter posts bid in the open market not exceeding the offer price.
- Penalty bids.
 - Revoke selling concession if shares are “flipped.”

Stylized Facts

- Fact 1: First-day under-pricing
- Fact 2: Long-run under-performance
- Fact 3: IPO markets are very cyclical
 - “Hot” and “Cold”
 - Volume drops significantly following stock markets drops (quantity adjustment and not price adjustment).

First day under-pricing

- First documented by Stoll and Curley (1970), Reilly (1973), Logue (1973), and Ibbotson (1975).
- On average the stock price jumps on the first day of trading
 - From 1980-2001, the average first-day return is 18.8%
 - From 1990 to 1998 companies left over \$27 billion on the table
 - Close to 70% of IPOs end the first day of trading with positive returns, 16% of IPOs end with zero first day returns.
 - The median firm has modest first day return, but a few firms have several hundred percent.
- This pattern is found in most developed capital markets

- In the U.S., the monthly average correlation of first-day returns is 0.60. Lowry and Schwert (2002).
 - Autocorrelation is worst if “bubble period” (1998-2001) included
 - Every single month from November 1998 to April 2002 had an average first-day return of more than 30%.

Average first-day returns on IPOs

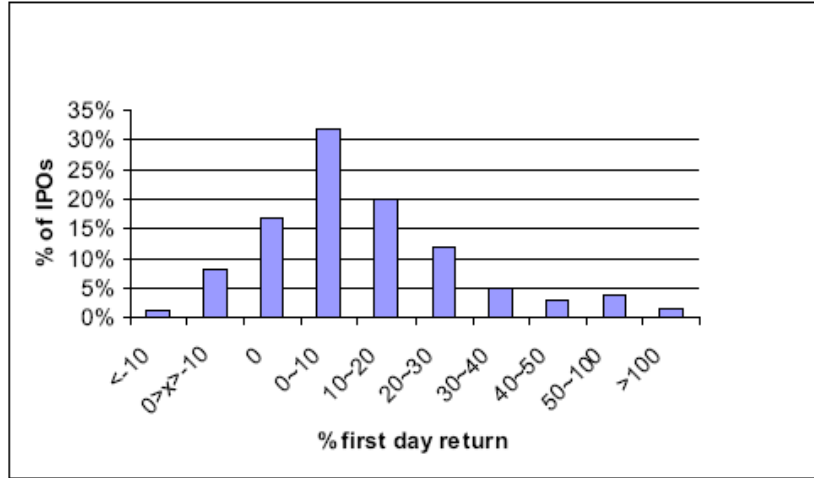
	1980s Return (in %)	1980s N	1990s Return (in %)	1990s N
Segmented by issue size				
- Small	8.7	944	12.9	1761
- Large	6.7	1425	27.5	2280
Segmented by underwriter prestige				
- Low prestige	8.7	1889	14.5	2056
- High prestige	5.0	663	26.8	2189
Segmented by venture capital backing				
- Not VC-backed	6.7	1664	15.7	2293
- VC-backed	7.8	515	29.0	1637
All	7.8	2552	20.9	4245
All (excluding OP < \$5.00)	6.8	2358	20.9	4129

Data Source: ICS, Lehman Brothers, and First Call

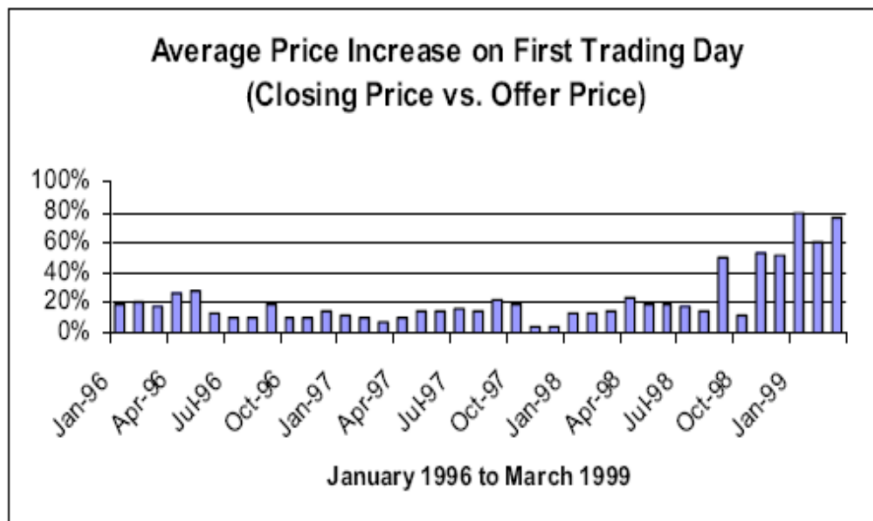
Number of IPOs, First-day Return, Amount of Money (1990-2001)

Year	Number of IPOs	Average First-day Return	Aggregate Gross Proceeds, millions	Aggregate Money Left on the Table, millions	Average 3-year Buy-and-hold Return		
					IPOs	Market- adjusted	Style- adjusted
1980	70	14.5%	\$2,020	\$408	88.2%	35.5%	17.1%
1981	191	5.9%	\$4,613	\$264	12.8%	-26.2%	-7.4%
1982	77	11.4%	\$1,839	\$245	32.2%	-36.5%	-48.7%
1983	442	10.1%	\$15,348	\$1,479	15.4%	-38.7%	2.5%
1984	172	3.6%	\$3,543	\$86	27.7%	-51.3%	3.0%
1985	179	6.3%	\$6,963	\$354	7.6%	-39.5%	7.3%
1986	378	6.3%	\$19,653	\$1,030	18.6%	-20.4%	14.3%
1987	271	6.0%	\$16,299	\$1,019	-1.8%	-18.9%	4.5%
1988	97	5.4%	\$5,324	\$186	55.7%	8.3%	51.3%
1989	105	8.1%	\$6,773	\$336	51.1%	16.8%	32.5%
1990	104	10.8%	\$5,611	\$454	12.2%	-34.1%	-32.4%
1991	273	12.1%	\$15,923	\$1,788	31.5%	-1.7%	5.8%
1992	385	10.2%	\$26,373	\$2,148	34.8%	-2.3%	-19.4%
1993	483	12.8%	\$34,422	\$3,915	44.9%	-7.8%	-23.9%
1994	387	9.8%	\$19,323	\$1,650	74.1%	-8.3%	1.0%
1995	432	21.5%	\$28,347	\$5,033	24.8%	-62.3%	-14.1%
1996	621	16.7%	\$45,940	\$7,383	25.6%	-57.0%	8.6%
1997	432	13.8%	\$31,701	\$4,664	67.7%	6.8%	41.0%
1998	267	22.3%	\$34,628	\$5,352	27.1%	9.1%	12.2%
1999	457	71.7%	\$66,770	\$37,943	-46.2%	-32.9%	-74.2%
2000	346	56.1%	\$62,593	\$27,682	-64.7%	-36.4%	-42.6%
2001	80	14.0%	\$34,344	\$2,973	n.a.	n.a.	n.a.
1980-1989	1,982	7.4%	\$82,476	\$5,409	20.8%	-24.7%	6.9%
1990-1994	1,632	11.2%	\$101,652	\$9,954	44.7%	-7.2%	-12.7%
1995-1998	1,752	18.1%	\$140,613	\$22,436	36.0%	-32.3%	11.6%
1999-2000	803	65.0%	\$129,363	\$65,625	-53.8%	-34.3%	-61.2%
2001	80	14.0%	\$34,344	\$2,973	n.a.	n.a.	n.a.
1980-2001	6,249	18.8%	\$488,448	\$106,397	22.6%	-23.4%	-5.1%

First day returns of IPOs (1990-98)



Average first-day returns



Money left on the table

Company	Lead Underwriter	Offer Price	Pricing Valuation (mil.)	First Trade Price	First Trade Valuation (mil.)	Money on the Table (mil.)
Priceline.com	Morgan Stanley Dean Witter	\$16	\$160	\$81	\$810	\$650
Ivillage Inc	Goldman Sachs	\$24	\$88	\$95.88	\$350	\$262
Pacific Internet	Lehman Brothers	\$17	\$51	\$88	\$264	\$213
MarketWatch.com	BT Alex Brown	\$17	\$47	\$90	\$248	\$201
United Pan-Europe Communications	Goldman Sachs	\$32.78	\$577	\$43	\$757	\$180
Covad Communications Group	Bear Stearns	\$18	\$140	\$40.50	\$316	\$176
Delphi Automotive Systems Corporations	Morgan Stanley Dean Witter	\$17	\$1,700	\$18.75	\$1,875	\$175
ZDNet Group	Goldman Sachs	\$19	\$190	\$35.75	\$358	\$168
OneMain.com	BT Alex Brown	\$22	\$187	\$38	\$323	\$136
AutobyteL.com	BT Alex Brown	\$23	\$104	\$52.75	\$238	\$134

Data Source: "Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs?," Tim Loughran and Jav R. Ritter. *Review of Financial Studies*, Vol. 15, No. 2 (2002), pp. 413-443.

Possible reasons for under-pricing

- Selection bias
 - Excess returns are not well-measured. Ritter and Welch (2002) dismiss this idea. Why are not second-day returns also biased?
- Compensation for investors (Signaling).
 - Dynamic game: “leave something on the table” to participate in future projects, Welch (1989); to generate favorable market responses to future dividend announcements, Allen and Faulhaber (1989); or analyst coverage, Chemmanur (1993).
 - IPO firms “leave something on the table” as a quality signal.
 - Winner’s Curse: Uniformed investors fear that they will only received full allocation of shares in bad –i.e., overpriced- IPOs, Rock (1986).

- Compensation for underwriters.
 - Frequent story: “underwriters provide an difficult to measure service to IPO firm” –for example, consulting, optimistic recommendations. Michaely and Womack (1999).
- Bookbuilding
 - Investors will not thruthfully demand (price and quantity), unless there is some combination of more IPO allocation and underpricing. Benveniste and Spindt (1989), Spatt and Srivastave (1991).
- Herding/Cascade effects:
 - Information cascade: Based on the behavior of others, investors make the same choice, independent of his/her private signal.
 - Example: Demand by institutional investors induces less informed investors to “rush in.” Welch (1992), Busaba (1996), Amihud, Hauser and Kirsh (2001), Sharma, Easterwood and Kumar (2006).

- Litigation insurance.
 - There may be investors’ litigation if stock price drops after the IPO. Tinic (1988) and Lowry and Shu (2002) finds support for this view.
- Marketing expense
 - A “hot” IPO gets a lot of press. For products and/or other financial instruments (stocks, bonds, etc.).
 - Habib and Ljungqvist (2001) also argue that underpricing is a substitute for costly marketing expenditures: An extra dollar left on the table reduces other marketing expenses by a dollar.
 - Demers and Lewellen (2003) find that there is a significant increase in “web” traffic following a “successful” –i.e., with initial high return- IPO.

- Discrimination of allocation
 - Underwriter has control over the order book. Issuers and underwriters can decide to whom to allocate shares.
 - Institutions are also naturally block-holders, capable of displacing poor management. Underpricing attracts excess demand. Booth and Chua (1996), Mello and Parsons (1988).
 - In a sample of 69 British IPOs, Brennan and Franks (1997) find that when shares are placed more widely, not just with just a few powerful large shareholders, management is less easy to oust from the company.
 - Booth and Chua (1996) link allocation to after-market trading. Small investors increase liquidity associated with more aftermarket trading. Issuers value this.

- Optionality
 - There is an option to reprivatize publicly traded companies when the firm's cash flows have fallen to a level at which the gains from diversification no longer justify the costs of being public.
 - Then, the risk of recently issued "young" firms (for which this "put option" is a relatively large fraction of firm value) is smaller than the risk of "older" companies (with relatively low "put option" value). Benninga, Helmantel and Sarig (2005).
- Hot Periods/Bubbles.
 - Cluster of firms in industries with a technological innovation. Benveniste et al. (2002): information externalities created by other IPOs in the industry.
 - Irrational investors. Managers take advantage of investor overoptimism (Lerner (1994), Rajan and Servaes (1997)). (Behavioral finance models.)

Flipping and spinning

- Flipping:
Investors are allocated shares in the IPO. They sell the shares during the first day of trading
 - Investment banks rewarding clients?
- Spinning:
Underwriter offer shares in “hot” IPOs to executives in companies, whose business an investment bank is looking to attract.
- Underwriters dislike flippers.
- Q: Can flipping be used to predict long-term returns on IPOs?
- Krigman, Shaw, and Womack (1999) and Houge et al (2002) say yes.

Flipping of IPO shares

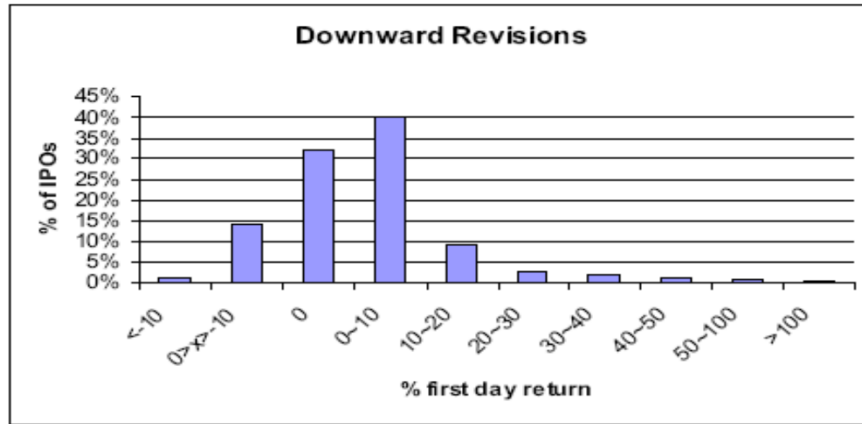
Institution	Shares allocated in the IPO	Shares bought on the first day	Shares sold on the first day	% of Allocation bought/sold
Fidelity Management	150,000	0	150,000	100%
AIM Capital Management	60,000	0	60,000	100%
Alliance Capital Management	60,000	0	60,000	100%
American Express	60,000	0	60,000	100%
Morgan Stanley Asset Mgt	60,000	0	60,000	100%
Delaware Inv. Advisers	60,000	470,000	0	783%
Weiss Peck & Greer	30,000	180,000	0	600%
Columbia Management	25,000	25,000	0	100%

- **Evidence:**
 - Aggarwal (2002): Hot IPOs are commonly flipped, especially by institutions.
 - Aggarwal and Conway (2000): Opening trade price follows many quote revisions.
 - Benveniste, Erdal, and Wilhelm (1998): Penalty bids constrain selling by individuals on cold IPOs
 - Chowdhry and Nanda (1996) stabilization activities reduce the winner's curse
 - Fische (2002): Flipping creates artificial demand which is sometimes useful
 - Krigman, Shaw, and Womack (1999) institutions flip IPOs more successfully than individuals do
 - Ljungqvist, Nanda, and Singh (2001) selective flipping allows price discrimination

Why don't issuers get upset about leaving money on the table?

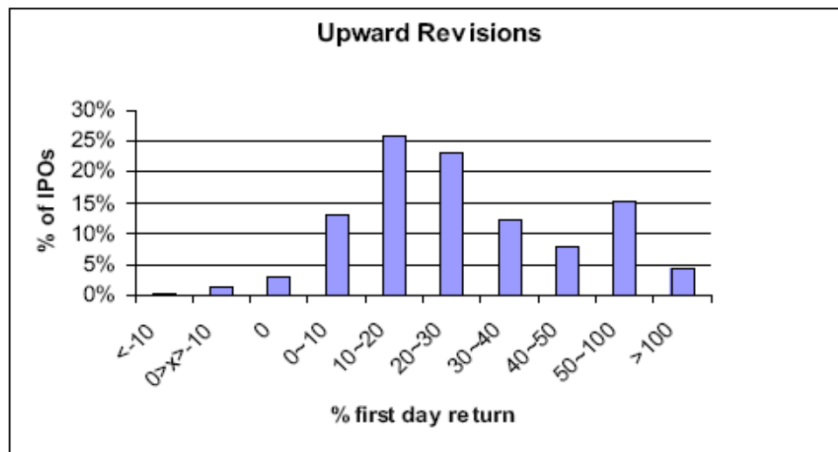
- Valuation models based on accounting data and use of comparable firm multiples (Price/Sales multiples, P/E multiples, etc.) may have a lot of error.
 - Purnanandam and Swaminathan (2001) find that IPOs are overpriced –by 50% above “comparable” issues- even at the offered price.
 - Issuers get rich themselves in the IPO, they do not mind the underpricing. But, some of them do!
- Issuers are very risk averse and want to make sure that IPO succeeds.

IPOs with downward revisions have less under-pricing



Data Source: "Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs?," Tim Loughran and Jay R. Ritter, *Review of Financial Studies*, Vol. 15, No. 2 (2002), pp. 413-443.

IPOs with upward revisions have more under-pricing



Data Source: "Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs?," Tim Loughran

Mean First-day Returns for IPOs Conditional Upon Offer Price Revision, 1980-2001

Initial public offerings with an offer price below \$5.00 per share, unit offers, ADRs, closed-end funds, REITs, bank and S&L IPOs, and those not listed by CRSP within six months of the offer date are excluded. IPOs are categorized by whether the offer price is below, within, or above the original file price range. For example, an IPO would be classified as within the original file price range of \$10.00-\$12.00 if its offer price is \$12.00. Eleven IPOs from 1980-1989 have a missing file price range, and are deleted from this table.

Time period	Number of IPOs	Percentage of IPOs with Offer Price Relative to File Range			Mean First-day Returns			% of First-day Returns=0		
		Below	Within	Above	Below	Within	Above	Below	Within	Above
1980-1989	1,971	27.6%	59.9%	12.5%	0.6%	7.8%	20.5%	32%	62%	88%
1990-1994	1,632	26.1%	54.2%	19.7%	2.4%	10.8%	24.1%	49%	75%	93%
1995-1998	1,752	25.0%	49.1%	25.9%	6.1%	13.8%	37.6%	59%	80%	97%
1999-2000	803	18.1%	36.8%	45.1%	7.9%	26.8%	119.0%	59%	77%	96%
2001	80	25.0%	60.0%	15.0%	7.2%	12.5%	31.4%	70%	83%	92%
1980-2001	6,238	25.2%	52.3%	22.5%	3.3%	12.0%	52.7%	47%	72%	94%

From Ritter and Welch (2002).

- Ritter and Welch (2002) consider the average underpricing of 53%, conditional on an upward price revision too large to be explained as equilibrium compensation for revealing favorable information.

Quiet Period

- During the first 25 days after the IPO the firm and its underwriters have to remain silent about the firm's financial prospects
 - Prevent insiders from “hyping up” the price.
- After 25 days underwriters release their (usually favorable) reports about the firm.
- On average stock price rises at the end of the quiet period.

Lock-up Period

- Underwriters require that initial pre-IPO shareholders do not sell their stock for a pre-determined period (usually 180 days):
 - Keep incentives aligned
 - Prevent pressure on stock prices, if demand curves are downward sloping
- Stock price drops significantly after the expiration of the lock-up period.

Long-run under-performance

- IPOs under-perform the market in the 5 years after the IPO:
 - For an investor buying shares at the first-day closing price and holding them for three years, IPOs returned 22.6 percent. But, for the same three-years, the CRSP value-weighted market index by 23.4 percent. (Using BARs.)
 - It also underperformed seasoned companies with the same market capitalization and book-to-market ratio by 5.1 percent.

Note: IPOs are strongly biased towards small growth firms, the worst-performing style category of the last several decades.
- Problem with BAR: Returns on individual IPOs overlap. Brave (2000)

- Alternative approach to BAR is to measure returns in calendar time, rather than event time.
 - Use the Fama-French factors to adjust for risk.
 - Underperformance is -0.32, or 32 bps per month, CAPM-adjusted. Around 4% per year. But, adjusted by FF factors, underperformance is 2.5% per year.
- Reasons for long-run underperformance:
 - “Clientele effects”: Only optimistic investors buy into an IPO, but believes converge when more information is released about the firm. Miller (1977).
 - “Window of opportunity”: Valuations of IPOs is subject to fads so issues try to go public in “hot markets.” Schultz (2001).
 - Purnanandam and Swaminathan (2001) find that IPOs are overpriced –by 50% above “comparable” issues- at the offered price.
 - Heaton (2001) argues that managers tend to be overoptimistic, and tend to overinvest if funds are available.

Long-run IPO under-performance

	First six months	Second six months	First year	Second year	Third year	Fourth year	Fifth year	Geometric Mean years 1-5
IPO firms	6.2%	2.6%	9.2%	8.5%	10.4%	13.7%	12.1%	10.7%
Size-matched	4.5%	5.9%	10.8%	14.1%	14.2%	17.2%	14.0%	14.1%
Difference	1.7%	-3.3%	-1.6%	-5.6%	-3.8%	-3.5%	-1.9%	-3.4%
Number	6226	6215	6226	6113	5327	4400	3704	6621
IPO firms	6.8%	2.9%	10.1%	11.5%	11.4%	12.6%	9.7%	11.0%
Style-matched	2.2%	4.4%	6.7%	12.4%	11.2%	13.1%	10.8%	10.8%
Difference	4.6%	-1.5%	3.4%	-0.9%	0.2%	-0.5%	-1.1%	0.2%
Number	5967	5957	5967	5676	4911	4010	3348	6081

Percentage Returns on IPOs During the First Five Years After Issuing (1970-1998)

Data Source: Lee, Locheed, Ritter and Zhao (1996)

Table 15

Long-run Returns on IPOs Categorized by the Pre-issue Sales of the Firm

All Last Twelve Months (LTM) sales figures for the firms going public have been converted into dollars of 2005 purchasing power using the Consumer Price Index. IPOs from 1980-2004 are used, with returns calculated through the end of December, 2006. The sample size is 6,585 firms for which sales data is available. IPOs with an offer price below \$5.00 per share, unit offers, ADRs, REITs, closed end funds, partnerships, banks and S&Ls, and IPOs not listed on CRSP within six months of the offer date are excluded. mm is millions of dollars. Buy-and-hold returns are calculated until the earlier of the three-year anniversary or the delisting date (Dec. 31 of 2006 for IPOs from 2004). Market-adjusted returns use the CRSP value-weighted index. Style adjustments use firms matched by market cap and book-to-market ratio with at least five years of CRSP listing and no follow-on equity issues in the prior five years. All returns include dividends and capital gains, including the index returns.

Sales	Number of IPOs	Average First-day Return	Average 3-year Buy-and-hold Return		
			IPOs	Market-adjusted	Style-adjusted
0-9,999 mm	1,370	26.4%	-9.6%	-47.3%	-29.6%
10-19,999 mm	726	26.3%	6.6%	-36.0%	-5.4%
20-49,999 mm	1,447	21.0%	24.3%	-21.9%	0.9%
50-99,999 mm	1,054	15.0%	40.7%	-5.9%	4.8%
100-499,999 mm	1,455	10.6%	43.5%	-4.2%	13.3%
500 mm and up	533	8.6%	40.1%	-1.5%	10.2%
0-49,999 mm	3,543	24.2%	7.6%	-34.6%	-12.2%
50 mm and up	3,042	11.8%	41.9%	-4.3%	9.8%
1980-2004	6,585	18.4%	23.4%	-20.6%	-2.0%

Multi-factor Regressions with an Equally Weighted Portfolio of U.S. IPOs

$$r_{it} - r_{ft} = a + b_1(r_{mt} - r_{ft}) + b_{2,t}(r_{mt,t-1} - r_{ft,t-1}) + s_1SMB_t + s_{2,t}SMB_{t-1} + v_1VMG_t + v_{2,t}VMG_{t-1} + e_{it}$$

a
 b_1
 $b_{2,t}$
 s_1
 $s_{2,t}$
 v_1
 $v_{2,t}$
 R^2_{adj}

Panel A: Sensitivity of intercepts to expanding the number of factors

(1) Jan 73-Sept 01	-0.32 (-1.17)	1.40 (24.25)						63.1%
(2) Jan 73-Sept 01	-0.47 (-1.82)	1.39 (25.22)	0.34 (6.08)					66.6%
(3) Jan 73-Sept 01	-0.21 (-1.23)	1.11 (27.01)		1.16 (22.16)		-0.23 (-3.76)		86.1%
(4) Jan 73-Sept 01	-0.20 (-1.22)	1.10 (28.12)	0.11 (2.85)	1.13 (22.07)	0.10 (2.01)	-0.22 (-3.80)	-0.15 (-2.50)	87.5%

Panel B: Sensitivity of the intercepts to different sample periods

(5) Jan 73-Dec 89	-0.15 (-0.83)	1.02 (23.83)		1.33 (20.20)		-0.17 (-2.36)		89.7%
(6) Jan 90-Dec 99	-0.14 (-0.77)	1.11 (20.79)		1.23 (18.88)		-0.17 (-2.24)		91.3%
(7) Jan 90-Dec 00	-0.48 (-2.01)	1.17 (17.39)		0.96 (13.80)		-0.25 (-2.76)		88.2%
(8) Jan 00-Sept 01	0.62 (0.29)	1.45 (3.13)		0.60 (1.59)		-0.68 (-2.24)		75.9%

Long-run performance of VC-backed IPOs

- VC-backed IPOs show much less underperformance than non-VC-backed IPOs.
- Relative to their industry benchmarks VC-backed IPOs have no under-performance.
- Most of the under-performance in the aggregate is driven by the smaller offerings.

VC-backed IPOs

Five-Year
Equal-Weighted
Buy-and-Hold
Returns

Benchmarks	IPO Return	Benchmark Return	Wealth Relative	IPO Return	Benchmark Return	Wealth Relative
S&P 500 Index	44.6	65.3	0.88	22.5	71.8	0.71
NASDAQ Composite	44.6	53.7	0.94	22.5	52.4	0.80
NYSE/AMEX Value-Weighted	44.6	61.4	0.90	22.5	66.4	0.75
NYSE/AMEX Equal-Weighted	44.6	60.8	0.90	22.5	55.7	0.79
Size and Book-to-Market (5x5)	46.4	29.9	1.13	21.7	20.8	1.01
Fama-French Industry Portfolio	46.8	51.2	0.97	26.2	60.0	0.79
	Venture-Backed IPOs			Nonventure-Backed IPO		

Five-Year
Value-Weighted
Buy-and-Hold
Returns

Benchmarks	IPO Return	Benchmark Return	Wealth Relative	IPO Return	Benchmark Return	Wealth Relative
S&P 500 Index	43.4	64.5	0.87	39.3	62.4	0.86
NASDAQ Composite	43.4	50.4	0.95	39.3	51.1	0.92
NYSE/AMEX Value-Weighted	43.4	60.0	0.90	39.3	57.6	0.88
NYSE/AMEX Equal-Weighted	43.4	56.4	0.92	39.3	47.7	0.94
Size and Book-to-Market (5x5)	41.9	37.6	1.03	33.0	38.7	0.96
Fama-French Industry Portfolio	46.0	45.0	1.01	45.2	53.2	0.95
	Venture-Backed IPOs			Nonventure-Backed IPO		

Data Source: Brav and Gompers, Journal of Finance (2001)

Long-run Returns on IPOs Categorized by VC-backing or Buyout Fund-backing

Panel A: IPOs from 1980-2005 categorized by venture capital backing

VC-backed or not	Number of IPOs	Average First-day Return	Average 3-year Buy-and-hold Return		
			IPOs	Market-adjusted	Style-adjusted
VC-backed	2,391	28.6%	26.0%	-13.0%	3.5%
NonVC-backed	4,450	13.0%	21.2%	-24.7%	-5.0%
NonVC and nonBuyout	3,630	13.9%	16.7%	-31.5%	-9.7%
All	6,841	18.5%	22.8%	-20.6%	-2.1%

Note: The nonVC- and nonBuyout-backed IPOs do not include a minimum sale size, unlike in Panel B.

Panel B: IPOs with at least \$50 million in LTM sales (2005 purchasing power) from 1985-2005 categorized by private equity (buyout fund) backing

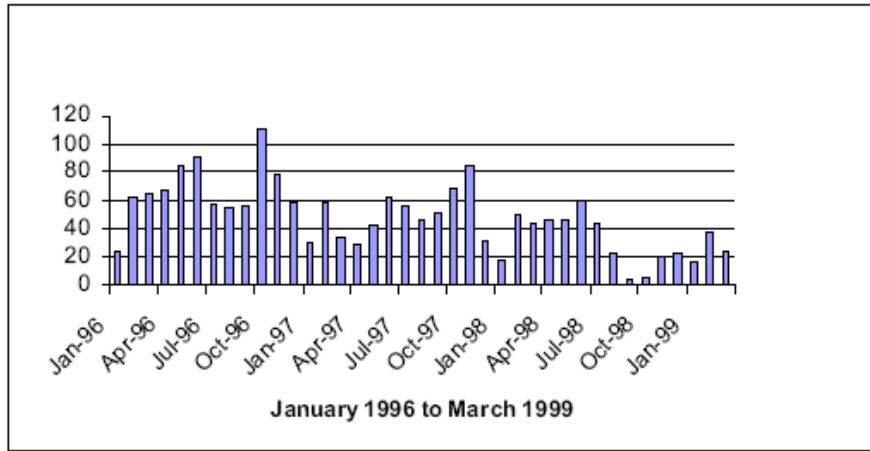
Buyout-backed or not	Number of IPOs	Average First-day Return	Average 3-year Buy-and-hold Return		
			IPOs	Market-adjusted	Style-adjusted
Buyout-backed	666	8.5%	45.8%	10.4%	22.0%
NonBuyout-backed	2,211	13.9%	39.6%	-6.7%	5.4%
All	2,877	12.7%	41.1%	-2.8%	9.2%

Tables 15 and 16 (this one) from Ritter's website (2007).

“Hot Issue” Markets

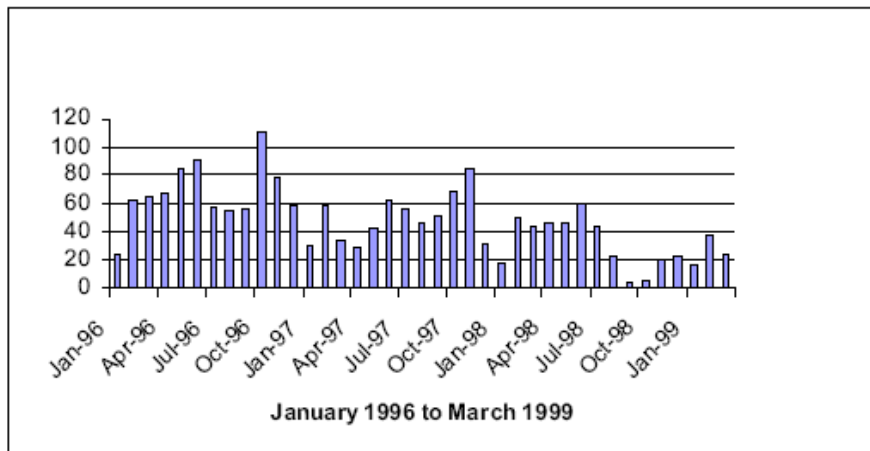
- IPOs markets follows a cycle with big swings, referred as “hot” and “cold” markets. Ibbotson and Jaffe (1975) and Ritter (1984).
 - “Hot” IPO market: High average initial IPO returns, unusually high volume of offerings, frequent oversubscription. Possible concentration in particular industries.
- Reasons:
 - Cycles in the quality and risk composition of firms that go public. Allen and Faulhauber (1989), Ginblatt and Huand (1989).
 - Correlation in the fund inflow of large money managers. Herding-type of story.
 - “Wild bullishness from irrational investors (Loughran and Ritter (1995), Lerner (1994), Field (1997)).

Number of IPOs from 1996-1999



Data Source: SDC

IPO volume from 1996 to 1999



Data Source: SDC

Table 3
Firm and Industry Characteristics at time of IPO for Hot and Cold Market IPOs from 1975-2000

The sample consists of all nonfinancial firm IPOs in the SDC database from 1975-2000, except reverse LBOs, unit offerings, spinoffs, IPOs offered at less than \$1 a share, IPO firms that were not listed on Compustat or CRSP, and IPO firms that did not have complete trading data on CRSP at the time of the IPO. Hot IPOs defined by number include 2011 firms that completed IPOs in periods of high issuance volume (defined by three month moving averages of monthly counts of IPOs), normal period IPOs total 1329 in the sample, the remaining 162 cold IPOs were completed in the months that constituted the bottom third in the moving average counts. Hot IPOs defined by SIC include 1842 that completed IPOs in periods of high issuance volume for 9 most frequent SIC industries, and cold IPOs by SIC include 90 IPOs in the 9 most frequent SIC industries. Firm financial characteristics are from Compustat and are year-end data for the IPO year (see text for details). Adjusted firm characteristics are the median of values for the IPOs less the median for the industry, defined by the same 2-digit SIC category, excluding other IPOs in the same year and the previous 5 years. ** and * represent that hot market characteristics are significantly different from cold market characteristics at 95 and 99 percent, respectively, where hot market by number is compared to cold market by number, and hot market by SIC is compared to cold market by SIC. All variables are median values except as denoted.

IPO Characteristics	Markets by Number		Markets by SIC		Adjusted Firm Characteristics			
	HOT	COLD	HOT	COLD	Markets by Number		Markets by SIC	
					HOT	COLD	HOT	COLD
SIC Cluster	92**	1.03	90	1.00				
Mean First-day return	27.7*	20.5	30.6*	17.0				
IPO amount (\$million, year 2000)	51.4*	44.2	50.8*	44.2				
IPO amount-to-capital expenditures	9.5**	3.2	10.7**	4.5				
Industry market-to-book	1.6**	1.3	1.8**	1.3				
Industry long-term earnings growth rate	20.0**	15.0	22.5**	19.5				
Firm Financial Characteristics								
Market-to-book	2.5*	2.1	2.8**	2.0	0.87	0.91	1.03	0.76
Long-term earnings growth %	30.0	30.0	35.0	30.0	9.8*	15.5	10.1	14.3
Operating income-to-assets	8.6**	15.9	5.7**	13.9	0.1**	3.8	-1.6*	3.2
Capital expenditures-to-assets	5.0**	9.3	4.6**	7.5	0.8**	3.8	0.6**	2.7
Debt-to-assets	3.8**	9.7	2.8**	12.6	-9.1*	-13.0	-9.1*	-10.6
R&D-to-assets	0.8	2.8	4.2	2.9	0.0*	1.3	0.0	0.0
Fixed assets-to-assets	11.2**	19.4	9.5**	18.8	-5.6	-4.8	-5.9*	-3.8
Assets (\$million, year 2000)	108.4**	186.3	106.9*	159.3	10.0*	-17.7	25.4	-1.3
Sales (\$million, year 2000)	72.9**	193.0	61.0**	186.5	-20.6*	-55.9	-13.1	-24.0
Other Firm Characteristics								
Percent with negative earnings (mean)	43.6**	31.1	49.9**	34.4				
Discretionary accruals-to-assets	5.3	5.4	7.7	2.3				
Institutional ownership	15.3**	8.2	15.2*	10.8				
Percent with venture capital (mean)	46.8	41.0	54.7**	38.9				

1. Data available for only 1,302 hot market and 48 cold market IPOs by number, and 1,178 hot and 31 cold market IPOs by SIC.

Table 4
Firm Characteristics and Excess Returns in Years Following the IPO for Hot and Cold Market IPOs

The sample consists of all nonfinancial firm IPOs in the SDC database from 1975-2000, except reverse LBOs, unit offerings, spinoffs, IPOs offered at less than \$1 a share, IPO firms that were not listed on Compustat or CRSP, and IPO firms that did not have complete trading data on CRSP at the time of the IPO. Year 1 sample includes IPOs before 1990, year 3 sample includes IPOs before 1998 and year 5 sample includes IPOs before 1996. Year values include firms that fail or are acquired and used the value for the last year the firm is in the sample. Industry-adjusted assets is the median of the difference between firm assets and the median assets for firms in its industry, defined by 2-digit SIC, excluding IPOs and IPOs in and the previous 5 years, as a percent of median assets for firms in its industry. Industry-adjusted operating income, capital expenditures, and sales growth are the difference between the firm value and the median value for firms in its industry. Operating income is operating income before depreciation, as defined on COMPUSTAT research tapes. * and ** denote values are significantly different for hot and cold IPOs at 95 and 99 percent, respectively; + and ++ denote values are significantly different from zero at 95 and 99 percent, respectively.

		Year After IPO		
		Year 1	Year 2	Year 3
Industry-Adjusted Medians (%)				
Oper. Inc.-to-Assets	Hot by number	-0.8*	0.4	-0.8*
	Cold by number	2.5	1.2	0.9
Cap. Exp.-to-Assets	Hot by SIC	-1.4**	-1.3*	-2.1
	Cold by SIC	2.2	1.2	0.3
Assets	Hot by number	21.0**	0.6**	0.5**
	Cold by number	3.0**	2.3	1.8**
Sales growth	Hot by SIC	1.9**	0.6**	0.5**
	Cold by SIC	4.1**	1.8**	2.1**
Assets	Hot by number	20.3**	19.2**	1.1
	Cold by number	5.9	19.1**	32.5
Sales growth	Hot by SIC	35.4**	30.6**	37.7*
	Cold by SIC	33.5	87.7*	88.9
Sales growth	Hot by number	30.5**	9.4**	5.1*
	Cold by number	24.7**	7.3*	5.9*
Sales growth	Hot by SIC	32.7**	9.6**	5.1**
	Cold by SIC	27.4	12.8*	10.0**

Tables 3 and 4 from Helwege and Liang (2002)