

# **Initial Public Offerings: Life Science (Biotech and Pharma) IPOs Through 2023**

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October 21, 2024

Table 4b: Profitability and Median Sales of Technology and Life Science IPOs, 1980-2023

Table 4g: Life Science Company IPOs (Median age, Mean underpricing, # with sales>0, # with EPS>0), 1980-2023

Table 18b Long-run Returns on VC-backed and other IPOs Segmented by Industry, 1980-2022

Table 18c Long-run Returns on VC-backed and other IPOs Segmented by Industry, 1999-2022

**Table 4b** (updated January 1, 2024)

**Technology and Life Science Company IPOs, 1980-2023**

There are 3,320 tech and 1,000 life science IPOs from 1980-2023, after excluding those with an offer price below \$5.00 per share, unit offers, ADRs, closed-end funds, partnerships, acquisition companies, REITs, bank and S&L IPOs, and firms not listed on CRSP. Life science includes biotech and pharmaceutical firms. Life science is defined as SIC=2830, 2834, 2835, 2836, and 8731. In prior years, I had included 2833 (medical chemicals and botanical products) as well, but I am not including this industry in life science since in recent years it has been mainly cannabis-related companies.

Tech stocks are defined as internet-related stocks plus other technology stocks including telecom, but not including biotech. Loughran and Ritter (2004) list the SIC codes in their appendix 3 and sources of founding dates in appendix 1. The definition of technology stocks has been changed from that in Loughran and Ritter (2004 *Financial Management*), with SIC=3559, 3576, and 7389 added to tech. Some 7389 (business services) companies have had their SIC codes changed into non-tech categories, such as consulting and two new SIC codes that I created: 5614 for telemarketing firms and 7388 for non-tech business services such as Sotheby's Auctions. I have also added the S.E.C.'s computer communications equipment code of 3576 for 21 companies, including Cisco Systems.

Missing and questionable numbers from the SDC new issues database are supplemented by direct inspection of prospectuses on EDGAR, information from Dealogic for IPOs after 1991, Howard and Co.'s *Going Public: The IPO Reporter* from 1980-1985, and the Graeme Howard-Todd Huxster collection of IPO prospectuses for 1975-2006.

Sales are the last twelve months (LTM) revenues as reported in the prospectus. The median sales, in millions, are expressed in dollars of 2022 purchasing power using the CPI. Pro forma numbers are usually used if there have been recent mergers or mergers that coincide with the IPO. The percentage of IPOs that are profitable measures profitability using trailing LTM earnings (usually using after extraordinary items earnings, and usually using pro forma numbers that are computed assuming that any recent or concurrent mergers have already occurred, and the conversion of convertible preferred stock into common stock). In some cases, last fiscal year earnings are used when LTM earnings are unavailable.

(table on the next page)

Year	Number of IPOs			% Profitable			Median sales (\$2022, mm)		
	Tech	Life Sci	Other	Tech	Life Sci	Other	Tech	Life Sci	Other
1980	22	3	46	91%	67%	70%	58.6	20.5	77.3
1981	72	10	110	88%	30%	85%	41.8	4.9	43.3
1982	42	2	33	83%	50%	79%	31.4	4.0	29.9
1983	173	21	257	71%	42%	86%	24.8	7.4	88.8
1984	50	2	119	80%	100%	85%	27.0	136.3	69.5
1985	37	5	144	84%	40%	87%	35.7	12.5	106.3
1986	77	23	293	74%	35%	84%	33.4	10.8	95.2
1987	59	10	216	86%	20%	85%	45.0	7.8	110.9
1988	28	2	75	79%	0%	85%	58.3	9.9	229.7
1989	35	4	77	77%	0%	82%	73.2	2.7	122.2
1990	32	4	74	94%	0%	87%	63.0	4.5	129.0
1991	71	32	183	75%	16%	88%	72.3	7.0	154.8
1992	115	33	264	65%	18%	80%	45.6	2.6	142.0
1993	127	27	356	74%	22%	75%	53.2	3.0	120.2
1994	115	20	267	70%	20%	80%	40.4	3.2	107.1
1995	205	21	236	71%	14%	75%	40.0	5.8	118.8
1996	276	44	357	47%	14%	73%	30.3	4.1	99.4
1997	174	22	278	50%	14%	77%	37.4	9.9	111.7
1998	113	10	160	36%	30%	69%	38.5	13.4	123.8
1999	370	10	96	14%	20%	63%	20.7	10.1	194.1
2000	261	50	69	14%	12%	50%	20.2	6.6	153.2
2001	24	5	51	30%	0%	66%	38.1	0.3	571.2
2002	20	5	41	40%	40%	63%	151.2	228.0	684.8
2003	18	8	37	39%	0%	76%	160.4	0.1	623.8
2004	61	30	82	44%	7%	70%	84.3	5.3	300.6
2005	45	16	98	36%	13%	70%	100.3	18.2	320.0
2006	48	24	85	50%	8%	80%	81.7	4.8	472.6
2007	76	19	64	30%	5%	73%	95.9	1.9	323.0
2008	6	1	14	67%	0%	57%	208.7	0.4	268.7
2009	14	3	24	71%	67%	71%	232.1	50.1	598.8
2010	33	11	47	64%	0%	70%	155.1	0.0	419.0
2011	36	8	37	36%	0%	59%	180.4	4.0	412.6
2012	40	10	43	43%	0%	77%	140.7	0.5	424.6
2013	45	40	73	27%	7%	58%	129.2	11.9	507.1
2014	53	71	82	17%	7%	57%	108.8	0.0	286.2
2015	38	42	38	26%	0%	66%	157.4	0.0	205.8
2016	21	25	29	29%	8%	59%	130.1	1.1	775.6
2017	30	32	44	17%	0%	42%	218.2	0.0	516.2
2018	39	59	36	15%	0%	51%	203.3	0.0	536.2
2019	37	42	27	30%	0%	50%	219.7	0.0	121.5
2020	46	76	43	22%	5%	47%	220.0	0.0	311.5
2021	121	89	101	22%	2%	49%	202.4	0.0	325.4
2022	6	16	16	33%	0%	38%	92.7	0.0	7.2
2023	9	13	32	33%	0%	48%	6.2	0.0	20.4
2001-23	866	645	1,151	32%	4%	62%	134.6	0.0	371.3
<b>1980-23</b>	<b>3,320</b>	<b>1,000</b>	<b>4,861</b>	<b>47%</b>	<b>10%</b>	<b>75%</b>	<b>46.9</b>	<b>1.4</b>	<b>135.2</b>

**Table 4g** (updated January 1, 2024)

**Life Science Company IPOs, 1980-2023**

IR is the initial return (underpricing), measured as the equally weighted average of the first-day return from the offer price to close. There are 1,000 biotech IPOs from 1980-2023, after excluding those with an offer price below \$5.00 per share, unit offers, ADRs, closed-end funds, partnerships, special purpose acquisition companies (SPACs), REITs, bank and S&L IPOs, and firms not listed on CRSP. Missing and questionable numbers from the SDC new issues database are supplemented by direct inspection of prospectuses on EDGAR, information from Dealogic for IPOs after 1991, Howard and Co.'s *Going Public: The IPO Reporter* from 1980-1985, and the Graeme Howard-Todd Huxster collection of IPO prospectuses for 1975-2006.

Life science includes biotech and pharmaceutical firms, defined as SIC=2830, 2834, 2835, 2836, and 8731.

Sales are the last twelve months (LTM) revenues as reported in the prospectus. The median sales, in millions, are expressed in dollars of 2022 purchasing power using the CPI. Pro forma numbers are usually used if there have been recent mergers or mergers that coincide with the IPO. The percentage of IPOs that are profitable measures profitability using trailing LTM earnings (usually using after extraordinary items earnings, and usually using pro forma numbers that are computed assuming that any recent or concurrent mergers have already occurred, and the conversion of convertible preferred stock into common stock). In some cases, last fiscal year earnings are used when LTM earnings are unavailable. EPS is earnings per share. Age is the median age in years, defined as the calendar year of the IPO minus the calendar year of founding.

Many of the biotech companies with positive sales have research contracts producing revenue, rather than product sales.

(table on the next page)

Year	Number of IPOs		Life Sci IR, %	Life Science IPOs		Life Sci sales (\$2022, millions)		
	Total	Life Sci		EPS>0	Age	# zero	% zero	Median
1980	71	3	44.3%	67%	4	0	0.0%	20.5
1981	192	10	14.1%	30%	4.5	2	20.0%	4.9
1982	77	2	16.0%	50%	2	0	0.0%	4.0
1983	451	21	6.2%	42%	3	1	4.8%	7.4
1984	171	2	0.0%	100%	16	0	0.0%	136.3
1985	186	5	2.4%	40%	3	1	20.0%	12.5
1986	393	23	7.0%	35%	5	0	0.0%	10.8
1987	285	10	5.1%	20%	4	0	0.0%	7.8
1988	105	2	-1.6%	0%	9	1	50.0%	9.9
1989	116	4	3.8%	0%	6	0	0.0%	2.7
1990	110	4	0.8%	0%	4	2	50.0%	4.5
1991	286	32	12.8%	16%	4	3	9.4%	7.0
1992	412	33	9.9%	18%	5	6	18.2%	2.6
1993	510	27	7.7%	22%	5	3	11.1%	3.0
1994	402	20	3.4%	20%	7.5	3	15.0%	3.2
1995	462	21	6.6%	14%	5	5	23.8%	5.8
1996	677	44	12.2%	14%	4	7	15.9%	4.1
1997	474	22	8.3%	14%	6	3	13.6%	9.9
1998	283	10	6.2%	30%	7	0	0.0%	13.4
1999	476	10	31.8%	20%	5.5	1	10.0%	10.1
2000	380	50	31.9%	12%	6	10	20.0%	6.6
2001	80	5	10.7%	0%	5	2	40.0%	0.3
2002	66	5	-4.9%	40%	9	0	0.0%	228.0
2003	63	8	2.6%	0%	6	4	50.0%	0.1
2004	173	30	7.8%	7%	7	6	20.0%	5.3
2005	159	16	8.0%	13%	6	1	6.3%	18.2
2006	157	24	4.2%	8%	8	4	16.7%	4.8
2007	159	19	2.2%	5%	8	8	42.1%	2.0
2008	21	1	-5.7%	0%	9	0	0.0%	0.4
2009	41	3	1.3%	67%	14	0	0.0%	50.0
2010	91	11	0.9%	0%	6	6	54.5%	0.0
2011	81	8	6.4%	0%	5.5	3	37.5%	4.0
2012	93	10	7.8%	0%	7	5	50.0%	0.5
2013	158	40	19.3%	7%	10	12	30.0%	11.9
2014	206	71	13.8%	7%	10	38	53.5%	0.0
2015	118	42	22.9%	0%	7	26	61.9%	0.0
2016	75	25	7.0%	8%	8	8	32.0%	1.1
2017	106	32	7.0%	0%	6.5	23	71.9%	0.0
2018	134	59	13.8%	0%	5	39	66.1%	0.0
2019	113	42	21.7%	0%	4	33	78.6%	0.0
2020	165	76	37.6%	5%	6	49	64.5%	0.0
2021	311	89	24.4%	2%	5	55	61.8%	0.0
2022	38	16	49.4%	0%	4	13	81.3%	0.0
2023	54	13	5.4%	0%	4	10	76.9%	0.0
2001-23	2,662	645	17.7%	4%	7	345	53.5%	0.0
<b>1980-2023</b>	<b>9,181</b>	<b>1,000</b>	<b>15.9%</b>	<b>10%</b>	<b>6</b>	<b>393</b>	<b>39.3%</b>	<b>1.4</b>

**Table 18b** (updated October 21, 2024)**Long-run Returns on VC-backed and other IPOs Segmented by Industry, 1980-2022**

This table appears as Table 7 in “Going Public with IPOs and SPAC Mergers” by Rongbing Huang, Jay R. Ritter, and Donghang Zhang, forthcoming in *Research Handbook on the Structure of Private Equity and Venture Capital*. 9,127 IPOs from 1980-2022 are used, with returns calculated through December 29, 2023. IPOs with an offer price below \$5.00 per share, unit offers, SPACs, ADRs, REITs, closed end funds, natural resource partnerships, banks and S&Ls, small best efforts offers, and IPOs not listed on CRSP within six months of the offer date are excluded. Buy-and-hold returns are calculated from the first closing market price until the earlier of the three-year anniversary or the delisting date (Dec. 29 of 2023 for IPOs from 2021 and 2022). The captions to Tables 2 and 6 provide industry classification details. 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. The market-adjusted and style-adjusted returns are the average buy-and-hold return on the IPOs minus the average compounded return on the benchmark. Market capitalization (size) is calculated using the first closing market price after the IPO and the post-issue number of shares outstanding.

**Panel A: Long-run Returns on VC-backed IPOs, by Industry, 1980-2022**

Sector	Number of IPOs	Average First-day Return	Average 3-year Buy-and-hold Return		
			IPOs	Market-adjusted	Style-adjusted
Tech	1,992	37.3%	26.4%	-4.4%	5.7%
Life science	788	15.7%	9.1%	-22.9%	-19.5%
Other	893	14.7%	23.1%	-21.5%	-9.0%
All	3,673	27.2%	21.9%	-12.5%	-3.3%

**Panel B: Long-run Returns on nonVC-backed IPOs, by Industry, 1980-2022**

Sector	Number of IPOs	Average First-day Return	Average 3-year Buy-and-hold Return		
			IPOs	Market-adjusted	Style-adjusted
Tech	1,319	22.2%	15.1%	-23.5%	-9.0%
Life science	199	17.6%	35.7%	1.1%	26.0%
Other	3,936	10.4%	18.1%	-25.8%	-15.4%
All	5,454	13.5%	18.0%	-24.2%	-12.4%

Note: The high life science 3-year buy-and-hold return for the 199 nonVC-backed IPOs in Panel B is partly driven by the 2,444.8% return on the June 1980 IPO of Enzo Biochem and the 1,606.1% return on the August 2003 IPO of New River Pharmaceutical, which used a WR Hambrecht + Co auction to go public. Of the 971 life science IPOs during 1980-2021, these are two of the three top long-run performers, with the VC-backed July 1998 IPO of Abgenix being the third, with a 2,071.1% return. Moderna, a December 2018 VC-backed IPO, produced the fifth-highest return.

**Table 18c** (updated April 10, 2024)

**Long-run Returns on VC-backed and other IPOs Segmented by Industry, 1999-2022**

This table appears as Table 8 in “Going Public with IPOs and SPAC Mergers” by Rongbing Huang, Jay R. Ritter, and Donghang Zhang, forthcoming in *Research Handbook on the Structure of Private Equity and Venture Capital*, edited by Brian Broughman and Elisabeth de Fontenay.

3,464 IPOs from 1999-2022 are used, with returns calculated through December 29, 2023. See the captions to Tables 2 and 6 in the book chapter above for a description of the sample and industry definitions.

**Panel A: Long-run Returns on VC-backed IPOs, by Industry, 1999-2022**

Sector	Number of IPOs	Average First-day Return	Average 3-year Buy-and-hold Return		
			IPOs	Market-adjusted	Style-adjusted
Tech	1,030	54.4%	-13.7%	-18.9%	-28.2%
Life science	579	18.6%	2.2%	-21.2%	-25.5%
Other	285	23.4%	0.0%	-19.8%	-33.6%
All	1,894	38.8%	-6.8%	-19.8%	-28.2%

**Panel B: Long-run Returns on nonVC-backed IPOs, by Industry, 1999-2022**

Sector	Number of IPOs	Average First-day Return	Average 3-year Buy-and-hold Return		
			IPOs	Market-adjusted	Style-adjusted
Tech	458	32.8%	-21.5%	-23.4%	-34.4%
Life science	113	21.9%	3.5%	-15.1%	-10.7%
Other	999	13.9%	11.3%	-6.2%	-13.0%
All	1,570	20.0%	1.2%	-11.8%	-19.1%