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## **The Costs of Biopharmaceutical Firms Going Public in the U.S.**

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## Abstract

The purpose of this paper is to examine the process and costs associated with biopharmaceutical firms undertaking an initial public offering. It discusses the direct and opportunity costs associated with this process. It shows the historical mispricing of firms and costs associated with biopharmaceutical firms going public over the past several years. Private biopharmaceutical firms need to be aware of the process and costs of going public in order to determine if these costs are acceptable, compare these costs (and benefits) with those of other sources of funding, and better manage the IPO process.

Keywords: biopharmaceutical; initial public offering; costs; underwriters

## Introduction

Privately owned biopharmaceutical firms seek to sell their stock to the public for the first time via initial public offerings (IPOs) for several reasons. These reasons include internal growth of existing or potential products and product lines, diversification into related and unrelated areas, as an exit mechanism for owners, and survival.<sup>1</sup> Much has been written about the benefits of IPO pursuits by consultants and scholars. However, little has been made of the costs of undertaking an IPO, which is among the most expensive ways to finance a venture.<sup>2</sup> This paper is written for new biopharmaceutical entrepreneurs who are seeking ways to finance their ideas, and who may be considering an IPO. It also may be of interest to scholars and laypersons interested in factors contributing to the costs of new drugs as these costs must be ultimately borne by the end user and society. This study is believed to be timely as the U.S. bio-pharmaceutical IPO market began heating up again in 2013,<sup>3,4</sup> with 2014 seeing the greatest number of biopharmaceutical IPOs and greatest amount of proceeds overall raised ever.<sup>5</sup>

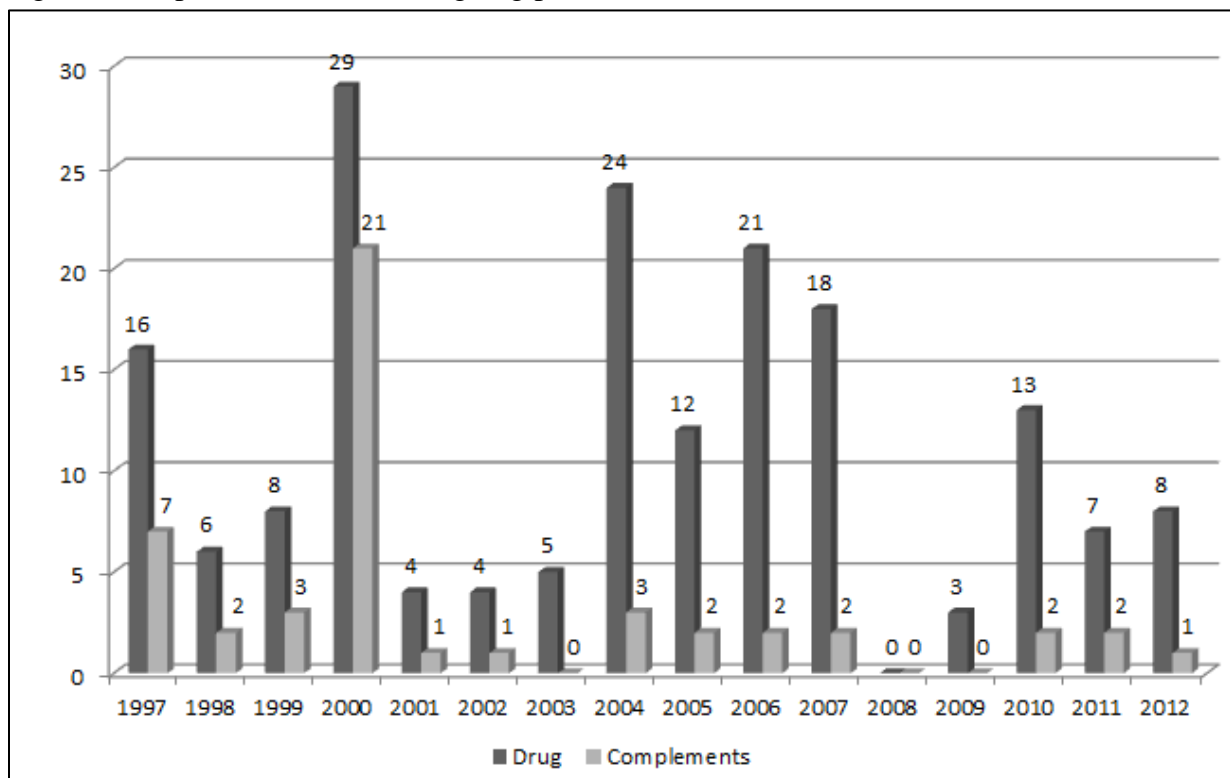
As the majority of biopharmaceutical entrepreneurs have a science background and may not be familiar with all aspects of financing a new firm,<sup>6</sup> this paper is offered as a partial guide to the IPO process and its associated costs. This lack of knowledge is not limited to scientist-entrepreneurs. For example, a recent survey of chief financial officers of firms going public in all industries found nearly a quarter of these executives surprised by the costs associated with their own firm going public and almost fifty percent stated that the cost of their IPO exceeded their expectations.<sup>7</sup> The present study provides data pertaining to the costs of recent biopharmaceutical IPOs (with comparisons to the costs of other IPOs) in order for the biopharmaceutical entrepreneur to understand these historical costs, and perhaps, in the future compare with their own experience. Consultants and agents often state that a knowledgeable client lowers the time spent on a project and thus the costs of the service provided.<sup>8,9</sup> It is hoped that this paper will act to inform biopharmaceutical entrepreneurs and others of these costs, which in turn may lower the costs of biopharmaceutical innovations.

## The U.S. Biopharmaceutical IPO Market

An initial public offering is the process by which a firm sells its stock or securities for the first time on an open, public market. A public market is a place, entity, or system that allows for the exchange of a firm's securities or stock between entities and individuals. Examples of public markets in the U.S. include the New York Stock Exchange (NYSE), NASDAQ (formerly National Association of Security Dealers Automated Quotation), and the American Stock Exchange (AMEX, which is now owned by NYSE Euronext). Figure 1 shows the number of biopharmaceutical IPOs primarily engaged in the development of human drugs or technologies in the U.S. between the years 1997 through 2012. We examine the U.S. IPO market due to its size advantage comparable other countries<sup>10</sup> and given its high level of biopharmaceutical IPO activity.<sup>1</sup>

There were 227 biopharmaceutical firms pursuing an IPO during this time. One hundred seventy eight (or 78 percent) were drug makers and 49 (or 22 percent) were firms that made or provided complementary products or services to this industry. Drug makers are firms with the standard industrial classification (SIC) codes 2834 or 2836.<sup>11</sup> Various websites were used as sources to derive the names of the firms going public. These sources included Biospace, Ernst & Young, Hoovers, and the Securities & Exchange Commission (SEC). These websites included firms that were also engaged in the development of biopharmaceutical drugs or complements for non-human consumption (i.e., animal, industrial, or military). Firms pursuing biopharmaceutical products or complements that are not primarily for human use are excluded from this study. SEC filings were used to determine if a firm met this criterion.

Figure 1. Biopharmaceutical firms going public: 1997 – 2012.

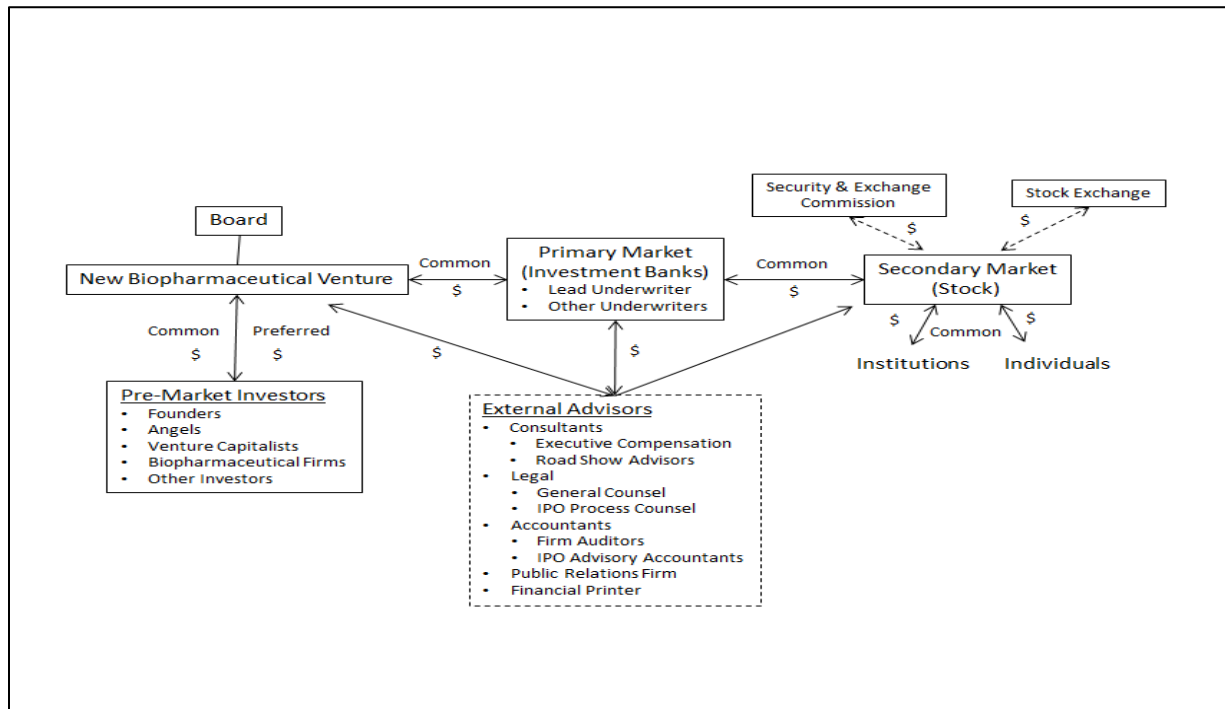


From Figure 1, two items stand out: the large number of IPOs in 2000 and then the lack of IPOs in 2008. In the late 1990s, biopharmaceutical firms began attracting venture capital and other investors in large numbers, which in part led to these firms ultimately filing for an IPO (as venture capital firms themselves need an exit vehicle).<sup>12</sup> In 2008, there were no biopharmaceutical firms that were primarily engaged in human drug development (or complement firms) completing an IPO. This lack of activity was mainly due to the financial market crisis and the leeriness of investors of risk capital in the public markets.<sup>13</sup>

### The IPO Arrangement

Figure 2 illustrates a generic IPO arrangement. On the left side of Figure 2, one can see the firm considering an IPO. The initial investors may include founders, angel investors, venture capitalists, other biopharmaceutical firms, and other investors.<sup>14,15</sup> This stage is called the “pre-market” as the firm has a limited number of investors and is not yet publicly traded.<sup>16</sup> Founders are individuals (such as scientists) who were with the firm at its inception. Angel investors are individuals and entities that invest their own monies.<sup>14</sup> Venture capitalists are individuals and entities that primarily invest other people’s monies, and actively engage in the management and/or governance of the firm.<sup>17</sup> Historically, other biopharmaceutical firms have been the largest investors in start-up biopharmaceutical firms.<sup>18</sup> The pre-market investors typically own both preferred and common stock in the firm. It is not unusual for these individuals and entities to convert their preferred stock into common stock at or about the time of the initial public offering in order to make their investment more liquid. Additionally, it is likely that public investors (who buy common shares) would not want preferred shares of the company to continue once the company is public.

Figure 2. Generic IPO arrangement.



Pre-market investors usually do not sell their securities directly to the public at large, but rather go through middlemen known as investment bankers or underwriters. Typically, several different investment banks work together to bring a firm's stock to a public market. This is a form of syndication with one firm taking the lead.<sup>19</sup> The lead investment bank also is called the lead underwriter or book runner. There are two basic types of arrangements that investment banks enter into with new ventures seeking to sell their stock: firm commitment contracts and best effort contracts.<sup>20</sup> Speaking generally, in a firm commitment contract the underwriter guarantees to sell a certain number of shares of the stock at a set price. In a best effort contract, the investment bank does not.

As investment banks are middlemen, they are looking to sell the firm's stock in a public market to individuals and institutions. They must first determine what a reasonable price for the firm's stock would be and how many shares of stock to offer to the public. They do this by way of a roadshow, which is where the investment bankers take officers and other investors of the new venture around to meet potential buyers of their stock. They can market the future IPO shares in one of two ways: the fixed price method or book-building method. In a fixed price method, the underwriter prices the shares based on the informal information gleaned from the roadshow. In book building, the shares are priced based on a similar process without the potential investors making a commitment to purchase the shares. It should be added that this process adds significant direct and opportunity costs, as it takes considerable time and effort on the part of the officers and others to carry-out these roadshows<sup>21</sup>—time that will not be spent on the operations of the firm or even, perhaps, in the discovery of new drugs or therapies. For firms going public between 2009 through 2012, it took about 9.3 months on average between the time the firm filed its initial registration form (S-1) and the actual date of its IPO. Due to the 2008 financial crisis some firms postponed their IPO efforts. When 2009 firms are not included and one examines 2010 through 2012 IPOs, the actual time is about 8 months. It should be noted that for most, if not all, firms the actual process of going public started many months in advance of the filing of the firm's initial registration form. Although it may slow down their time to initiating the IPO, firms may be able to lower some of their costs by spending sufficient time and energy in this preparatory stage.<sup>7</sup>

### The Fees Associated with Going Public

Investment banks charge a fee for their services. The firm going public usually reports this fee (and others) as a subtraction from the gross proceeds that it receives from the initial public offering—what is referred to as the net proceeds. As long as the IPO closes, this fee is not a great issue. However, as in 2008, much time can be spent without a firm going public due to market attractiveness. In addition to the underwriters themselves, the underwriters and firm going public engage other external advisors to this process. Table 1 shows the underwriter fees and other parties' fees associated with biopharmaceutical IPOs from 2009 through 2012. The data come from the firms' SEC filings, typically their quarterly or annual report after the IPO. These data at times differ from those reported in the trade-press or in later SEC filings as some firms extend the IPO process beyond a given reporting period or may have pre-market investors receive IPO funding directly, but not the firm itself. Also, Table 1 reflects that some firms do not separate underwriting fees from other fees, but report total combined fees paid.

Table 1. Biopharmaceutical firm length to IPO, proceeds, and fees: 2009 – 2012

Name	SIC	S-1 Form Filing Date	IPO Date	Gross Proceeds	Net Proceed	Underwriter Fees	Other Fees	Total Fees	Underwriter Fees as Percentage of Gross Fees	Total Fees as Percentage of Net Proceeds	Total Fees as Percentage of Gross Proceeds
Cumberland	2834	5/1/2007	8/26/2009	85,100,000	75,200,000	6,000,000	3,900,000	9,900,000	7.05%	13.16%	11.63%
Talecris	2834	7/27/2007	9/30/2009	554,700,000	519,700,000	30,000,000	5,000,000	35,000,000	5.41%	6.73%	6.31%
Omeros	2834	1/9/2008	10/8/2009	68,200,000	61,800,000	4,800,000	1,600,000	6,400,000	7.04%	10.36%	9.38%
2009 Sum				708,000,000	656,700,000	40,800,000	10,500,000	51,300,000			
2009 Mean				236,000,000	218,900,000	13,600,000	3,500,000	17,100,000	6.50%	10.09%	9.11%
Ironwood	2834	11/20/2009	2/3/2010	215,200,000	203,200,000	10,500,000	1,500,000	12,000,000	4.88%	5.91%	5.58%
Anthera	2834	9/15/2009	3/1/2010	44,100,000	41,100,000			3,000,000		7.30%	6.80%
AVEO	2834	12/16/2009	3/12/2010	89,700,000	80,300,000	6,300,000	3,100,000	9,400,000	7.02%	11.71%	10.48%
CorMedix	2834	11/25/2009	3/26/2010	12,500,000	10,400,000	1,300,000	800,000	2,100,000	10.40%	20.19%	16.80%
Tengion	2836	12/24/2009	4/9/2010	30,000,000	25,800,000	1,800,000	2,400,000	4,200,000	6.00%	16.28%	14.00%
Alimera	2834	7/1/2008	4/22/2010	72,050,000	68,395,419			3,654,581		5.34%	5.07%
Codexis	2860	4/14/2008	4/22/2010	78,000,000	68,000,000	5,500,000	4,500,000	10,000,000	7.05%	14.71%	12.82%
Trius	2834	11/6/2009	8/2/2010	50,000,000	45,600,000	1,700,000	2,700,000	4,400,000	3.40%	9.65%	8.80%
NuPathe	2834	5/14/2010	8/5/2010	50,000,000	43,000,000	3,500,000	3,500,000	7,000,000	7.00%	16.28%	14.00%
Aegerion	2834	3/21/2007	10/22/2010	54,625,000	48,800,000	3,325,000	2,500,000	5,825,000	6.09%	11.94%	10.66%
Pacific Biosc.	3826	8/16/2010	10/27/2010	230,000,000	210,400,000	16,100,000	3,500,000	19,600,000	7.00%	9.32%	8.52%
Complete	8731	7/30/2010	11/11/2010	54,000,000	47,000,000			7,000,000		14.89%	12.96%
Anacor	2834	8/31/2007	11/24/2010	66,900,000	61,000,000	3,200,000	2,700,000	5,900,000	4.78%	9.67%	8.82%
Ventrus	2834	7/20/2010	12/23/2010	16,961,500	15,700,000			1,261,500		8.04%	7.44%
Zogenix	2834	3/20/2008	12/23/2010	57,700,000	51,700,000	2,700,000	3,300,000	6,000,000	4.68%	11.61%	10.40%
2010 Sum				1,121,736,500	1,020,395,419	55,925,000	30,500,000	101,341,081			
2010 Mean				74,782,433	68,026,361	5,084,091	2,772,727	6,756,072	6.21%	11.52%	10.21%

Pacira	2834	11/1/2010	2/3/2011	42,000,000	37,000,000			5,000,000		13.51%	11.90%
Endocyte	2834	8/17/2010	2/4/2011	86,300,000	78,200,000	5,500,000	2,600,000	8,100,000	6.37%	10.36%	9.39%
BG Medicine	2835	8/3/2007	2/4/2011	40,200,000	34,800,000	2,800,000	2,600,000	5,400,000	6.97%	15.52%	13.43%
Fluidigm	3826	4/14/2008	2/10/2011	83,000,000	77,000,000			6,000,000		7.79%	7.23%
Acelrx	2834	11/12/2010	3/11/2011	40,000,000	35,200,000			4,800,000		13.64%	12.00%
Tranzyme	2834	11/19/2010	4/4/2011	57,400,000	51,400,000			6,000,000		11.67%	10.45%
Horizon Pharm	2834	8/3/2010	7/28/2011	49,500,000	41,900,000	3,500,000	4,100,000	7,600,000	7.07%	18.14%	15.35%
NewLink Gen.	2834	12/21/2010	11/11/2011	43,400,000	37,500,000	3,000,000	2,900,000	5,900,000	6.91%	15.73%	13.59%
Clovis Onc.	2834	6/23/2011	11/17/2011	139,100,000	129,400,000	6,900,000	2,800,000	9,700,000	4.96%	7.50%	6.97%
2011 Sum				580,900,000	522,400,000	21,700,000	15,000,000	58,500,000			
2011 Mean				64,544,444	58,044,444	4,340,000	3,000,000	6,500,000	6.46%	12.65%	11.15%
Merrimack Ph.	2834	7/8/2011	3/29/12	105,300,000	100,500,000			4,800,000		4.78%	4.56%
Supernus	2834	12/23/2010	5/1/2012	50,900,000	47,600,000			3,300,000		6.93%	6.48%
Tesaro	2834	3/23/2012	6/28/2012	81,000,000	72,600,000	5,700,000	2,700,000	8,400,000	7.04%	11.57%	10.37%
Durata Ther.	2834	3/22/2012	7/19/2012	78,500,000	73,900,000			4,600,000		6.22%	5.86%
Hyperion Ther.	2834	4/13/2012	7/26/2012	57,500,000	51,200,000	4,000,000	2,300,000	6,300,000	6.96%	12.30%	10.96%
Regulus Ther.	2834	8/17/2012	10/9/2012	50,900,000	44,900,000	3,400,000	2,600,000	6,000,000	6.68%	13.36%	11.79%
Intercept	2834	9/4/2012	10/11/12	86,300,000	78,700,000	6,100,000	1,500,000	7,600,000	7.07%	9.66%	8.81%
Kythera	2834	5/17/2012	10/16/2012	81,000,000	72,600,000			8,400,000		11.57%	10.37%
Atossa	3841	3/30/2010	11/9/2012	4,000,000	3,000,000			1,000,000		33.33%	25.00%
2012 Sum				595,400,000	545,000,000	19,200,000	9,100,000	50,400,000			
2012 Mean				66,155,556	60,555,556	4,800,000	2,275,000	5,600,000	6.94%	12.19%	10.47%
Overall Sum				3,006,036,500	2,744,495,419	137,625,000	65,100,000	261,541,081			
Overall Mean				83,501,014	76,235,984	5,983,696	2,830,435	7,265,030	6.43%	11.85%	10.42%

From Table 1 one can see that biopharmaceutical IPOs raised about \$3 billion in total from 2009 through 2012. The average firm reported receiving gross proceeds of almost \$83.5 million. The average firm paid a little under \$7.3 million in fees to underwriters and others, which meant that the firm received about \$76.2 million on average in net proceeds from the IPO. When examining only the firms that separated underwriting fees from other fees, one can see that the average firm paid underwriters just under \$6 million and others about \$2.8 million—this combined figure is higher than the total fees figure and may be due to some of the larger IPOs reporting their fees separately. Overall, firms paid underwriters and others about 10.4 percent of the gross proceeds from the IPO or about 11.9 percent of the net proceeds from the IPO. For firms that separated the underwriter fees from other fees, these firms paid underwriters about 6.4 percent of the gross proceeds of the IPO. This compares with the results of a study of 380 IPOs from all industries between January 1, 2009, and June 30, 2012 by PricewaterhouseCoopers (PWC) which found underwriters receiving between 5.5 and 6.9 percent of gross proceeds.<sup>7</sup>

As one can see from Figure 2 and Table 1, other entities receive fees for their services. These entities include consultants who assist with the roadshow and also other consultants who assist with executive compensation. Legal fees typically are quite extensive as firms require general counsel advice for all contractual arrangements, with firms often receiving separate legal advice about the IPO process itself. Accountants also play a vital role. The above-mentioned PWC study found legal fees range from \$100 thousand to \$17 million and auditor fees ranging from zero to \$5 million.<sup>7</sup> A sub-sample by PWC of 31 IPOs found that all non-underwriter costs ranged from 23 to 61 percent of all fees, with larger IPOs in terms of amount raised being associated with a smaller percentage of non-underwriter fees. The present biopharmaceutical study found total non-underwriter fees averaging about 38 percent of all fees, and ranging from 12.5 percent to 61 percent. Similar to PWC's results, the results indicate larger firms being associated with smaller percentages of non-underwriter fees. Our results differ in that several firms had lower non-underwriter percentages suggesting that several of the biopharmaceutical firms had larger underwriter fees than the general population of IPOs surveyed by PWC. This may be an area that biopharmaceutical firms may wish examine further in the future.

To further elaborate on fees Table 2 is offered. Table 2 shows a detailed estimate of the non-underwriter fees paid by Pacific Biosciences. There was a \$16,399 registration-filing fee with the SEC. Pacific Biosciences also paid the Financial Industry Regulatory Authority (FINRA) a fee of \$23,500. FINRA is an independent regulator of security firms. FINRA reviews and approves all underwriting arrangements. In Pacific Biosciences' case, this would be the arrangement among it and JP Morgan, Morgan Stanley, Deutsche Bank Securities, and Piper Jaffray. Pacific Biosciences is also responsible for a listing fee with the NASDAQ Global Market of \$275,000. Legal fees total \$1,500,000, and accounting fees amount to \$950,000. Each security sold in a state is also subject to registration in that state and must pay a fee. This is known as Blue Sky Qualification Fees and Expenses and in the case of Pacific Biosciences amounts to \$25,000. IPOs also hire outside entities to keep up with whom the firm's shareholders are, their stock positions, and to provide them with certain recordkeeping activity associated with these new shareholders. This is reflected in the transfer agent and registration fees of \$30,000. IPOs may also have other expenses. Pacific Biosciences accounts for this under the category of miscellaneous expenses of over \$480,000. These other expenses may include a public relations firm, among others.



Table 2. Other fees associated with Pacific Biosciences IPO

Security & Exchange Commission Fee	\$	16,399
FINRA Fee		23,500
NASDAQ Listing Fee		275,000
Printing and Engraving Fees		200,000
Legal Fees		1,500,000
Accounting Fees		950,000
Blue Sky Qualification Fees		25,000
Transfer Agent & Registrar Fees		30,000
Misc.		480,101
<b>Total</b>	<b>\$</b>	<b>3,500,000</b>

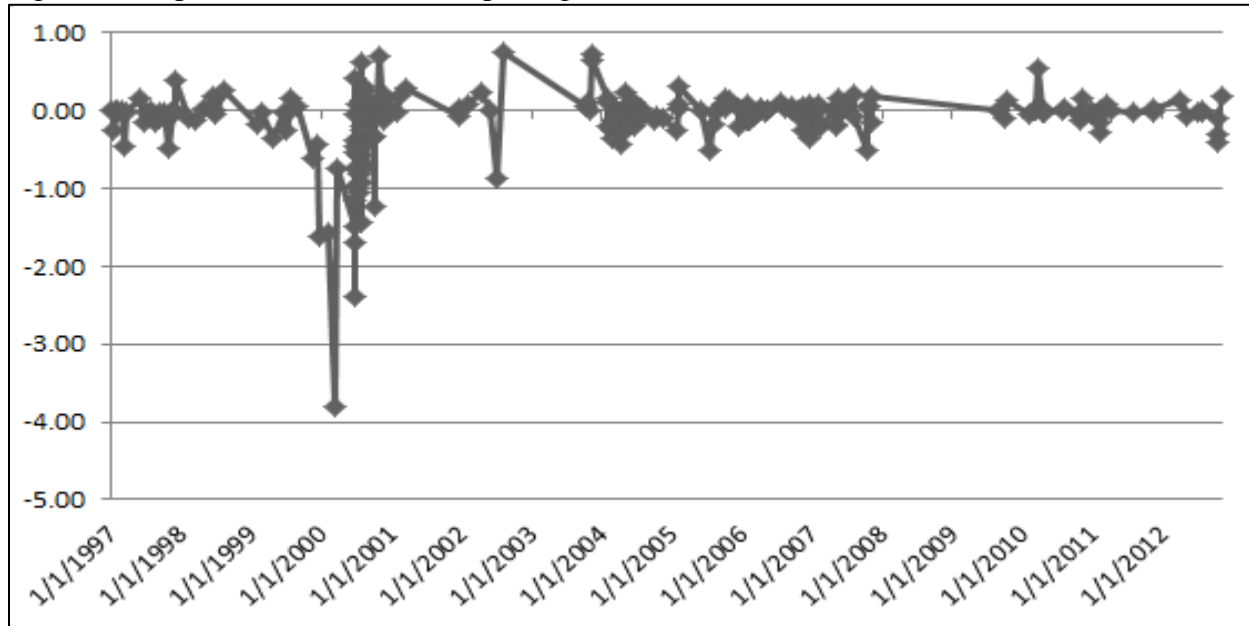
Source: Amendment 4 to Pacific Biosciences registration statement; <http://www.sec.gov/Archives/edgar/data/1299130/000119312510231219/ds1a.htm>

### The Opportunity Cost of Mispricing the IPO

In addition to the time and effort to prepare for an IPO, it has been noted that one of the areas that firms going public have experienced the greatest opportunity costs is in the difference in price between what the firm sells its stock for (known as the offer price) to underwriters in the primary market and what the public market investors actually pay.<sup>22</sup> Public markets (e.g. NYSE) are known as the secondary market. This secondary market relates to both the selling of stock for the first time in an IPO, and also where existing shares of stock continue to be traded. The difference between what the initial firm owners receive and what the secondary owners' pay creates what is known as the mispricing issue, which can be a type of opportunity cost for the pre-market investors. In other words, had the firm gone directly to the secondary market with its shares, in what is known as a direct public offering, it would potentially reduce the opportunity (and direct) costs of underwriters. Direct public offerings are rare occurrences.

Mispricing can take the form of secondary investors paying less than the offer price, which is called overpricing, or when secondary market investors pay more than the offer price, which is known as underpricing. Underpricing is the predominant form of mispricing for IPOs in general<sup>23</sup> and biopharmaceutical IPOs specifically.<sup>15</sup> For various reasons not discussed here, firms do not get too upset typically about the opportunity costs associated with underpricing (see Loughran and Ritter, 2002 or Williams and Young, 2012 for explanations as to why this is). Nonetheless, underpricing represents opportunity costs. Figure 3 shows the mispricing of biopharmaceutical firms going public between 1997 through 2012.

Figure 3. Biopharmaceutical IPO mispricing.



N= 227 Negative numbers = underpricing (1<sup>st</sup> day closing price > offer price);  
 Positive numbers = overpricing (1<sup>st</sup> day closing price < offer price).  
 Source: SEC filings and finance.yahoo.com

Figure 3 shows the percentage difference in the offer price and the price at which the IPO's stock sold in a public market on the close of the first day of selling. The negative numbers represent underpricing and the positive numbers represent overpricing. The average firm's stock over these 16 years underpriced 13 percent, meaning the stock closed 13 percent higher than its offer price. As can be seen, much of this underpricing took place in the early 2000s. Mispricing ranged from one firm underpricing 385 percent (i.e., the stock price closed 3.85 times higher than its offer price) to another firm's stock being overpriced 26 percent (i.e., the stock price closed at 74 percent of its offer price). One hundred twenty seven IPOs (or 56 percent) were underpriced, 80 IPOs (or 35 percent) were overpriced, and 20 IPOs (9 percent) experienced no mispricing. Loughran and Ritter found that for the overall IPO market (all industries) that the market underpriced IPOs around 7 percent from 1980-1989; around 15 percent from 1990 through 1998; around 65 percent from 1999 through 2000; and back down to 12 percent from 2001 through 2003.<sup>21</sup> Separately, it has been reported that the overall market from 2001 through 2009 was underpriced about 12.1 (similar to our 13 percent for the 16 years period of this study), with the past 50 years or so averaging an underprice of 16.8 percent.<sup>22</sup>

As mentioned earlier, in addition to the price of the stock, part of the underwriting process is to determine how many shares of stock the firm can sell in its initial public offering. An IPO is considered successful when its shares offered are all sold at a reasonable price (i.e., close to the offer price). Table 3 shows data related to 2011 and 2012 IPOs' intentions and actual first day returns. The source of the offer price and number of shares to be offered is from the firm's prospectus. Data related to first day trading are from finance.yahoo.com.

Table 3. Biopharmaceutical IPOs' money left on the table.

Name	Offer Price	Closing Price	1st day mispricing	Volume	(Offer - Closing Price) x Volume	Low Price	(Offer - Low Price) x Volume	High Price	(Offer - High Price) x Volume	(Offer - Average Price) x Volume	IPO Shares offered in Prospectus	(Offer - Closing Price) x All IPO Shares	(Offer - Avg Price) x All IPO Shares
Pacira Pharm	7.00	7.02	0.00	1,710,500	-34,210	6.95	85,525	7.25	-427,625	-171,050	6,000,000	-120,000	-600,000
Endocyte, Inc.	6.00	7.73	-0.29	1,458,000	-2,522,340	6.15	-218,700	8.34	-3,411,720	-1,815,210	12,500,000	-21,625,000	-15,562,500
BG Medicine	7.00	8.05	-0.15	2,453,000	-2,575,650	7	0	8.58	-3,875,740	-1,937,870	5,000,000	-5,250,000	-3,950,000
Fluidigm Corp	13.50	14.02	-0.04	2,676,200	-1,391,624	13.46	107,048	14.48	-2,622,676	-1,257,814	5,558,333	-2,890,333	-2,612,417
Acelrx Pharm	5.00	4.55	0.09	1,899,700	854,865	4.51	930,853	5.09	-170,973	379,940	8,000,000	3,600,000	1,600,000
Tranzyme	4.00	4.00	0.00	1,762,400	0	3.95	88,120	4.19	-334,856	-123,368	13,500,000	0	-945,000
Horizon Pharma	9.00	9.15	-0.02	564,400	-84,660	9	0	9.20	-112,880	-56,440	5,500,000	-825,000	-550,000
NewLink Genetics	7.00	7.08	-0.01	1,729,200	-138,336	7	0	7.81	-1,400,652	-700,326	6,200,000	-496,000	-2,511,000
Clovis Oncology	13.00	12.56	0.03	1,912,700	841,588	12.29	1,358,017	13.39	-745,953	306,032	10,000,000	4,400,000	1,600,000
2011 Sum					-5,050,367		2,350,863		-13,103,075	-5,376,106		-23,206,333	-23,530,917
2011 Mean			-0.04		-561,152		261,207		-1,455,897	-597,345		-2,578,481	-2,614,546
Merrimack Pharm	7.00	6.04	0.14	3,778,300	3,627,168	5.86	4,307,262	6.50	1,889,150	3,098,206	14,300,000	13,728,000	11,726,000
Supernus Pharm	5.00	5.37	-0.07	676,900	-250,453	5.20	-135,380	7.01	-1,360,569	-747,975	10,000,000	-3,700,000	-11,050,000
Tesaro Inc.	13.50	13.69	-0.01	1,266,200	-240,578	12.82	861,016	14.00	-633,100	113,958	6,000,000	-1,140,000	540,000
Durata Therapeutics	9.00	9.04	0.00	1,848,400	-73,936	8.99	18,484	10.00	-1,848,400	-914,958	7,500,000	-300,000	-3,712,500
Hyperion Thera	10.00	10.11	-0.01	399,800	-43,978	9.95	19,990	11.00	-399,800	-189,905	5,000,000	-550,000	-2,375,000
Regulus Therap	4.00	4.38	-0.10	35,600	-13,528	4.24	-8,544	4.44	-15,664	-12,104	11,250,000	-4,275,000	-3,825,000
Intercept Pharm	15.00	19.40	-0.29	813,300	-3,578,520	18.74	-3,041,742	20.40	-4,391,820	-3,716,781	5,000,000	-22,000,000	-22,850,000
Kythera Biopharm	16.00	22.50	-0.41	100,200	-651,300	21.65	-566,130	25.20	-921,840	-743,985	4,400,000	-28,600,000	-32,670,000
Atossa Genetics	5.00	4.05	0.19	51,900	49,305	4.05	49,305	4.69	16,089	32,697	800,000	760,000	504,000
2012 Sum					-1,175,820		1,504,261		-7,665,954	-3,080,847		-46,077,000	-63,712,500
2012 Mean			-0.06		-130,647		167,140		-851,773	-342,316		-5,119,667	-7,079,167

From Table 3, one can see that firms averaged 4 percent and 6 percent underpricing in 2011 and 2012, respectively. Jay Ritter has noted that IPOs oftentimes “leave money on the table”.<sup>24</sup> By this, he means money not going to pre-market investors, but rather to middlemen. He calculates this money left on the table as the difference between the closing price of the stock on the first day of trading and the offer price, multiplied by the number of shares sold (or volume). This assumes that all trading is for new shares without any shares trading again on this date. Using Ritter’s formula, the 2011 firms left in excess of \$5.0 million and almost \$1.2 million on the table in 2012, cumulatively. This means that the average firm left in excess of \$560,000 in 2011 and \$130,000 in 2012. One important aspect of Table 3 is that some firms’ underwriters lose money on their trading at the close of the first day of trading others do not.

An issue with looking at data in the above manner is the assumption that all shares sold at the closing price. They did not. Exact data for these firms are not readily available, but one can look at several other measures in conjunction with closing price data for comparative purposes. If one assumed that all shares sold for the lowest price traded on the first day, this would mean that cumulatively firms would not leave money on the table. Rather, they would gain above what the secondary market was willing to pay of over \$2.3 million in 2011 and almost \$1.5 million in 2012. If one assumed selling all shares at the high stock price of the day, this would mean leaving on the table over \$13.1 million in 2011 and over \$7.6 million in 2012. Perhaps, a better indicator is an average of the high and low prices. This average measure indicates cumulative potential money left on the table in excess of \$5.3 million in 2011 and \$3.0 million in 2012 for these firms, with the average firm in 2011 leaving about \$600,000 on the table and the average firm in 2012 leaving about \$342,000. Although, most firms do not sell all of their offering shares on the first day, one can speculate that if they did sell all shares at the closing price these firms cumulatively would leave in excess of \$23.2 million dollars in 2011 and \$46.0 million in 2012. If one assumed they sold all shares at the average first day price, then this would leave \$23.5 million in 2011 and \$63.7 million in 2012 on the table. Thus, one can see that there is opportunity costs in utilizing the services of investment banks and not pursuing a direct public offering.

There are significant opportunity costs associated with a direct public offering as well. There is no guarantee that the IPOs in this study would have been able to garner these prices or sold all of their shares of stock without the efforts of the investment bankers<sup>23</sup>—in this sense underwriters add value. In another sense, underwriters add value compared with attempting a direct offering in that they assist the entrepreneurs in the navigation of all the complexities related to the secondary or public market and their associated parties (see Figure 2 and Table 2 for examples of these parties). They also may have a better or closer understanding of the readiness (i.e., hotness) of the IPO market and when to go public. Perhaps the greatest cost associated with a direct offering as opposed to utilizing investment banks is the opportunity costs of having the firm’s executives spend a greater amount of time and energy on raising capital and away from developing new biopharmaceutical products and innovations. In other words, if there is no lead underwriter (or any underwriter) then the biopharmaceutical entrepreneur must take the lead in conjuring up future investors for its public shares.

## Conclusion

The IPO market for biopharmaceutical firms appears to be coming back.<sup>5</sup> Yet, there are costs associated with an IPO and firms must understand the length of time, process, and associated costs of going public in order to act in the most efficacious business manner.<sup>7</sup> Attorneys, agents, and consultants often appreciate an informed client, with such leading to greater client satisfaction,<sup>8</sup> and perhaps, the lowering of costs and speeding up of the time to IPO. The present study found both similarities and subtle differences in costs when compared with the general population of IPOs. It found that underwriter fees as a percentage of gross IPO receipts are similar to the general IPO market as reported by an external survey. However, the study's underwriter fees as a percentage of total fees are slightly higher than the general IPO market. It also found IPO underpricing to be not too dissimilar than the general IPO market as reported by external sources. The present study should help biopharmaceutical entrepreneurs and others understand the cost of going public in order to evaluate their options. For those who choose to go public, the present study may better align expectations associated with these costs.

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