

IPO Underpricing: The Owners' Perspective

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ABSTRACT

Most corporate finance textbooks include a chapter on raising capital, giving particular attention to initial public offerings (IPOs). For IPOs, underpricing is defined as the percentage change from the offer price to the closing price on the first trading day. Textbooks universally treat underpricing as the indirect cost of issuance; however, this fails to account for the share issuance decision. Because owners do not typically sell all (or even most) of their shares, underpricing overstates the wealth lost by preexisting owners. I provide simple, real-life examples for instructors to use in courses such as corporate finance, entrepreneurship, or alternative investments.

Introduction

Issuing securities is a common topic in most corporate finance textbooks, carrying chapter titles such as “Raising Capital” and “The Investment Banking Process.” While this material is obviously a mainstay of the traditional corporate finance class, the topic is of much broader interest. For example, alternative investments such as venture capital and private equity funds have increased in importance as investors have increasingly sought for ways to improve portfolio efficiency. In this area, the preferred exit strategy for underlying investments is an IPO, or initial public offering. Thus, the topic of securities issuance, and IPOs in particular, is one that should be of interest to both companies and potential private investors.

Unfortunately, most textbooks seem to cover IPOs in a very broad way, making generalizations that may actually mislead students, who are the potential entrepreneurs and investors of the future. Of particular interest in this regard is the subject of IPO underpricing, also referred to as initial return. Underpricing (UP) is defined as the percentage change from the offer price (OP) to the market price (P_1) at the end of the stock's first trading day:

$$UP = \frac{P_1 - OP}{OP} \quad (1)$$

So, for example, if a company offered shares to the public at \$20 and the issue closed at \$23, then underpricing is 15 percent.

A firm will pay many direct costs, such as the gross underwriting spread and legal fees, which in total may approach 8 to 10 percent of the issue proceeds. Where the problem arises, however, is in the treatment of underpricing. Most textbooks, rightfully so, suggest that underpricing, which is historically positive, is an indirect cost since the firm is essentially “leaving money on the table.” Further, given that underpricing commonly approaches 15-20 percent (or more), the common assumption is that underpricing is the largest cost of issuance. While the logic seems sound, there is an underlying assumption that most textbooks (and potentially faculty) overlook. Specifically, characterizing underpricing as the correct measure of indirect issuance cost assumes that all preexisting firm shares are sold in the IPO. As I

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document later, however, this is an extremely uncommon event. As such, underpricing significantly overstates indirect issue cost, and the wealth impact on owners is not as extreme as textbooks suggest.

The purpose of this paper is to illustrate the typical share structure of an IPO, thereby clarifying the true cost of securities issuance as it is attributable to underpricing. In addition, I will provide detailed examples (both fictitious and real) that can be used in classes to explain the concept, as well as to help strengthen students' ability to gather public information from external sources such as the Securities and Exchange Commission's EDGAR database.

This material should be helpful for faculty who are teaching corporate finance or alternative investments, particularly where the focus is on the investment side of alternative assets such as private equity and venture capital. Further, courses on entrepreneurship and business ownership should necessarily address this issue, as the IPO represents a key exit point where value is created from these ventures. Thus, owners (whether original entrepreneurs or third party investors) need to understand that underpricing is likely not as detrimental to their wealth as traditional discussions would suggest.

A Simple Example

To help clarify, it is probably best to start with a simple example, particularly in a classroom setting. So, consider an entrepreneur, John Smith, who starts and grows a company. John is the sole owner, and the capital structure consists of 10 shares. John decides to go public, and he plans to offer 2 shares.

One of these shares will be from his current ownership, thus he is using the IPO as a way to partially exit the firm. This share is a secondary share because it already exists. The other share will be newly created and is thus being used as a way to raise capital for the firm. This share is a primary share since it is being newly created and sold. This primary share will dilute the value of the firm. Thus, after the offering there will be 11 total shares outstanding: 9 owned by John and 2 by new investors.

Traditionally, textbooks have suggested that the primary purpose of an IPO is to raise capital. But, is it? In this example, capital raising is part of the process, but it is only part of the story. In fact, in many cases the primary rationale for an IPO is actually more related to creating a market for what is otherwise a very illiquid asset (i.e., private ownership of firm equity).² I provide some detailed metrics on average ownership and issuance structures in a subsequent section.

So, back to John Smith and his IPO. Suppose John and his underwriter determine that the offer price for the shares is \$10. They subsequently complete the IPO, and the shares increase in price, closing the first trading day at \$12 per share. Underpricing is thus 20%, and the traditional corporate textbook would generally stop here. For example, Ross, Westfield and Jaffe (2011) state:

“For initial public offerings, the stock typically rises substantially after the issue date. This is a cost to the firm because the stock is sold for less than its efficient price in the aftermarket.”

While the quote does not explicitly state that underpricing is the actual cost, it does seem to imply this, particularly since no additional explanation is provided. This approach is not unique to this particularly book.

But, did John really lose 20 percent of his firm value? Since he sold relatively few shares as compared to the total number that existed prior to the offering, the answer is no. In this example, John left \$4 of money on the table (\$2 per share). This occurs because he sold two shares at \$10 per share, but the market actually priced them at \$12 per share. This money left on the table is the dollar cost of underpricing, which textbooks accurately reflect. But, what is the percentage cost? The true percentage cost is not the underpricing, but the percent of value that John lost as compared to the firm's (i.e., owner's) value prior to the offering.

² See Aggarwal, Krigman and Womack (2002) for more on the strategic nature of underpricing.

To estimate the firm's value prior to the IPO, we need to consider the impact of both primary and secondary shares. The money left on the table from the secondary share impacts only John's wealth, not the firm. The money left on the table from the primary share represents a dilution in firm value, as this is value that is effectively transferred from the company to new owners. So, this represents a reduction in firm value and impacts the value of John's retained shares.

If the market applies a share price of \$12 per share, this would reflect the dilution associated with the issuance of the new share since the value is no longer part of the firm. At \$12, the firm's value before the offering was \$120 (10 preexisting shares at \$12 per share) plus the amount of the dilution, which was \$2. So, the preexisting firm value was \$122. If the total money left on the table was \$4, this represents a cost of only 3.3% (\$4/\$122). So, while textbooks might simply suggest the indirect issuance cost was 20% (i.e., the underpricing), the true percentage cost is much less. This primarily results because John still has nine shares that he could sell at the current market price, at least once the standard lockup period expires. While John might like to be able to undertake this process for free, he might be quite willing to pay 3.3% of his share value if he is able to create a liquid market for what is otherwise a very illiquid investment.

In equation form, the opportunity cost of issuance (OCI) would be calculated as:

$$OCI = \frac{(P_1 - OP) * (SharesOffered)}{P_1 * ExistingShares + (P_1 - OP) * PrimaryShares} \quad (2)$$

$$OCI = \frac{(12 - 10) * 2}{12 * 10 + (12 - 10) * 1} = \frac{4}{122} = 3.3\%$$

Barry (1989) was really the first to address this issue over 20 years ago. More recently, Dolvin and Jordan (2008) expanded on the topic, providing a more theoretical underpinning for this issue. Unfortunately, the topic has yet to make its way into the textbooks (and therefore the typical classroom), meaning that students still leave with an incomplete understanding, in that they might assume that IPOs have a greater (negative) wealth impact than they actually do.

Putting It into Practice

While the fictional example above is useful for illustrating the issue, it is always helpful to provide students (and faculty) with real-world examples, particularly one that involves an interesting company. This approach helps solidify the concept, while also providing the opportunity to enhance student skills in the area of financial research. So, consider the recent IPO of Tesla Motors, the maker of the Tesla Roadster, which is a high-end electric sports car that sells for over \$100,000. Tesla went public on June 29, 2010.

In examining the IPO, let's begin with the common textbook approach, simply concentrating on the underpricing. To calculate underpricing, we need to know the offer price and the closing market price on the first trading day. The closing price was \$23.89, and this value is easily obtained using the "Historical Prices" tab at <http://finance.yahoo.com>. To obtain the offer price, we can search the Securities and Exchange Commission's EDGAR database (www.sec.gov). The filing that addresses the registration of securities is an S-1.

Searching the EDGAR database reveals that Tesla originally filed for registration on January 29, 2010. What you should also notice in the search results is that there were multiple amendments to the original filing (i.e., form S-1/A). This is important as it illustrates that the issuing firm has an embedded option in the issuance process, as owners can wait until the "last minute" to determine the final number of shares that will be issued, as well as the offer price at which they will be sold. This may provide selling shareholders with a level of control over indirect issuance costs. For Tesla, the final filing occurred on June 28, 2010, which is the day immediately prior to the actual offering.

According to the final filing document, Tesla offered its shares at \$16 per share. Thus, with a closing price of \$23.89, underpricing was 49.3 percent. Under conventional thought, this would suggest that offering shareholders lost almost half of their value through the IPO. However, this ignores the share distribution. To address this information, review the amended S-1As from the day prior to the offering. These documents reflect the final values.

The introductory information in these registration documents details that Tesla offered 13,300,000 shares in the IPO. Of these, 11,880,600 were primary shares and 1,419,400 were secondary shares being sold by preexisting owners. This sounds like a lot, but the section entitled “Description of Capital Stock” reveals that there were 78,264,763 shares outstanding prior to the IPO. So, owners sold less than 2 percent of their holdings (i.e., secondary shares) and increased the total number of company shares by only about 15 percent (i.e., primary shares). Thus, the 49 percent underpricing was not as detrimental as common thought would suggest.

To get a more detailed picture, we can use the above information to obtain the actual level of indirect issuance cost, which is money left on the table relative to preexisting firm value. Money left on the table is $13,300,000 * (\$23.89 - \$16) = \$104,937,000$, of which \$93,737,934 is attributable to primary shares (which reduces firm value) and \$11,199,066 is attributable to secondary shares (which impacts the wealth of owners, but not firm value).

Prior to the offering, there were 78,264,763 shares, which are now valued at \$23.89 per share. This represents a value of \$1,869,745,188; however, this is net of the dilution associated with the issuance of new shares. Thus, the estimate of preexisting value is $\$1,869,745,188 + \$93,737,934 = \$1,963,483,122$. So, money left on the table of \$105 million doesn’t necessarily seem like that much. In fact, the indirect issuance cost is only 5.3% (i.e., $\$104,937,000 / \$1,963,483,122$). In equation form, this can be calculated as:

$$OCI = \frac{(23.89 - 16) * 13,300,000}{23.89 * 78,264,763 + (23.89 - 16) * 11,880,600} = 5.3\%$$

As we will see below, this value is in line with the historical average, again illustrating that high underpricing does not necessarily have as negative an impact on owners as the textbooks suggest. Further, Tesla’s IPO created a market value of almost \$2 billion for the firm and produced a liquid market for shares, where none previously existed. This might well be worth giving up 5 percent of your wealth. For an additional example that can be used as a student assignment or exam question, see Appendix A.

Historical Evidence

Given the importance of the share structure, it is critical to provide some perspective on what a typical IPO looks like. For example, Chen and Ritter (2000) find that the gross spread (which is a direct cost) is standardized at 7 percent for most issues, while Bradley, et al. (2006) find that the spread is 10 percent for smaller offerings.

Unfortunately, while the gross spread and other direct costs are rather standard, underpricing is not. It varies across time and firms. The same is true for share distribution—i.e., primary vs. secondary shares offered. This latter issue is often measured using share overhang, which Bradley and Jordan (2002) define as preexisting shares retained relative to total shares offered. In our Tesla example above, share overhang would be: $(78,264,763 - 1,419,400) / 13,300,000 = 5.78$. A higher overhang indicates larger share retention, and, given our examples above, it should be apparent that higher overhang reduces the net effect of underpricing on owners’ wealth (since underpricing is generally positive).

To put this in perspective, Table 1 reports average values of IPO characteristics across various time periods (1986-1989, 1990-1998, 1999-2000, and 2001-2004). These follow Dolvin and Jordan (2008).³ Specifically, the table reports values for underpricing, as well as for share distribution (i.e., preexisting shares, secondary shares sold, primary shares sold, total shares sold, and shares retained, all of which are in millions of shares). Finally, the table provides values for share overhang and the opportunity cost of issuance, which is the focus of this study.

Table 1: IPO Characteristics

	1986-1989	1990-1998	1999-2000	2001-2004
Underpricing	7.58%	16.29%	65.64%	10.99%
Preexisting Shares	4.06	7.99	28.46	22.85
Secondary Sold	0.30	0.50	0.55	1.41
Primary Sold	1.54	2.52	6.06	9.38
Total Sold	1.84	3.02	6.61	10.79
Shares Retained	3.76	7.49	27.91	21.44
Share Overhang	2.61	2.50	4.40	2.57
Opportunity Cost	4.79%	5.18%	6.22%	4.00%

As suggested, underpricing is quite volatile, particularly over time. During the “internet bubble” of 1999-2000, underpricing averaged over 65 percent. However, consistent with an embedded option, owners retained a larger portion of their companies during this time, as overhang was quite high, thereby mitigating the impact of underpricing on owner’s wealth. The net result is that the true cost to owners (i.e., the indirect cost, or opportunity cost) was much less, averaging just over 6 percent. In fact, the opportunity cost remains relatively stable through time, suggesting that owners are able to exhibit a level of control over the process and that underpricing significantly overstates the indirect cost of an IPO.

Conclusion

Most textbooks address the topic of raising capital, which includes the process of issuing shares through an IPO. The textbooks appear to do a good job of addressing the direct costs such as gross spreads and legal fees; however, this is to be expected since they are more objective and standardized. While underpricing is also defined, it is typically treated in isolation, without regard to the share issuance decision. Thus, underpricing is considered a straight indirect cost. The potentially large level of underpricing suggests a large wealth loss for most owners.

However, consider what would happen if a firm went public by offering a single share. Any level of underpricing would have virtually no impact on the overall wealth of owners. Thus, textbooks should necessarily discuss the share structure of IPOs. In doing so, a more relevant cost can be calculated. Unfortunately, since textbooks fail to do this, it is the responsibility of instructors to illustrate this relationship and provide students with a better perspective. Doing so will enable these students, who are future business owners and investors, to make more rational decisions.

³ For the period 2005-2010, there was little change from the prior period of 2001-2004. Underpricing averaged 12% and OCI averaged 4%.

References

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Appendix A: Additional Example

Suppose Edison Electronics is going public. In conjunction with its underwriter, Edison has determined the offer price will be \$15 per share. Edison's current owners have 100,000 shares, 10,000 of which they will sell in the IPO. In addition, Edison plans to offer 5,000 new shares. After the offering, Edison's stock closes the first trading day at \$17.25 per share.

- a. How much new capital does Edison raise in the IPO?
*The primary shares represent new capital: $5,000 * \$10 = \$50,000$*
- b. What is the initial return (or underpricing) of the IPO?
 $(\$17.25 - \$15) / \$15 = 15\%$
- c. How much money is "left on the table?"
*Edison sold a total of 15,000 shares, each of which was sold for \$2.25 less than its market value: $15,000 * (\$17.25 - \$15) = \$33,750$*
- d. What is Edison's preexisting firm value?
The firm had 100,000 preexisting shares, and the market values the firm at \$17.25 per share, net of dilution. The dilution is the money left on the table from the new (i.e., primary) shares.
 *$Dilution = 5,000 * (\$17.25 - \$15) = \$11,250$*
 *$Preexisting\ value = (100,000 * \$17.25) + \$11,250 = \$1,736,250$*
- e. What is the true indirect cost of issuance?
The indirect cost is not the underpricing of 15%, but is the money left on the table relative to preexisting firm value. This cost is $\$33,750 / \$1,736,250 = 1.94\%$.