“Underpricing and underwriter wealth gains”

AUTHORS	William C. Johnson

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William Johnson (USA)

Underpricing and underwriter wealth gains

Abstract

The paper examines a subset of IPOs that have publicly traded underwriters and finds that these underwriters have positive abnormal stock price increases of 0.23% around the IPO prospectus filing date and 0.21% around the issue date for an average market capitalization increase of $64 million and $59 million, respectively. The paper investigates the potential sources of these underwriter wealth gains: the underwriter spread for the offering, enhanced reputation due to successful IPOs, and wealth transfers from IPO firms to underwriters. The author finds that underwriter wealth gains are concentrated on IPO offerings with the highest underpricing, consistent with wealth transfer from the IPO firm. Further, underwriters with the most ability to transfer wealth have the strongest relationship between underwriter wealth gains and underpricing. Finally, the article shows that the operating performance of the underwriter is related to the aggregated underpricing of new stock issues. On average, for every dollar of underpricing, the underwriter has a stock price increase of $0.45 and an annual sales increase of $0.16.

Keywords: initial public offerings, investment banks, underpricing.
JEL Classification: G24, G30.

In the aftermath of the subprime mortgage crisis, the issue of underwriter conflicts of interest is gaining the attention of the media and academia[1]. Since underwriters face a variety of clientele, they must serve their various clients in investment banking, broking, and asset management and at the same time, control the conflicts of interest inherent in these roles. This paper investigates the staged conflicts of interest faced by underwriters who first, set the offer price of the stocks that they underwrite, then give this valuable and generally underpriced asset to potential buy-side clients through the allocation of IPO shares. Underwriters may use the underwriting process to gain a reputation for fair dealing with both, IPO firms and institutional clients. This reputation may enhance underwriter value through ensuring a greater stream of cash flows from underwriting mandates in the future. Alternatively, if severely underpriced IPOs are allocated to investment bank preferred clients in return for higher trading commissions or more future business from these clients, this results in a direct wealth transfer from the pre-IPO shareholders to the owners of the underwriter. Such a wealth transfer will be observable for public underwriters in the form of higher stock and operating performance for the underwriters. I examine two potential sources of wealth gains for the underwriter: enhanced reputation from successfully taking a firm public and wealth transfers related to IPO underpricing. I use a subset of underwriters for my study, underwriters who are publicly traded at the time of their client's IPOs because these underwriters have stock and accounting data readily available.

When an IPO firm files its preliminary prospectus, the market should be able to estimate the approximate size of the overall offering and thus, the overall dollar value of commissions to be paid to the underwriter[2]. Therefore, the underwriter should have a stock price value increase equal to the net present value of the benefits from underwriting that particular IPO. This positive stock price movement should be equal to the sum of benefits from the underwriting fees paid to the underwriter plus any other benefits the underwriter can glean from the offering. In the cohort of IPOs from 1990-2005, the mean commission amounts to $8.3 million – it is clear that a successful offering should result in at least this amount of wealth generation for an underwriter. I find that there is a significant stock price response of 0.23% to the prospectus filing of the IPO for the underwriter amounting to a mean increase in market capitalization of $64 million. Initially it may seem that this stock price response is attributable to the commission revenue, but the dollar magnitude of this stock price move is almost ten times the commission revenue earned for the offering implying that the underwriter is obtaining some other benefit from the transaction besides the commission revenue. There is also a positive abnormal stock return of 0.21% for the underwriters around the issue date, a result that amounts to an increase in valuation for the underwriter of $59 million. The pur-

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[1] In the popular press, the Wall Street Journal Online reported on IPO stock offering conflicts of interest for underwriters on June 7, 2011. Underwriter conflicts of interest have also been investigated by Keys, Mukherjee, Seru, and Vig (2010) and Drucker and Mayer (2008), among others.

[2] Such an estimate will come from information about past issue sizes of firms in related industries as well as the size of the firm in terms of assets and sales. In general, underwriters receive a 7% spread or commission on offerings (see Chen and Ritter, 2000) so it is fairly easy to estimate the commissions the underwriter will receive, even if the exact offer size (in total dollars) is not available at the time of the preliminary prospectus filing.

pose of this paper is to study the wealth generation mechanism for underwriters and determine what happens to the IPO firm's money left on the table in the form of underpricing.

I propose two main hypotheses. The Reputation Hypothesis states that underwriters enhance their reputation by successfully taking IPO firms public resulting in an increase in underwriter value. For each initial public offering an underwriter helps to take public, they will gain a positive reputation for fair dealing with clients. This will ensure that the underwriter will in the future obtain a continuous stream of profitable business in the form of more future underwriting business. Thus, for each transaction that enhances underwriter reputation, the wealth of the underwriter should increase substantially, particularly if the stream from future underwriting business is large. Thus, the Reputation Hypothesis states that underwriters have wealth gains from underwriting IPOs successfully because they enhance their chances of getting more future business. The Wealth Transfer Hypothesis states that underwriters transfer the wealth of the IPO firm to themselves through the share allocation process. The underwriter may be substantially underpricing offering to allow the transfer of IPO firm wealth to its clients and through relationships with these clients, to itself. The Wealth Transfer Hypothesis states that the gains made by the underwriter are not wealth creation, but rather are a straight transfer of wealth.

I find that the relationship between the underpricing of the IPO and the stock return of the investment bank around the filing date and issue date is positive and statistically significant. In fact, for every dollar of underpricing, the investment bank has a wealth gain of $0.45 on the filing date[1]. After documenting a positive underwriter announcement day return and IPO offer day return, I then examine the source of these gains. I show that underpricing is significantly linked to the wealth gains for underwriters. However, underpricing could either be a measure of a successful IPO (and thus, enhance the underwriter reputation) or it may be a measure of the benefits from wealth transfer. To tease out the difference, I examine various subsets of firms that are more likely to have greater reputation enhancement or a greater propensity to transfer wealth from the IPO firm. My empirical tests are generally consistent with the Wealth Transfer Hypothesis, finding that wealth gains for underwriters with the highest benefits from reputation have no strong relationship with underpricing. In contrast, underwriters that seem most likely to transfer wealth from their investment banking division to their broking and asset management division seem to have the highest wealth gains associated with underpricing. I then use a discontinuity setup to check the impact of low underpricing compared to moderate underpricing and the highest levels of underpricing on the underwriter wealth gains. Inconsistent with the Reputation Hypothesis I find that moderate levels of underpricing are not associated with underwriter wealth enhancement. Rather, underwriters have large wealth gains only from the top quartile of underpricing, consistent with the Wealth Transfer Hypothesis. To ensure that my results are not caused by my experimental setup I run a battery of robustness checks and find qualitatively similar results. I find that my results are consistent both, before the internet boom and after.

Looking at accounting performance for the IPO underwriters, I demonstrate that annual revenues of the underwriter are related to the aggregate underpricing of IPOs taken public during a particular year. My results indicate that for every dollar increase in aggregate underpricing, there is a $0.16 increase in annual revenues for the underwriter. These results imply a relatively efficient transfer of wealth from the existing IPO shareholders to the shareholders of the underwriters.

I contribute to the literature in several ways. First, the academic literature and SEC investigations have examined the allocation of hot IPOs in very specific instances. Reuter (2006), and Ritter and Zhang (2007) are interested in the allocation of hot IPOs to mutual funds and the SEC has actively investigated IPO stock allocation practices at CSFB. Rather than study one investment bank (CSFB) or one class of shareholder (mutual funds), I investigate the systematic practice of IPO firm expropriation by 44 IPO underwriters. This work is significant in that it sheds light on how widespread the practice of trading underpriced shares for services such as inflated brokerage commissions has been. My second contribution relates to a question by Reuter (2006): "how many of the dollars left on the table the underwriters able to recapture?"[2]. I answer the question of how efficient the wealth transfer from the IPO to underwriter shareholders is defined, providing an underwriter benefit of $0.16 in revenues and $0.45 in market capitalization for every dollar left on the

[1] This result is quite close to the wealth transfer estimate given by the SEC in release 2002-14. "Specifically, CSFB allocated shares of IPOs to more than 100 customers who, in return, funneled between 33 and 65 percent of their IPO profits to CSFB." While this SEC release shows that one investment bank received direct benefits through wealth transfers, my paper shows that this was a systematic practice among all the underwriters in my sample.

[2] I define money left on the table as the underpricing of the IPO times the dollar value of the shares issued by the issuer.

table. Finally, I provide empirical support for the hypothesis that underwriters are actively exploiting firms issuing new equity. When IPO firms go public, they leave money on the table in the form of underpricing. Ritter and Welch (2002) point out that "there has been no academic research investigating how the money left on the table was split among buy-side participants…and sell-side participants (the stockholders of the investment banking firms through higher profits…)". My paper provides a quantitative measure of the gains made by the stockholders of the underwriting firm because of underpricing.

The paper proceeds as follows. In the next section of the paper I talk about the relevant literature and develop hypotheses to be tested. A description of the sample and summary statistics are provided in section 2 followed by the empirical analysis of the paper in section 3. The final section provides a summary of the results and concludes the paper.

1. Hypothesis development and related literature

There are several mechanisms that may lead to underwriter wealth gains at the time of an initial public offering. When an investment bank underwrites an IPO firm, the "spreads are the primary direct compensation of underwriters" (Chen and Ritter, 2000). Underwriters purchase the shares in the firm for the offer price, less the spread, and then sell (allocate) the shares to interested clients at the offer price, pocketing the difference as the underwriter's fee for service. Any wealth gains attributable to the underwriter from this service are strictly the result of carrying out a contract with the firm wishing to go public. The underwriter is performing a service for the IPO firm, earning a profit from this activity.

Another way for an underwriter to have a positive benefit from underwriting an offering is by enhancing its reputation for being a high quality underwriter. For instance, Dunbar (2000) finds that future underwriting market share is negatively related to first day underpricing implying that underwriters generating a reputation for high underpricing lose future business[1]. Thus, it appears that underwriters bringing higher-than-average quality firms to market (and not bringing low quality firms to market) and then pricing them fairly enhancing an underwriter's ability to obtain more future business (Chemmanur and Fulghieri, 1994).[2] In this sense, the underwriter's good performance in taking the current firm public enhances its reputation and ensures that future IPO firms will want to do business with this underwriter. When an underwriter successfully takes a firm public it may enhance its reputation and thus, have wealth gains attributable to the anticipated positive future cash flows from increased underwriting business.

Alternatively, an underwriter can enhance its value by transferring wealth from the pre-IPO shareholders of the firm to other underwriter clients who then provide a quid pro quo to the underwriter in the form of higher brokerage fees (Fulghieri and Spiegel, 1993; Nimalendran, Ritter, and Zhang, 2007; and Reuter, 2006) or by transferring wealth to other divisions within the investment bank (Johnson and Marietta, 2009; Mola and Guidolin, 2009). In this case, the underwriter is not creating any value per se, but is simply transferring wealth from one group of investors to another. This particular method of underwriter value enhancement is viewed quite negatively by regulators (SEC Release 2005-10, SEC filing 2002-14) and academics alike (Ritter, 2011). Aggarwal, Prabhala, and Puri (2002) find that the book-building process alone does not explain the high levels of underpriced stocks being allocated to institutional investors as opposed to retail investors. Their findings suggest that underwriters have a preference for allocating highly underpriced shares to institutional traders, traders who might have the ability to repay the allocation of underpriced stock with other banking business.

I propose two hypotheses concerning the wealth benefits to underwriters from taking firms public. The Reputation Hypothesis states that underwriters have positive wealth benefits from taking a firm public because doing so successfully leads to a greater future underwriting business. The Reputation Hypothesis has several testable implications. First, the underwriter should have a positive wealth gain when the IPO is announced and possibly when the stock is issued as well. This wealth gain occurs because when an IPO firm is successfully taken public, the underwriter gains a better reputation and will obtain more future mandates to take firms public. The resulting enhanced future cash flow stream causes a higher underwriter stock price today. It is important to note that successfully taking the firm public involves an optimal level of underpricing by the underwriter. As mentioned by Beatty and Ritter (1986), "an investment banker who cheats on this underpricing equilibrium will lose…issuers if it underprices too much". This result obtains because severe underpricing makes future issuers more likely to shy away from such an underwriter.

[1] Likewise, in the bond market, Fang (2005) shows that underwriters with a higher reputation can earn economic rents on their reputation providing strong incentives to maintain their reputational capital.

[2] Dunbar (2000) discusses in detail the underwriter Friedman Billings Ramsey Group which goes from being an unknown underwriter to becoming a top-ranked underwriter by bringing high quality firms to the market and at the same time, selling them with relatively low underpricing.

The second hypothesis I propose is the Wealth Transfer Hypothesis. This hypothesis states that underwriters make large gains in wealth not through providing good service to their clients, nor through enhancing their reputation for bringing good firms public, but through transferring wealth from pre-IPO shareholders to the shareholders of the underwriter. This concept was proposed by Fulghieri and Spiegel (1993) whose model shows that it is optimal for underwriters to allocate underpriced shares to a client who will then repay the allocation with higher business for the underwriter. Their findings support the idea that underwriters with multiple product lines (for instance, investment banks with an underwriting division, a brokerage division, and an asset management division) will have a spillover effect across their product lines when they allocate underpriced shares. The Wealth Transfer Hypothesis has several important empirical implications. As with the Reputation Hypothesis, the Wealth Transfer Hypothesis predicts that successfully taking a firm, public results in a positive wealth gain for the underwriter. But under the Wealth Transfer Hypothesis, the wealth enhancement by the underwriter comes at the expense of pre-IPO shareholders. These two hypotheses lead us to several testable implications.

H1: IPO firm underwriters have positive announcement day returns when they obtain a new mandate for underwriting an IPO. In addition, the underwriter will have a positive abnormal return at the time of the offering.

This first empirical prediction is consistent between both the Reputation Hypothesis and the Wealth Transfer Hypothesis. However, I need to control for the spread earned by the underwriter from the offering to ensure that I am not just observing the cash flow effect from the underwriter earning the spread. Because the announcement day abnormal return is discounted by the probability that the offering will not occur, the issue day will also have a positive abnormal return once the offering proceeds.

One important question is how to measure the successful offering of an IPO. Clearly successful offerings are necessary to enhance underwriter reputation (under the Reputation Hypothesis) or to allow the underwriter to transfer wealth (under the Wealth Transfer Hypothesis). One measure of a successful IPO is the first-day return (or underpricing) of the offering. An offering that has a highly negative first day return will imply that the underwriter will have trouble allocating shares in the future and hurt the reputation of the underwriter with its institutional clients (Beatty and Ritter, 1986). In contrast, an excessively undervalued offering (high first-day return) will result in losses to the underwriter reputation with firms wishing to go public since the offering will discourage issuers from using this underwriter for future offerings (Dunbar, 2000). In contrast, the Wealth Transfer Hypothesis predicts that underwriters are able to transfer more wealth through allocating more underpriced shares. This leads us to our next testable implication.

H2: The Reputation Hypothesis (Wealth Transfer Hypothesis) predicts that underwriters will have reputational gains from taking a firm public with moderate (high) level of underpricing.

Both the Reputation Hypothesis and the Wealth Transfer Hypothesis predict that a negative first day stock return is bad news for the underwriter. But the Reputation Hypothesis predicts that a moderate level of underpricing is optimal for the underwriter to please both, its underwriting clients and the institutions who receive the allocated shares (Beatty and Ritter, 1986). In contrast, the Wealth Transfer Hypothesis predicts that the higher is the underpricing, the greater are the wealth gains for the underwriter.

If the underwriters are able to successfully take the firm public, then the underwriter abnormal return should be associated with some benefits for the underwriter. Low reputation underwriters can increase the value of their reputation (and thus have gains in market share in the future) by bringing even one high quality IPO firm public. In contrast, a high reputation underwriter cannot increase their reputation much through a single offering since the marginal impact of one offering on a high quality underwriter is small. This implies that under the Reputation Hypothesis, the reputational enhancement for bringing high quality IPOs to market with moderate underpricing will be very high for low reputation underwriters, but the reputational enhancement for high reputation underwriters will be small[1]. In contrast, the Wealth Transfer Hypothesis yields the prediction that high reputation underwriters are better able to extract rents from IPO firms relative to low reputation underwriters since they have greater influence over the firms they take public. This leads us to our next hypothesis.

H3: The Reputation Hypothesis (Wealth Transfer Hypothesis) predicts that low (high) reputation underwriters will have higher wealth benefits from taking a firm public successfully.

[1] This prediction is somewhat different from Dunbar (2000) who suggests that high reputation underwriters have more reputational capital at state and, therefore, are less likely to excessively underprice their offerings. In the event that they do excessively underprice their offerings, high reputation underwriters suffer larger declines in market share.

As a measure of high (low) reputation, I use the following proxies: IPO underwriters with a Carter and Manaster (1990) rank of 9 (below 9); IPO underwriters with above (below) the median market capitalization.

I also consider the impact of the underwriter structure on the Reputation Hypothesis and the Wealth Transfer Hypothesis. Ljungqvist (2003) provides empirical evidence of this effect in the British IPO market demonstrating that IPO firms utilizing underwriters more specialized in corporate finance (investment banking) experience lower underpricing. This observation is important since underwriters with fewer broking services or asset management clients will have fewer clients to allocate underpriced shares to and therefore, fewer routes of obtaining payback from these clients. Based on the Wealth Transfer Hypothesis, firms with greater conflicts of interest (larger asset management and broking businesses) will have larger conflicts of interest and thus, are more likely to have greater wealth transfers across divisions. In contrast, the Reputation Hypothesis predicts that firms more focused on corporate finance (less asset management and broking) will mostly benefit from the reputational enhancement of taking firms public. This leads to our final empirical prediction.

H4: The Reputation Hypothesis (Wealth Transfer Hypothesis) predicts that concentrated (diversified) IPO underwriters will have larger benefits from taking firms public successfully.

Although US underwriters are much more homogeneous in terms of structure than the British underwriters (Ljungqvist, 2003), I use firms with below (above) the median percent of total revenues associated with the investment banking business of the underwriter as a measure of diversified versus concentrated underwriters.

2. Data and summary statistics

2.1. Data. The sample of firms consists of IPOs between 1990 and 2005. I obtain the initial sample of IPOs from the Security Data Corporation (SDC) new issues database. I choose this time period because prior to 1990, there were only ten unique publicly traded underwriters[1]. I conclude my sample in 2005 due to the substantial drop in the number of initial public offerings after this point. Unit offerings, closed-end funds, Real Estate Investment Trusts (REITs), American Depository Receipts (ADRs), and firms with an offer price below $5 are excluded from the sample. I also eliminate all banks, S&Ls, and utilities firms. These screens yield an initial sample of 4,849 IPOs.

I am interested in determining the effect of the IPO on the investment bank that has underwritten the issuance so I require information about the operating performance and stock performance of the underwriter of the IPO. I go through the list of book runners to see if the underwriter is a publicly traded firm at the time of the initial prospectus filing[2]. I match the underwriter name to the universe of names in the CRSP database, using the SIC code in CRSP for assistance in matching firm names. I eliminate all IPOs with lead underwriters that are not publicly traded at the time of the preliminary prospectus filing. I also track all lead underwriter divisions back to their parent company. For instance, First Union Capital Markets is a subsidiary of Wheat First Union (Permno 36469) throughout my sample and as such, offerings underwritten by First Union are identified with Wheat First. As another example, Merrill Lynch, Pierce, Fenner & Smith during my sample period is a subsidiary of Merrill Lynch and Company and therefore is assigned Permno 52919. This leaves a sample of N = 1,501 IPOs with at least one lead (or co-lead) book runner that is public at the time of the preliminary prospectus filing. Since my unit of observation is the underwriters, when there are multiple public book runners, I consider them all as observations in my sample leading to N = 1,630 underwriter observations[3]. Note that many of the underwriters also went through IPOs themselves within our sample time period. These offerings are excluded from our sample since in the process of its own IPO, the investment bank typically acts as its own underwriter. For instance, Friedman Billings Ramsey Group went through an initial public offering on December 29, 1997 and acted as its own underwriter. This observation is omitted from the sample.

To calculate the underpricing of the IPO firms, I use the offer price as listed in the SDC database and use the first closing price listed in CRSP. Operating performance and underwriter characteristics are obtained from the COMPUSTAT database. In addition, I have hand collected net revenue information by corporate division (typically

[1] There were 13 initial public offerings of underwriters in the late 1980s and early 1990s including Shearson Lehman Brothers and Morgan Stanley.

[2] In this paper, I use the term underwriter, lead manager, and book managers interchangeably. I only examine book runners in this study, consistent with Dunbar (2000), since the book manager is the institution responsible for collecting indications of investor interest and then allocating shares to institutions.

[3] My results are not significantly affected if I repeat my tests excluding IPOs with multiple book runners or if I create a portfolio of returns for IPOs with multiple book runners.

investment banking, broking, and asset management) for a subset of the IPO underwriters from the prospectus and annual reports (10-K) from the SEC's Edgar database[1].

2.2. Summary statistics. Table 3 (Appendix B) reports the total number of IPOs and the number of IPOs with public lead underwriters by year[2]. I find that like the frequency of all IPOs, the frequency of IPOs with public underwriters peaks in the mid to late 1990s. Also, the percent of funds raised in IPOs with public underwriters accounts for about 59% of the total offerings suggesting that these offerings tend to be large. These results imply that IPOs with public underwriters are distributed over time similarly to the universe of IPOs despite the changes occurring in underwriting business structure throughout this period[3]. Note that over the sample period, the percent of IPOs being underwritten by public underwriters is greatly increasing. This is largely the result of many of the largest investment banks either becoming public firms, or merging with public firms.

Panel B of Table 3 shows the breakdown of IPOs by the presence of public book runners and joint public book runners. Most of the sample (N = 1,387) consists of IPO firms with a single public book runner, with about 15% of our sample consists of IPO firms with multiple public book runners[4]. In Panel C of Table 3 I show that the universe of IPOs from 1990-2005 has 567 unique book runners. Of these, 523 of these underwriters are not publicly traded at the time of the IPO and 44 of them are. The current study is focused on these 44 public underwriters. Table 2 (Appendix B) contains the names of the public underwriters in this study[5].

I examine a subset of IPOs so it is important to understand any systematic differences between the universe of IPOs and the subset examined. Table 4 (Appendix B) provides some characteristics of the IPOs that do not have a public underwriter and IPOs that do. I find that the IPOs without public underwriters have an average proceeds size of $50 million. This figure is statistically different from the average size of proceeds by the IPOs with a public underwriter ($126 million). Another major difference between the IPOs with non-public underwriters and public underwriters is in the amount of underpricing and money left on the table. IPOs with non-public (public) underwriters have underpricing of 18.5% (28.1%) and leave $10.5 million ($29.7 million) on the table. The difference between the non-public and public underwriten IPOs in these respects is highly significant.

Table 4 also shows that the post-IPO market capitalization based on the first day of trading closing price for IPOs with a public underwriter are significantly larger at $748 million compared to IPOs without a public underwriter at $240 million. The assets of public underwriter-backed IPOs are also larger than non-public underwriter IPOs. The average underwriter rank for IPOs with a public underwriter is 8.5 compared to the average of 7.5 for IPOs with a non-public underwriter. Firms choosing a public underwriter are 15.9 years old compared to the 12.9 years from founding for firms choosing a non-public underwriter. Firms with public underwriters are more likely to be venture capital backed (43.8% versus 37.5%), have slightly lower spreads (6.79% versus 7.42%) and have higher offer price revisions (4.4% versus 0.0%) compared to the non-public underwritten securities. In addition, IPO firms that are underwritten by a public underwriter are not on the AMEX, NASDAQ, or NYSE 3.5% of the time versus 16.1% of IPOs that are underwritten by non-public underwriters. I also find that the percent of IPOs in technology industries is higher for IPO firms with public underwriters (33.5% versus 30.6%). Overall, these results imply that the securities underwritten by public underwriters are larger, more mature firms with higher ranked underwriters.

[1] I use annual reports for the underwriters as posted in the SEC's Edgar database to find the net revenues for the investment banking (corporate finance) division versus the other divisions. Although the disclosure of revenues by division is not completely homogeneous by firm, most firms separate out investment banking (also called corporate finance) from the other divisions (generally an asset management division and a broking division). Due to the fact that some firms disclose 3 divisions, some disclose 4, and some disclose 5, I examine the ratio of all investment banking revenue to total revenue for our measure of underwriter diversification.

[2] As an example of the data in my sample, on September 24, 1998 Goldman Sachs was the lead underwriter for Ebay. This observation is not included in sample of IPOs with a public underwriter as Goldman Sachs was not publicly traded in 1998. On May 4, 1999 Goldman Sachs went through an initial public offering with itself as the lead underwriter. This observation, likewise is not considered because Goldman Sachs is not public at the time of the preliminary prospectus filing. However, on December 14, 2004 Goldman Sachs was the lead underwriter for the Las Vegas Sands Corporation. This observation is included in the IPOs with a public underwriter. Because Merrill Lynch is publicly traded for the entire sample period, all IPOs underwritten by Merrill Lynch are included in the sample.

[3] First there are several underwriters that go through IPOs during our sample period, for instance, Goldman Sachs. Second, Ljungqvist, Marston, and Wilhelm (2006) document that there are many underwriter mergers from 1988-2002. In the year of a merger, I consider underwriters as though they are part of the parent firm at the beginning of the calendar year. This technique should bias against my findings.

[4] My finding that few IPO firms have multiple public book runners is biased since I only consider publicly traded book runners. Hu and Ritter (2007) show that the incidence of multiple book runners increases substantially starting in 2004.

[5] Our list of public underwriters closely resembles Hoberg (2007) who lists N = 41 underwriters that have at least 15 IPOs from 1980-1997.

Since I am interested in looking at the underwriter response to the IPO, understanding the underwriter characteristics is important for this study. Table 5 (Appendix B) reports the characteristics of the 44 public underwriters in this study. First, the market capitalization for the public underwriters as $28.1 billion at the time of the IPO. The total asset measure is significantly larger than the market capitalization at $297 billion. The public underwriters have annual revenues of $22.7 billion and underwrite an average aggregate IPO proceeds of $2.68 billion in one year. The IPO firms an underwriter takes public in a year leave $750 million in aggregate on the table in underpricing. Underwriting firms tend to be considerably larger than the firms they take public with an average bank asset ratio to IPO asset ratio of 1710:1. On average, the investment banks in my sample underwrite 7.8 IPOs per year.

3. Empirical results

3.1. Underwriter returns on the IPO filing date and IPO issue date. When an IPO firm goes public, it pays a direct fee to the underwriter in the form of the gross spread. A successful IPO should cause the underwriter stock price to increase by the dollar value of the gross spread (less any costs for generating the revenue). However, the average underwriter market capitalization in this sample is quite large at $28 billion meaning that any increase in sales from an underwriting mandate must have a large impact to result in a detectable change in underwriter market capitalization. Further, when a firm files it preliminary prospectus, it is not guaranteed that the firm will go public. Dunbar and Forester (2008) find that 20% of all initial prospectus filings are withdrawn from the market. This implies that any wealth effects from the underwriter mandate will be split between the filing date (where returns will still be discounted by the likelihood that the offering will be withdrawn) and the offering date.

In Panel A of Table 6, I examine the stock return of the public underwriters around the preliminary prospectus filing date for the IPOs in my sample. The tabulated returns are market model adjusted returns using the previous year's daily returns to calculate the stock beta[1]. I report the average stock returns on the day before, the day of, and the day after the IPO filing date (FD) along with a two day, three day, and 11 day window. I find that the mean returns are often positive and are in general statistically different from zero. This result implies that at the time of the filing date, the market imputes a certain wealth gain to the underwriter. As an example of the data, when Ingram Micro files its preliminary prospectus on July 19, 1996, Morgan Stanley, the underwriter for the offering has a market model adjusted stock price response of 0.10%. I find that in general, the underwriter stock price movement is positive and statistically significant on the day after the filing date (FD) in addition to the three day, and 11 day window CAR. For all the observations in the sample, the average three day return is a statistically significant 0.23% amounting to an average market capitalization increase of $64 million.

In Panel B of Table 6 I tabulate the underwriter market model adjusted returns on the issue day of the IPO (ID). I find that the market model adjusted return on the day before and the day of the issue date are all positive on average, although not statistically significant. However, the average abnormal return the day after the offering is a statistically significant 0.13%. Over the window from ID-1 to ID+1 (ID-5 to ID+5), I find that the average market capitalization increases by a statistically significant 0.21% (0.32%) or $59 million ($89 million). As an example of the data, when Ingram Micro goes through its initial public offering on October 31, 1996, Morgan Stanley, the underwriter for the offering has a market model adjusted stock price response of 0.25%. The magnitude of this result is quite large economically and the abnormal return is different from zero at the 5% level.

I have shown that the underwriter has wealth gains that average far above the $8.8 million around the IPO filing and offer date. This fact points to another source for the underwriter wealth gains in addition to the value of the business relationship with the IPO firm. I have shown that the stock price response for the investment bank on the filing date ($64 million) and the issue date ($59 million) is substantially larger than the direct cash flow benefits from the underwriting mandate.

I now examine the relationship between underpricing and the underwriter stock returns. If underwriters are benefiting from underpricing, then underwriter returns should be higher when underpricing is higher. I follow Aggarwal, Prabhala, and Puri (2002) in segregating IPO firms into firms with a negative first day return, returns from 0% to 20%, and returns more than 20%. I then tabulate the underwriter abnormal returns for these three groups of IPOs in Table 7 (Appendix B)[2]. These results show that for

[1] This process further restricts the sample to underwriters that have been public for at least 90 days, the minimum amount of time I require to estimate the beta.

[2] Segregating the firms into other categories leads to similar results. For instance, separating the IPO into thirds by underpricing, leads to only the top third of underwriters having a positive and significant abnormal return. Likewise, separating the IPOs into quartiles by underpricing, leads to only the top quartile yielding a positive and significant abnormal return for the underwriters.

IPOs with negative first day returns, the average underwriter return on the filing date (issue date) is -0.17%, (0.12%), a figure that is not different from zero. The returns to underwriters of moderately underpriced IPOs average 0.19% on the filing date, a figure that is positive but insignificant at the 10% level. On the issue date, the average underwriter return is a statistically insignificant 0.04%. The returns for underwriters of the most underpriced IPOs average 0.46% on the filing date and 0.52% on the issue date. These figures are statistically significant at the 5% level and 1% level, respectively. Thus, it appears that underwriters have quite large stock price gains on the filing date as well as on the issue date if the IPO stock is heavily underpriced. An interesting artifact is that the underwriter has large wealth gains on the day of the prospectus filing if the underpricing of the stock is high in the future. In this sense, it appears that the market is capable of anticipating highly underpriced IPOs.

My results thus far have shown that IPOs with higher underpricing seem to be associated with greater wealth gains for underwriters. However, it is not clear as yet if this is because highly underpriced IPOs contribute substantially to the underwriter reputation or if the underwriter of such an IPO is capable of extracting greater wealth from such an IPO. Likewise, these results could be caused by a clustering effect of offerings in hot IPO markets. If high underwriter returns are caused by something other than underpricing, but occur when underpricing is high, then we would see the exact results reported in Table 7. To control for these possibilities, I now move on to a multivariate regression framework.

3.2. Determinants of underwriter returns − ordinary least squares. I have shown that an investment bank generally has a positive abnormal return on the filing date and the issue date of IPOs that the bank underwrites, particularly when underpricing is high. I now use a multivariate regression to study the determinants of this abnormal return. I include year dummy variables in my regressions to be sure that annual variation in underpricing and underwriter returns are not driving the results. As control variables in the regression, I include the market capitalization of the underwriter, the log of the offering proceeds, the underwriter rank, log(1 + IPO firm age), an indicator for a venture backed firm, and the ratio of underwriter assets/IPO firm assets. Several of these controls could be considered proxies for underwriter bargaining power including underwriter market capitalization (positively related to bargaining power), underwriter rank, (positively related to bargaining power) firm age, (negatively related to bargaining power) venture backing of the IPO firm, (negatively related to bargaining power) and the asset ratio of the underwriter to the IPO firm (positively related to bargaining power).

If the positive announcement day and issue day returns of underwriters are explained by the spread of the offering then there should be a positive relationship between the underwriter return and the spread. In Panel A of Table 8 I report regressions using the the 3 day underwriter abnormal return on the prospectus filing date as the dependent variable. In model (1) the coefficient for the bank market capitalization is negative and marginally statistically significant. Thus, I can see that the larger the underwriter is, the lower the underwriter's returns are on the filing date. The underwriter rank is positively, but not statistically significantly related to the underwriter return. However, when the IPO firm is venture backed, it results in a statistically significant decline in filing date returns of -0.40%. This result may imply that adding a third party into the underpricing negotiation process, the venture capitalist, helps to moderate the amount of wealth that the underwriter can expropriate from the IPO firm. I also find that the larger the asset ratio, the more wealth the underwriter gains from the offering. For instance, moving up one standard deviation in asset ratio from 1,710 to 5,040 results in an increase in the underwriter return of 0.21%. These results are largely consistent with the Wealth Expropriation Hypothesis. Perhaps the most telling result in model (1) is that the underwriter spread is not significantly related to the underwriter wealth gains. This could be due to the wealth gains not being significantly caused by the spread itself or by the lack of dispersion in the spread (naturally if all spread values are identically 7%, then the spread effect will be mingled with the intercept term in the regression).

I am interested to see exactly what mechanism is operating to allow the underwriter to make such large wealth gains. The obvious test is to see if the underwriter wealth gains are related to the underpricing of the IPO firm. Model (2) shows that the IPO underpricing is positively related to the underwriter price gains and this relationship is statistically significant at the 1% level. This result implies that an increase in underpricing of one standard deviation from 28.1% to 87.2% results in an increase in underwriter returns of 0.14%. Thus, it appears that the correlation between underwriter returns on the issue date and the underpricing of the offering is both economically and statistically significant. However, as mentioned earlier, this positive relationship between underpricing and underwriter wealth

gains could be either because of the reputation effects of successfully taking a firm public or because of wealth transfers to the underwriter.

To distinguish between the benefits from reputation building under the Reputation Hypothesis and wealth transfers under the Wealth Transfer Hypothesis, I separate the sample into firms likely to benefit from reputational enhancement (low reputation underwriters) and those most likely to be able to expropriate wealth from the underwriting clients (high reputation underwriters). I use proxies of high Carter and Manaster (1990) ranking (low ranking) and large size by market capitalization (low market cap) for underwriters most likely able to obtain wealth gains from having high underpricing through wealth transfers (enhanced reputation). In models (3)-(6), I show that high rank underwriters and large underwriters have wealth significantly associated with underpricing where low rank and small underwriters do not. This result implies that underwriters most able to expropriate wealth from the IPO shareholders have positive and significant gains from high levels of underpricing. In contrast, underwriters most likely to be helped by underwriting a successful IPO (low rank underwriters and small underwriters) have no significant relationship between underpricing and the underwriter wealth gains. Thus, our results strongly support the Wealth Transfer Hypothesis but provide little support for the Reputation Hypothesis.

I then separate my sample into underwriters that are likely to have conflicts of interest based on their corporate structure (diversified underwriters) and those that are less likely to have conflicts of interest (focused underwriters). For the subset of underwriters available in the SEC's Edgar database, I classify firms as being diversified is less than the median amount of their net revenue is generated by corporate finance (as opposed to broking or asset management services). I focus on this measure in particular since Ljungqvist (2003) reports that underwriters with operations more focused on corporate finance are less likely to be subject to conflicts of interest. In models (7) and (8) I find that the diversified underwriters, those with the highest propensity for conflicts of interest problems, show a strong relationship between underwriter CAR(-1, 1) and underpricing of the IPO, suggesting that the firms with potential conflicts of interest are driving a substantial portion of our results.

I then move on to the underwriter issue day return, examining the relationship between the underwriter CAR(-1, 1) on the controls and explanatory variables previously discussed. I find that the underwriter spread is positive and significantly related to the underwriter CAR(-1, 1) on the IPO issue date suggesting that there is some wealth impact on the IPO underwriter from the spread earned (Panel B of Table 8). However, even after controlling for the spread, there is still a positive and significant relationship with the underpricing of the IPO issuer. When I examine the sample separated by high investment banking reputation and focused versus diversified underwriters, I find qualitatively similar results with the exception of the focused underwriter proxy. I find in model (8) that focused underwriters actually have a positive and significant relationship between underpricing and underwriter wealth gains suggesting that for this subset of firms, there may be some reputational benefit to the underwriter. When I examine the relationships in model (9) including the announcement day return, I find qualitatively similar results with no significant relationship between the announcement day return and the issue day return for the underwriters.

A significant portion of underpricing may be anticipated by market participants, suggesting that our results may be driven by the expected underpricing of the offering. Dunbar (2000) uses a technique to eliminate anticipated underpricing by regressing underpricing on the log of proceeds, the proceeds, and two indicator variables: one for the offer price revision being above original range set and one for the offer price revision being below the original range set. I repeat his technique using a four-year rolling window and calculating the residual (abnormal) underpricing for each issue. In Panel C of Table 8 I repeat the analyses performed previously for the filing date return (model (1)) and the issue date return (model (4)) using the abnormal underpricing as an explanatory variable. I find that the use of abnormal underpricing versus raw underpricing does not appreciable change the results: abnormal underpricing is still significantly related to the underwriter abnormal filing day and issue day returns[1].

I also separate the underpricing variable into tercile and quartile indicator variables to see if the underpricing is linearly related to the underwriter abnormal return. Beatty and Ritter (1986) suggest a nonlinear relationship where a moderate level of underpricing should be positively and significantly related to the reputation build through the offering. Thus, the Reputation Hypothesis suggests that medium levels of underpricing (the middle third of underpricing or quartile 2 and 3) should be significant but the highest levels of underpricing (the top tercile or the top quartile) should be insignificantly (or even

[1] The correlation between raw underpricing and abnormal underpricing is quite high at 0.84.

negatively) related to the underwriter abnormal return. In contrast, the Wealth Transfer Hypothesis suggests that wealth transferred from the IPO firm to the underwriter will be monotonically increasing in underpricing since more highly underpriced IPOs are more valuable to allocate. My results in Panel C Table 8 show a monotonic increase in underwriter filing date CAR(-1, 1) for the tercile indicators (model (2)) and quartile indicators (model (3)). The results are qualitatively similar for the issue date CAR(-1, 1) as reported in models (5) and (6) although the results are not statistically significant.

On the whole, Table 8 shows strong support for the Wealth Transfer Hypothesis with only limited support for the Reputation Hypothesis. When I repeat my analyses in Table 8 using industry indicators, I find qualitatively similar results. I also find no sensitivity to include variables such as the offer price revision, or Hoberg's (2007) underwriter premium. Likewise, my results are not significantly impacted by including underwriter indicator variables in my regressions. I also split my regressions in time, examining IPOs before versus after March 31, 2000, the peak of the stock market during the internet boom. I find that the underpricing is positive and significantly related to underwriter wealth gains on the filing date both before March 31, 2000 (t-statistic = 2.72) and after March 31, 2000 (t-statistic = 4.66) indicating that the relationship is robust to time periods outside the internet boom. In contrast, the issue date results are not consistent across time periods with a positive and significant relationship between underpricing and underwriter wealth gains before March 31, 2000 (t-statistic = 2.56) but a negative and insignificant results after March 31, 2000 (t-statistic = 0.56). I also generate a portfolio of underwriter returns for the N = 1,501 unique IPO firms and repeat my analyses on this portfolio and find no substantial change in the results in the paper. Overall, my results paint a fairly compelling picture that underwriters have large gains from setting IPO offer prices low for a subset of offerings, and then allocating these underpriced offerings to either preferred clients, or other divisions within the underwriter.

3.3. Determinants of underwriter returns controlling for endogeneity. Thus far, my analysis has assumed that underwriters take firms as they are and try to extract wealth gains from the firms based on the exogenous underpricing of those firms. In reality, underwriters have a great deal of discretion in the pricing of the IPO firm leading to a potentially endogenous relationship between the underpricing of the firm and the filing date and issue date return of the underwriter. As such, viewing underpricing as an exogenous variable leads to model mis-specification and inconsistent estimates of the coefficients. To correct for this I use a two-stage least squares instrumental variables approach similar to Cliff and Denis (2004). The first stage regression uses the vast literature on underpricing to predict the IPO firm underpricing. The explanatory variables for underpricing are taken from Cliff and Denis (2004). I include the number of IPOs in the same or previous month, the average underpricing of IPOs in the same or previous month, the underwriter spread, the offer price revision, a dummy variable for firms that are not traded on the NASDAQ, AMEX, or NYSE, and the market return over the prior three weeks leading up to the IPO date as instruments for the underpricing. In addition, I include all exogenous variables used to estimate the filing date and issue date return of the underwriter. The first stage coefficients are largely consistent with the empirical literature concerning underpricing in terms of coefficient sign and statistical significance.

Once estimated, the instrumented underpricing is included in the second stage regression with the underwriter return as the dependent variable[1]. Note that the filing date return of the underwriter (column 2 of Table 9 in Appendix B) is negatively related to the bank market capitalization and venture backing of the IPO but positively related to the IPO proceeds, underwriter rank, and the ratio of bank assets to IPO firm assets. These results are largely consistent with the results of the OLS regression in Table 8 with the exception that the underwriter rank coefficient and the log proceeds coefficients are now statistically significant. This variable implies that for an increase of one standard deviation in the offering size from $125 million to $448 million results in a stock price increase for the underwriter of 0.09% on the filing date.

The results in Table 9 are largely consistent with the Wealth Transfer Hypothesis. First, a higher ranked underwriter and a larger underwriter relative to the IPO firm will have more bargaining power in the relationship. This will allow the underwriter to expropriate more wealth from the IPO firm. The coefficient on the underwriter rank is also positive and statistically significant. This result implies that an increase from a rank of 8 (just below the average) to a rank of 9 (the highest underwriter rank) results in an increase in the underwriter return of 0.23%. An increase of one standard deviation for the asset ratio from 1,710 to 5,040 results in an increase in the underwriter return of 0.26%. A third party monitor of the IPO transaction may help to reduce the ex-

[1] I follow Cliff and Denis (2004) including year dummy variables only in the first stage regression, not in the second stage regression. Including year dummies in the second stage regression induces collinearity problems.

propriation of the IPO firm if the party has a repeat relationship with the underwriter. In the present context, I assume that venture capitalists can serve in this capacity. I find that the underwriter returns on the day of the filing are reduced by a statistically significant 0.37% if the IPO is backed by a venture capitalist. The coefficient on the underpricing instrument is also positive and statistically significant, consistent with the expropriation hypothesis. As noted by Cliff and Denis (2004) the interpretation of the second stage coefficients is somewhat complicated by the fact that some of the exogenous variables predict both the underpricing instrument as well as the underwriter return. This collinearity between the underpricing instrument and the other exogenous variables increases the standard errors of the coefficients in the regression and may change their magnitude as well.

I then test the relationship between the issue date underwriter return and the underpricing of the IPO using a similar two-stage least squares approach. The first stage coefficients are consistent with the earlier regression. I find that only the underpricing instrument has a statistically significant relationship with the underwriter returns. This result is consistent with the OLS regression which showed there to be no relationship with any of the variables explaining the return other than underpricing. The coefficient on the underpricing instrument is positive and statistically significant and like the OLS regression, the coefficient is larger in magnitude for the issue date return than for the filing date return. This result implies that the issue date return is largely related to only the underpricing of the IPO firm.

3.4. Underpricing and underwriter accounting performance. I now examine the accounting performance of the underwriter and its relationship with IPO underpricing. I first merge the underpricing information for each IPO underwritten by a public underwriter with the accounting variables for the underwriter in the annual COMPUSTAT database. Since I am using annual data, I must aggregate the total proceeds of the underwriters and the money left on the table for all IPOs underwritten within a fiscal year. I scale the dependent variable, underwriter revenues, total IPO proceeds and total money left on the table by the underwriter assets. I also include the value-weighted market return in the fiscal year of the underwriter as a control variable. The results of the accounting regression are contained in Table 10. Note that in the process of aggregating the results on an annual basis, I lose the individual observations for each IPO and now only have annual observations for the underwriters themselves.

The results in model (1) show that the revenues for the investment bank are not higher simply because the market returns in the year is higher. It is important to control for the overall market return since underwriter revenues may simply be higher because stock prices in general are moving up. Regression model (2) shows that the underwriter sales are positively related to the aggregate annual proceeds that an underwriter takes public in one year. This result is consistent with the idea that the spread itself helps the underwriter to have positive wealth gains from taking firms public. Model (3) shows that the underwriter revenues are also positively related to the aggregate money left on the table by the firms taken public. This result implies that an increase of $1 in the money left on the table results in an increase of $0.16 in the revenues of the underwriter in the IPO year. Although these results are considerably smaller than the estimation of the SEC concerning Credit Suisse First Boston, they are still astoundingly large. With an average annual dollar amount of money left on the table of $750 million for the IPOs that these underwriters take public, this is a wealth transfer of $120 million per year. Models (4)-(6) in Table 10 show that the results are robust to the inclusion of year dummy variables.

A few notes are necessary here concerning the results of Table 10. First, the framing of the discussion thus far has largely ignored the fact that not all investors allocated hot IPOs will repay the underwriter through quid pro quo activities. Further, some investors (such as small institutional investors or retail investors) may be unwilling or even incapable of any sort of quid pro quo activities. This result implies that for each dollar in money left on the table, the institutional investors taking part in quid pro quo activities actually do so to a much larger extent than implied by the previous results. Aggarwal, Prabhala, and Puri (2002) show that underwriters allocate 56%, 73%, and 76% of their IPOs to institutional investors for classes of stock with underpricing of less than 0%, 0-20%, and greater than 20%, respectively. If only half of all investors return the favor of being allocated underpriced shares by, for instance, trading at inflated brokerage fees, then the results in Table 10 imply that the wealth transfer from IPO firm to underwriter may actually be closer to 32%, not the 16% discussed above. This figure is high but within the 33-65% range estimated by the SEC for CSFB, and implies a very efficient method for underwriters to expropriate the wealth of IPO firms. It is also relevant to recall that underwriters can obtain financial benefits by allocating underpriced IPOs within their own institutions to their mutual funds (Johnson and Marietta, 2010), another way to recoup the benefits of underpricing.

Conclusion

I have presented evidence concerning the source and size of wealth gains by the underwriters of IPOs. My results suggest that underwriters have some wealth gains associated with the spread of the offerings they take public. I find limited evidence that underwriters have wealth gains from using IPOs to generate a high reputation for underwriting high quality IPO firms. The underwriter wealth gains on the filing date are strongly related to underpricing as well as to the relative bargaining power of the underwriter compared to the IPO firm. This result provides strong support for the Wealth Transfer Hypothesis. Further, revenues for the underwriters are related to the underpricing of the issues they take public. The current work has added to the literature concerning IPOs by showing that for every dollar left on the table by an IPO firm, the underwriter has a wealth gain of $0.45 and a revenue increase of $0.16.

This paper does not explore the exact mechanism of this wealth transfer from IPO firm shareholders to the underwriter shareholders. The literature has shown several mechanisms for wealth transfer including investors trading at inflated brokerage costs (Reuter, 2006, laddering Binay, Gatchev, and Pirinsky, 2007), and market making activities (Ellis, Michaely, and O'Hara, 2000). The fact that underwriters make wealth gains averaging $64 million on the filing date and $59 million on the issue date implies that the benefits of underwriting stock must be very great indeed. The average money left on the table for an underwriter is only $29.7 million so the wealth gains by the underwriter exceed the wealth gains from the money left on the table by over two times. This result is related to the findings of Golstein, Irvine, and Pucket (2006) who show that most underpriced shares will be allocated to repeat customers, not short-term traders. As such, it appears that the benefits of underpriced stock reach far beyond just the dollar return of the underpriced stock itself, but include the ability of the underwriter to forge long-term relationships with preferred clients.

References

1. Aggarwal, R., N. Prabhala, and M. Puri (2002). Institutional allocations in initial public offerings: Empirical evidence, *Journal of Finance*, 57, pp. 1421-1441.
2. Binay, M., V.A. Gatchev, and C. Pirinsky (2007). The role of underwriter-investor relationships in the IPO process, *Journal of Financial and Quantitative Analysis*, 42, pp. 785-809.
3. Beatty, Randolph, and Jay R. Ritter (1986). Investment banking, reputation, and the underpricing of initial public offerings, *Journal of Financial Economics*, 15, pp. 213-232.
4. Carter, Richard B., S. Manaster (1990). Initial public offerings and underwriter reputation, *Journal of Finance*, 45, pp. 1045-1065.
5. Cliff, Michael T., and David J. Denis (2004). Do initial public offering firms purchase analyst coverage with underpricing? *Journal of Finance*, 59, pp. 2871-2901.
6. Chemmanur, T. and P. Fulghieri (1994). Investment bank reputation, information production, and financial intermediation, *Journal of Finance*, 49, pp. 57-79.
7. Chen, H., and J.R. Ritter (2000). The Seven Percent Solution, *Journal of Finance*, 55, pp. 1105-1131.
8. Dunbar, C.G. (2000). Factors affecting investment bank initial public offering market share, *Journal of Financial Economics*, 55, pp. 3-41.
9. Dunbar, C.G., and Forester, S.R. (2008). Second Time Lucky? Withdrawn IPOs that Return to the Market, *Journal of Financial Economics*, 87, pp. 610-635.
10. Drucker, S. and C. Mayer (2008). Inside information and market making in secondary mortgage markets, Working paper, Columbia University.
11. Ellis, K., R. Michaely, and M. O'Hara (2000). When the underwriter is the market maker: An examination of trading in the IPO aftermarket, *Journal of Finance*, 55, pp. 1039-1074.
12. Fang, Lily Hua (2005). Investment bank reputation and the price and quality of underwriting, *Journal of Finance*, 60, pp. 2729-2761.
13. Fulghieri, P. and M. Spiegel (1993). A theory of the distribution of underpriced initial public offers by investment banks, *Journal of Economics & Management Strategy*, 2, pp. 509-530.
14. Hoberg, Gerard (2007). The underwriter persistence phenomenon, *Journal of Finance*, 62, pp. 1169-1206.
15. Hu, Wendy Y., and Jay R. Ritter (2007). Multiple bookrunners in IPOs, Working paper, Unviersity of Florida.
16. Johnson, W.C., and Marietta, J. (2009). Universal banking, asset management, and stock underwriting, *European Financial Management*, 15, pp. 703-732.
17. Keys, B.J., T. Mukherjee, A. Seru, and V. Vig (2010). Did securitization lead to lax screening? Evidence from subprime loans, *Quarterly Journal of Economics*, 125, pp. 307-362.
18. Ljungqvist, Alexande (2003). Conflicts of interest and efficient contracting in IPOs, Working paper, New York University.
19. Ljungqvist, Alexander, Felicia Marston, and William Wilhelm Jr. (2006). Competing for securities underwriting mandates: Banking relationships and analyst recommendations, *Journal of Finance*, 61, pp. 301-340.

20. Loughran, Tim and Jay R. Ritter (2004). Why Has IPO Underpricing Changed Over Time? *Financial Management*, 33, pp. 5-37.
21. Mola, Simona and Massimo Guidolin (2009). Affiliated mutual funds and analyst optimism, *Journal of Financial Economics*, 93, pp. 108-137.
22. Nimalendran, M., Jay R. Ritter, and Donghang Zhang (2007). Do today's trades affect tomorrow's IPO allocation? *Journal of Financial Economics*, 84, pp. 87-109.
23. Reuter, Jonathan (2006). Are allocations for sale? *Journal of Finance*, 61, pp. 2289-2324.
24. Ritter, Jay R., and Ivo Welch (2002). A review of IPO activity, pricing, and allocations, *Journal of Finance*, 57, pp. 1795-1828.
25. Ritter, Jay R., and D.H. Zhang (2007). Affiliated mutual funds and the allocation of initial public offerings, *Journal of Financial Economics*, 86, pp. 337-368.
26. Ritter, Jay R. (2011). Equilibrium in IPO market, *Annual Review of Financial Economics*, forthcoming.

Appendix A

Table 1. Construction of variables

Variable	Description
Bank market capitalization	Bank share price times the number of shares outstanding as listed in CRSP.
Proceeds	The dollar proceeds from the offering as provided by SDC.
Underwriter rank	Range of values from 1-9 obtained from Jay Ritter's web site, http://bear.warrington.ufl.edu/ritter/.
Age	The number of years from the founding year to the IPO year. Founding dates are obtained from Jay Ritter's web site, http://bear.warrington.ufl.edu/ritter/.
Venture backed	A dummy variable taking a value of one if the offering is backed by a venture capitalist and zero otherwise.
Bank assets / IPO assets	The ratio of the underwriter COMPUSTAT data item 6 to the IPO firm COMPUSTAT data item 6 divided by 1000.
Underwriter spread	Gross underwriter spread as provided by SDC, in percent.
Underpricing	Percentage return from the offer price as listed in SDC to the first day close as listed in CRSP.
IPO frequency	A count variable for the number of IPOs in the same or past month.
IPO returns	The average underpricing of IPO firms in the same month as the current IPO or past month.
Offer price revision	The percentage increase from the midpoint of the filing range to the offer price.
Non-exchange traded	A dummy variable taking a value of zero if the firm is traded on the NYSE, AMEX, or NASDAQ and one otherwise.
Technology dummy	Takes a value of one if the firm is in a technology industry as defined by Loughran and Ritter (2004) Appendix D.
Pre-IPO market return	The average value-weighted index return for the three weeks prior to the IPO issue date.
Market return	The one year return for the value-weighted market index.
Scaled total proceeds	The total proceeds from all IPO firms underwritten by a particular underwriter in the prior year divided by the assets of the underwriter.
Scaled total money left on the table	The total money left on the table by all IPO firms underwritten by a particular underwriter in the prior year divided by the assets of the underwriter

Appendix B

Table 2. The list of public lead underwriters (1990-2005)

Advest Group Inc	A.G. Edwards
Alex Brown Inc	American Express Co
Argent Bank	Bank of America Corp
Bear Stearns Companies	Citigroup Global Markets
Citigroup Inc	Credit Suisse First Boston
Dain Rauscher Inc	Donaldson Lufkin and Jenrette
First Albany Companies	First Midwest Bancorp
Friedman Billings Ramsey	Goldman Sachs Group
Hambrecht & Quist Group	Hopper Soliday Corp
Interstate / Johnson Lane Inc	Jefferies Group Inc
J. P. Morgan Chase & Co	Kemper Corp
Keycorp	Kirlin Holding Corp
Legg Mason Inc	Lehman Brothers Holdings Inc
Merrill Lynch & Co Inc	Morgan Keegan Inc
Morgan Stanley	Ohio Bancorp
Oppenheimer	Pacific Crest Capital
Paine Webber Group	Paulson Capital Corp

Table 2 (cont.). The list of public lead underwriters (1990-2005)

Advest Group Inc	A.G. Edwards
Raymond James Financial Corp	Rodman & Renshaw Capital Group
Ryan Beck & Co Inc	Scott and Stringfellow Financial
Shearson Lehman Brothers Holdings	State Street Corp
Suntrust Banks Inc	Tucker Anthony Sutro
UBS AG	Wachovia Corp

Table 3. IPOs by whether or not the lead underwriter is a publicly traded firm

The sample is comprised of 4,849 IPOs reported in the Securities Data Corporation (SDC) New Issues database between 1990 and 2005. All banks, savings and loans, REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, and IPOs with an offer price below $5 are removed from the sample. Whether or not a lead underwriter is public is determined by looking in the CRSP database for the underwriter by name and SIC code. Percent of proceeds with public lead underwriters is the total dollar value proceeds for IPOs with public book runners divided by the dollar value of proceeds for all IPOs.

Panel A. Summary of observations by year				
Year	Number of IPOs	Number of IPOs with public lead underwriter	Percent of IPOs with public lead underwriter	Percent of proceeds with public lead underwriter
1990	107	38	35.5%	40.6%
1991	268	65	24.3%	37.9%
1992	395	84	21.5%	30.7%
1993	507	110	21.7%	43.0%
1994	412	83	20.1%	33.9%
1995	435	98	22.5%	31.0%
1996	669	179	26.8%	42.7%
1997	449	131	29.4%	46.3%
1998	286	73	25.5%	54.0%
1999	447	181	40.5%	65.6%
2000	333	145	44.1%	65.1%
2001	76	38	55.3%	66.3%
2002	68	36	52.9%	75.3%
2003	65	44	67.7%	91.8%
2004	173	103	59.5%	85.4%
2005	159	93	58.5%	90.7%
1990-2005	4,849	1,501	31.0%	58.9%

Panel B. Number of observations by underwriting relationship		
	N of total IPOs	N of total public book runners
IPOs with one public lead underwriter	1,387	1,387
IPOs with two public co-lead underwriters	100	200
IPOs with three co-lead public underwriters	13	39
IPOs with four co-lead public underwriters	1	4
Total observations	1,501	1,630

Panel C. Number of unique underwriters in the sample	
	N
Unique IPO lead underwriters	567
Unique public IPO lead underwriters	44

Table 4. Sample characteristics

The sample is comprised of 3,348 IPOs without a public lead underwriter and of 1,501 IPOs with a public lead underwriter reported in the Securities Data Corporation (SDC) New Issues database with a public lead underwriter between 1990 and 2005. All IPOs of banks, savings and loans, REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, and IPOs with an offer price below $5 are removed from the sample. Whether or not a lead underwriter is public is determined by looking in the CRSP database for the underwriter by name and SIC code. IPO proceeds is the number of shares issued in the offering times the offer price. Underpricing is defined as the closing price of the IPO firm on the first day it trades minus the offer price of the IPO divided by the offer price of the IPO. Money left on the table is the underpricing times the IPO proceeds. Market capitalization is the first price of the IPO listed in CRSP times the number of shares outstanding listed in CRSP. Total assets are COMPUSTAT data item 6. Underwriter rank is a variable between 1 (worst) and 9 (best) as updated by Ritter. Age is the number of years from the founding date to the IPO date. Venture backed is based on the classification from the SDC new issues dataset. Underwriter spread is the percent of the spread as listed in SDC. Offer price revision is the final offer price minus the midpoint of the initial filing range divided by the midpoint of the initial filing range. Non-exchange traded is a dummy variable taking a value of one if the firm is not traded on the NASDAQ, NYSE, or AMEX exchanges. Percent of firms in technology industry as defined in Appendix D of Loughran and Ritter (2004). Bank assets to IPO assets ratio is the bank assets divided by the IPO assets / 1000. ***, **, and * denote that the test statistics are significantly different from zero at the 0.01, 0.05, and 0.10 levels, respectively.

Deal and IPO firm characteristics			
Deal characteristics	IPOs without public lead underwriter	IPOs with public lead underwriter	Difference (t-statistic)
IPO proceeds ($ millions)	49.9	125.5	75.6*** (11.39)
Underpricing	18.5%	28.1%	9.6%*** (6.99)
Money left on the table ($ millions)	10.5	29.7	19.2*** (10.42)
Market capitalization ($ millions)	240	748	508*** (11.68)
Total assets ($ millions)	379	1,193	814*** (3.41)
Underwriter rank	7.5	8.5	1.0*** (35.40)
Age (years)	12.9	15.9	3.0*** (4.99)
Venture backed	37.5%	43.8%	6.3%*** (4.29)
Underwriter spread	7.42%	6.79%	0.63*** (19.93)
Offer price revision	0.0%	4.4%	4.3%*** (5.97)
Non-exchange traded	16.1%	3.5%	12.6%*** (13.46)
Percent of firms in technology industry	30.6%	33.5%	2.93%** (2.07)
N	3,348	1,501	

Table 5. Public underwriter characteristics

The sample is comprised of 1,501 IPOs with 1,630 public underwriters reported in the Securities Data Corporation (SDC) New Issues database with a public lead underwriter between 1990 and 2005. All IPOs of banks, savings and loans, REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, and IPOs with an offer price below $5 are removed from the sample. Whether or not a lead underwriter is public is determined by looking in the CRSP database for the underwriter by name and SIC code. Market capitalization is the first price of the IPO listed in CRSP times the number of shares outstanding listed in CRSP. Total assets are COMPUSTAT data item 6 and revenues are COMPUSTAT data item 12. Total annual proceeds are the cumulative dollar value of IPO issues underwritten by one underwriter in a particular year. Total money left on the table is the cumulative dollar value of each IPO's proceeds times the underpricing of the issues. Bank assets to IPO assets ratio is the bank assets divided by the IPO assets / 1000. Number of underwriting mandates per year is the number of times an underwriter was the book runner or co-book runner for an IPO.

Public underwriter characteristics			
	Mean	Median	Standard deviation
Market capitalization ($ billions)	28.1	6.4	46.5
Total assets ($ billions)	297	188	344
Revenues ($ billions)	22.7	16.6	24.5
Total annual proceeds ($ billions)	2.68	1.74	2.82
Total money left on the table ($ billions)	0.75	0.22	1.51

Table 5 (cont.). Public underwriter characteristics

Public underwriter characteristics			
	Mean	Median	Standard deviation
Bank assets to IPO assets ratio (thousands)	1.71	0.64	3.33
Number of underwriting mandates per year	7.84	5	8.34

Table 6. Investment bank returns and IPO underpricing

The sample is comprised of 1,501 IPOs with 1,630 public underwriters reported in the Securities Data Corporation (SDC) New Issues database with a public lead underwriter between 1990 and 2005. All IPOs of banks, savings and loans, REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, and IPOs with an offer price below $5 are removed from the sample. Whether or not a lead underwriter is public is determined by looking in the CRSP database for the underwriter by name and SIC code. ***, **, and * denote that the average value is different from zero at the 0.01, 0.05, and 0.10 significance levels, respectively. T-statistics testing for a difference of the value from zero are reported below the values in parentheses.

Panel A. Abnormal returns for lead underwriter around the prospectus filing date				
Event window	Mean	t-test (p-value)	Median	Wilcoxon test (p-value)
FD-1	0.05%	0.92 (0.36)	-0.05%	-0.79 (0.43)
FD	0.06%	1.17 (0.24)	-0.05%	0.26 (0.80)
FD+1	0.11%	1.97** (0.05)	0.00%	0.44 (0.66)
FD-1 to FD+1	0.23%	2.42** (0.02)	0.03%	1.38 (0.17)
FD-5 to FD+5	0.27%	1.84* (0.06)	0.12%	2.24** (0.02)
Panel B. Abnormal returns for lead underwriter around the issue date				
Event window	Mean	t-test (p-value)	Median	Wilcoxon test (p-value)
ID-1	0.04%	0.55 (0.29)	-0.03%	-0.06 (0.95)
ID	0.04%	0.99 (0.16)	-0.07%	-1.02 (0.31)
ID+1	0.13%	2.29** (0.02)	0.03%	1.23 (0.22)
ID-1 to ID+1	0.21%	2.18** (0.03)	0.03%	1.67* (0.09)
ID-5 to ID+5	0.32%	2.02** (0.04)	0.25%	2.32** (0.02)

Table 7. Investment bank returns on the filing date and issue date grouped by underpricing

The sample is comprised of 1,501 IPOs with 1,630 public underwriters reported in the Securities Data Corporation (SDC) New Issues database with a public lead underwriter between 1990 and 2005. All IPOs of banks, savings and loans, REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, and IPOs with an offer price below $5 are removed from the sample. Whether or not a lead underwriter is public is determined by looking in the CRSP database for the underwriter by name and SIC code. ***, **, and * denote that the average value is different from zero at the 0.01, 0.05, and 0.10 significance levels, respectively. T-statistics testing for a difference of the value from zero are reported below the values in parentheses.

	Underpricing < 0 N = 196	Underpricing between 0-20% N = 905	Underpricing > 20% N = 529
Underwriter filing date return	-0.17% (0.67)	0.19% (1.47)	0.46% (2.49)**
Underwriter issue date return	0.12% (0.45)	0.04% (0.38)	0.52% (2.72)***

Table 8. OLS multivariate regression of investment bank returns on the IPO filing date and issue date

The dependent variable is the three day market model adjusted returns for the IPO book runner around the filing date and the issue date. The sample is comprised of 1,501 IPOs with 1,630 public underwriters reported in the Securities Data Corporation (SDC) New Issues database with a public lead underwriter between 1990 and 2005. All IPOs of banks, savings and loans, REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, and IPOs with an offer price below $5 are removed from the sample. Whether or not a lead underwriter is public is determined by looking in the CRSP database for the underwriter by name and SIC code. Log bank market capitalization is the logarithm of the number of bank shares outstanding times the stock price of the bank at the time of the IPO measured in millions of dollars. Log proceeds is the logarithm of the offer price times the number of shares in the offering in millions of dollars. Underwriter rank is the underwriter reputation based on a ranking from 1 (worst) to 9 (best). Log (1+ age) is the natural logarithm of one plus the IPO year minus the founding year. Venture backed is a dummy variable taking a value of one if the IPO if backed by a venture capital firm and zero otherwise. Bank assets / IPO assets is the ratio of assets of the underwriter to assets of the IPO divided by 1000. IPO underpricing is the closing price of the IPO on the first day of trading minus the offer price divided by the offer price. Underwriter spread is the percent of the spread as listed in SDC. Filing date return is the three day market model adjusted returns for the IPO book runner around the filing date. Each regression contains dummy variables for each IPO year and white heteroskedasticity consistent standard errors clustered by year are below the regression coefficients. ***, **, and * denote the significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels, respectively.

Panel A. Lead underwriter CAR(-1, 1) around IPO filing date								
	(1) Whole sample	(2) Whole sample	(3) High rank underwriters	(4) Low rank underwriters	(5) Large underwriters	(6) Small underwriters	(7) Diversified underwriters	(8) Focused underwriters
Independent variables								
Log bank market capitalization ($ millions)	-0.204* (0.113)	-0.211* (0.112)	-0.264* (0.134)	-0.168 (0.166)	-0.472* (0.253)	-0.126 (0.232)	-0.364 (0.554)	-0.545* (0.299)
Log proceeds ($ millions)	0.055 (0.034)	0.055 (0.033)	0.070* (0.039)	-0.205 (0.360)	-0.398* (0.222)	0.022 (0.066)	-0.061 (0.245)	-0.679 (0.683)
Underwriter rank	0.186 (0.140)	0.177 (0.140)		0.284 (0.220)	-0.131 (0.293)	0.155 (0.228)	-0.025 (0.608)	1.031* (0.551)
Log(1+ age)	0.093 (0.092)	0.101 (0.095)	-0.006 (0.123)	0.334** (0.144)	0.039 (0.108)	0.155 (0.152)	-0.032 (0.085)	0.037 (0.173)
Venture backed	-0.402*** (0.082)	-0.438*** (0.090)	-0.445** (0.192)	-0.462 (0.273)	-0.391* (0.199)	-0.617** (0.154)	-0.630 (0.409)	-0.087 (0.218)
Bank assets / IPO assets	0.063*** (0.018)	0.068*** (0.018)	0.066*** (0.010)	0.065 (0.066)	0.053*** (0.017)	-0.091 (0.069)	-0.091 (0.180)	0.059*** (0.008)
Underwriter spread	0.047 (0.101)	0.024 (0.101)	-0.081 (0.127)	0.102 (0.384)	-0.390 (0.308)	-0.122 (0.343)	0.062 (0.198)	-1.138 (0.835)
IPO underpricing		0.227*** (0.064)	0.277*** (0.067)	-0.071 (0.455)	0.293* (0.163)	0.373 (0.483)	0.372*** (0.114)	0.046 (0.325)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	1,630	1,630	1,003	627	880	750	419	449
Adjusted R^2	2.04	2.13	3.26	3.90	3.43	2.90	3.95	4.31

Panel B. Lead underwriter CAR(-1, 1) around IPO issue date									
	(1) Whole sample	(2) Whole sample	(3) High rank underwriters	(4) Low rank underwriters	(5) Large underwriters	(6) Small underwriters	(7) Diversified underwriters	(8) Focused underwriters	(9) Whole sample
Independent variables									
Log bank market capitalization ($ millions)	-0.056 (0.110)	-0.068 (0.116)	-0.273** (0.094)	0.021 (0.176)	0.044 (0.157)	-0.165 (0.283)	-0.370 (0.321)	0.104 (0.209)	-0.060 (0.128)
Log proceeds ($ millions)	0.074 (0.051)	0.075 (0.052)	0.138*** (0.044)	0.640* (0.362)	-0.050 (0.335)	0.056 (0.109)	-0.209 (0.287)	0.533 (0.313)	0.078 (0.052)
Underwriter rank	0.088 (0.122)	0.074 (0.119)		-0.225 (0.255)	-0.207 (0.240)	0.179 (0.272)	0.720 (0.416)	-0.235 (0.586)	0.049 (0.120)
Log(1+ age)	-0.139 (0.106)	-0.124 (0.101)	-0.052 (0.138)	-0.263* (0.138)	-0.029 (0.131)	-0.282* (0.126)	0.032 (0.155)	-0.103 (0.201)	-0.128 (0.113)
Venture backed	-0.267 (0.196)	-0.331 (0.219)	-0.574** (0.209)	0.214 (0.295)	-0.341 (0.208)	-0.293 (0.349)	-0.664* (0.362)	-0.233 (0.419)	-0.269 (0.224)
Bank assets / IPO assets	-0.024 (0.043)	-0.016 (0.042)	-0.044 (0.042)	0.097 (0.058)	-0.024 (0.044)	-0.093 (0.217)	-0.043 (0.103)	-0.084** (0.032)	-0.014 (0.045)
Underwriter spread	0.384** (0.158)	0.342** (0.145)	0.411** (0.141)	1.113* (0.593)	0.203 (0.231)	0.321 (0.318)	0.055 (0.254)	1.050* (0.575)	0.332** (0.135)
IPO underpricing		0.405** (0.147)	0.528*** (0.102)	0.070 (0.343)	0.504*** (0.110)	0.360 (0.438)	0.153 (0.208)	0.754*** (0.240)	0.408*** (0.125)
Filing date return									-0.011 (0.026)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 8 (cont.). OLS multivariate regression of investment bank returns on the IPO filing date and issue date

	(1) Whole sample	(2) Whole sample	(3) High rank underwriters	(4) Low rank underwriters	(5) Large underwriters	(6) Small underwriters	(7) Diversified underwriters	(8) Focused underwriters	(9) Whole sample
Sample size	1,630	1,630	1,003	627	880	750	419	449	1,630
Adjusted R^2	2.77	3.06	4.30	5.42	5.27	3.33	8.63	5.52	3.08
Panel C. Lead underwriter CAR(-1, 1) around IPO filing date and issue date									
	Filing date CAR(-1, 1)					Issue date CAR(-1, 1)			
	(1) Whole sample	(2) Whole sample	(3) Whole sample			(4) Whole sample	(5) Whole sample	(6) Whole sample	
Measures of underpricing									
Abnormal underpricing	0.142** (0.066)					0.414*** (0.118)			
Tercile underpricing indicators									
Middle third underpricing indicator (2.5%-18.8%)		0.070 (0.251)					0.131 (0.213)		
Top third underpricing indicator (18.9%-697.5%)		0.507** (0.241)					0.218 (0.304)		
Quartile underpricing indicators									
Q2 underpricing indicator (0.4%- 9.4%)			0.070 (0.346)					-0.266 (0.210)	
Q3 underpricing indicator (9.5%-25.7%)			0.135 (0.295)					0.092 (0.231)	
Q4 underpricing indicator (25.8%-697.5%)			0.556* (0.275)					0.324 (0.294)	
Control variables	Yes	Yes	Yes			Yes	Yes	Yes	
Year dummies	Yes	Yes	Yes			Yes	Yes	Yes	
Sample size	1,630	1,630	1,630			1,630	1,630	1,630	
Adjusted R^2	2.07	2.32	2.30			3.02	2.82	3.02	

Table 9. Two-stage regression of investment bank returns on the filing day and IPO day

Below are the results for a two-stage regression controlling for the endogeneity between underpricing and underwriter returns. The first stage dependent variable is the underpricing of the IPO and includes all exogenous explanatory variables. The second regression contains a subset of the exogenous variables plus the underpricing instrument from the first stage regression. The second stage dependent variable is the three day market model adjusted returns for the IPO book runner around the filing date and the issue date. The sample is comprised of 1,501 IPOs with 1,630 public underwriters reported in the Securities Data Corporation (SDC) New Issues database with a public lead underwriter between 1990 and 2005. All IPOs of banks, savings and loans, REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, and IPOs with an offer price below $5 are removed from the sample. Whether or not a lead underwriter is public is determined by looking in the CRSP database for the underwriter by name and SIC code. Log bank market capitalization is the logarithm of the number of bank shares outstanding times the stock price of the bank at the time of the IPO measured in millions of dollars. Log proceeds is the logarithm of the offer price times the number of shares in the offering in millions of dollars. Underwriter rank is the underwriter reputation based on a ranking from 1 (worst) to 9 (best). Log (1 + age) is the natural logarithm of one plus the IPO year minus the founding year. Venture backed is a dummy variable taking a value of one if the IPO if backed by a venture capital firm and zero otherwise. Bank assets / IPO assets is the ratio of assets of the underwriter to assets of the IPO divided by 1000. IPO frequency is the number of initial public offerings in the pervious or concurrent month. IPO returns is the average underpricing of IPOs in the previous or concurrent month. Underwriter spread is the percent of the spread as listed in SDC. Offer price revision is the final offer price minus the midpoint of the initial filing range divided by the midpoint of the initial filing range. Non-exchange traded is a dummy variable taking a value of one if the firm is not traded on the NASDAQ, NYSE, or AMEX exchanges. Technology dummy is a dummy variable for IPOs that are in a high technology industry as defined in Appendix D of Loughran and Ritter (2004). Pre-IPO market return is the average return for the value-weighted index in the three weeks prior to the offering. Underpricing is the closing price of the IPO on the first day of trading minus the offer price divided by the offer price. The first stage regressions contain dummy variables for each IPO year and White heteroskedasticity consistent standard errors clustered by year are below the regression coefficients. ***, **, and * denote the significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels, respectively.

	First stage	Second stage	First stage	Second stage
	Underpricing	Filing date return	Underpricing	Issue date return
Independent variables				
Constant	-0.846*** (0.255)	1.388 (0.977)	-0.860*** (0.248)	-3.999** (1.908)
Log bank market capitalization ($ millions)	0.036*** (0.012)	-0.237*** (0.071)	0.036*** (0.012)	0.007 (0.085)

Table 9 (cont.). Two-stage regression of investment bank returns on the filing day and IPO day

	First stage	Second stage	First stage	Second stage
	Underpricing	Filing date return	Underpricing	Issue date return
Log proceeds ($ millions)	-0.018*** (0.007)	0.071** (0.025)	-0.017*** (0.007)	0.061** (0.031)
Underwriter rank	-0.005 (0.015)	0.239** (0.115)	-0.004 (0.015)	0.042 (0.114)
Log(1+ age)	-0.019* (0.011)	0.131 (0.098)	-0.022** (0.011)	-0.130 (0.090)
Venture backed	0.069*** (0.025)	-0.394** (0.115)	0.071*** (0.025)	-0.304 (0.218)
Bank assets / IPO assets	-0.007* (0.004)	0.078** (0.019)	-0.007* (0.004)	-0.012 (0.037)
Underwriter spread	-0.042 (0.065)	0.084 (0.103)	0.070*** (0.019)	0.323** (0.155)
Instrumental variables				
IPO frequency	-0.001 (0.001)		-0.001** (0.001)	
IPO returns	0.523*** (0.089)		0.484*** (0.084)	
Underwriter spread	0.066*** (0.020)		1.025*** (0.043)	
Offer price revision	1.031*** (0.044)		-0.045 (0.063)	
Non-exchange traded	-0.042 (0.065)		-0.045 (0.063)	
Technology dummy	0.069*** (0.025)		0.067*** (0.024)	
Pre-IPO market return	7.697 (5.537)		7.780 (5.322)	
Underpricing (instrumented)		0.380** (0.181)		0.487** (0.181)
Year dummies	Yes	No	Yes	No
Sample size	1,630	1,630	1,630	1,630
Adjusted R^2	49.87	1.02	49.41	1.33

Table 10. Multivariate regression of annual sales of investment banks on explanatory variables

The sample is comprised of 234 annual observations for investment bank sales from 41 unique investment banks. The dependent variable is the annual revenue divided by the assets of the bank as measured by the COMPUSTAT data items 12 and 6, respectively. The sample is comprised of 1,501 IPOs with 1,630 public underwriters reported in the Securities Data Corporation (SDC) New Issues database between 1990 and 2005. The IPOs must also have a publicly traded book runner at the time of the IPO. All IPOs of banks, savings and loans, REITs, unit offerings, closed-end funds, ADRs, firms not covered by CRSP, and IPOs with an offer price below $5 are removed from the sample. Whether or not a book runner or managing underwriter is public is determined by looking in the CRSP database for the underwriter by name and SIC code. Market return is the 12 month return of the value weighted index. Total proceeds are the aggregated proceeds of all IPOs underwritten by the book runner in a year divided by the assets of the underwriter. Total money left on the table is the offer proceeds times the underpricing of the IPO aggregated for all IPOs underwritten by the book runner in a year divided by the assets of the underwriter. Standard errors are below the regression coefficients. ***, **, and * denote the significance of the parameter estimates at the 0.01, 0.05, and 0.10 levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables						
Market return	0.013 (0.146)	-0.125 (0.085)	-0.123 (0.084)	-0.147 (0.354)	-0.215 (0.204)	-0.200 (0.201)
Total proceeds		0.632*** (0.030)	0.603*** (0.031)		0.631*** (0.030)	0.604*** (0.031)
Total money left on the table			0.156*** (0.054)			0.146*** (0.056)
Year dummies	No	No	No	Yes	Yes	Yes
Sample size	234	234	234	234	234	234
Adjusted R^2	0.00	66.12	67.16	0.00	66.48	67.36