WHEN IS 10% NOT ENOUGH?

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Abstract

This paper examines the existing cap on underwriter spreads at ten percent and its impact on the market for initial public offerings (IPOs). Approximately seven percent of share-only offerings and over two-thirds of all unit offerings have spreads at this maximum permissible level. For small offerings restricted by the current cap, we estimate that the level of compensation should be up to two percentage points higher. Our results suggest that current NASD compensation guidelines are not only restrictive but may result in a "lemons" market since the presence of the existing cap on underwriting spreads contributes to higher levels of underpricing.

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Abstract

This paper examines the existing cap on underwriter spreads at ten percent and its impact on the market for initial public offerings (IPOs). Approximately seven percent of share-only offerings and over two-thirds of all unit offerings have spreads at this maximum permissible level. For small offerings restricted by the current cap, we estimate that the level of compensation should be up to two percentage points higher. Our results suggest that current NASD compensation guidelines are not only restrictive but may result in a "lemons" market since the presence of the existing cap on underwriting spreads contributes to higher levels of underpricing.

Under National Association of Securities Dealers, Inc. (NASD) Rule 2710 (c), Corporate Financing Rule – Underwriter Terms and Arrangements, members are prohibited from being involved with security offerings where the level of underwriting compensation is determined to be "unfair or unreasonable." Factors deemed to be relevant in accessing the reasonableness of underwriter compensation include the offering proceeds, the level of risk assumed by the underwriter, and the type of offering. In its Notice to Members 98-88, the NASD states that there is no "standard" level of underwriting compensation, suggesting that the negotiation of compensation is left to the issuer and the underwriter, subject to review by the NASD. On the other hand, NASD Rule 2810 limits front-end permissible compensation to ten percent of the offering proceeds despite the NASD's prior hesitancy to establish a maximum spread allowable "because it would be counter-productive and discourage competition."[1]

[1] 15 U.S.C. 78o-3 (1988)

This paper addresses the following questions regarding the appropriateness of the existing cap on underwriter compensation: Is the ability to charge a differential for risk limited in the presence of a maximum spread? If compensation is artificially capped, irrespective of risk, do underwriters subject IPO firms to higher levels of mispricing in an effort to reduce the risk level of the offering? Furthermore, if underwriting compensation were indeed determined by the level of risk and the offer size, would it be significantly different from that currently charged under the present compensation structure?

The level of underwriter compensation has been the subject of several empirical studies in recent years. Chen and Ritter (2000) present evidence indicating that underwriter spreads for the vast majority of initial public offerings (IPOs) in the U.S. cluster at seven percent of gross proceeds.[2] Using a sample of firm commitment share-only IPOs they show that the number of IPOs with a seven percent spread increased from nineteen percent in 1985 to seventy-seven percent of all IPOs in 1998. Chen and Ritter argue that underwriting spreads on IPOs with proceeds over $30 million are too high. They suggest these levels are the result of "strategic pricing" in an effort by underwriters to maintain sufficient profits for year-end bonuses and prevent the IPO industry from becoming a "commodity business."

On the other hand, Ljungqvist and Wilhelm (1999) present evidence that the higher spreads, charged by U.S. underwriters, are associated with significantly lower levels of underpricing. Their results suggest an inverse relationship between the size of the gross spread and the level of mispricing, implying that U.S. underwriters receive a higher level of

[2] The spread constitutes compensation for three major underwriter roles: management of the deal, underwriting (risk-sharing), and selling concession.

compensation versus their non-U.S. counterparts because they provide a higher quality of service.

Hansen (2001) empirically tests two competing theories, the cartel theory and the efficient contract theory, and finds no evidence to support collusion among underwriters in an effort to maximize profits at seven percent. This finding is surprising given that previous evidence suggests that highly reputable underwriters are more costly.[3] Because of the "multiple dimensions" of the IPO contract, Hansen proposes that limiting the underwriting spread could simply shift the competitive forces of the IPO contract to its other dimensions, primarily the setting of the offer price. This would imply that in such a setting the issuer would accept a lower offer price in an effort to secure a more reputable banker.

Yeoman (2001) develops the "net proceeds maximization theory" that explains how the spread and offer price are determined. According to Yeoman, an issuer selects an investment bank that will pay the largest net proceeds. The investment bank will therefore propose an offer price and spread resulting in the highest net proceeds to the issuing firm, as long as the spread equals its expected cost plus a reasonable profit. Yeoman finds an inverse relationship between underwriting spread and the level of underpricing when controlling for the riskiness of the offering.

Another body of research investigates the use of warrants as underwriter compensation. In a sample of 723 firm commitment IPOs of common stock, Barry, Muscarella, and Vetsuypens (1991) document that 17 percent include underwriter warrants as a part of the compensation. In

[3] For example, Smith (1986) and Benveniste and Spindt (1989), make a case that the more prestigious is the underwriter the greater should be the compensation. Booth and Smith (1986) and Tinic (1988) provide further evidence consistent with this argument.

their sample, warrant values average between 45 and 80 percent of the underwriter spread. They conclude that warrants are a means by which underwriters can "circumvent otherwise binding regulatory limits on underwriter compensation." Dunbar (1995) suggests that the higher total offering costs that "result" from use of warrants may actually be due to a failure to account for self-selection in estimating offer cost relations. Dunbar estimates the level of offer costs under an alternative contract, where compensation consists of cash only. He finds that total offering costs, measured as underpricing plus all underwriter compensation, is 47 percent for offerings using warrants and would be 51 percent if warrants were not used. Using a sample of seasoned equity issues, Ng and Smith (1996) suggest that warrant compensation functions as a mechanism to certify the issue price by substituting for reputational capital. Their findings suggest that issuers use warrants when net issue proceeds would have been lower (costs would have been higher) than if warrants had not been used, consistent with Dunbar (1995).

The objective of this paper is to provide further insights into the pricing of underwriter services in the IPO market. In achieving our objective we make three important contributions to the literature. First, we examine the effect on compensation among underwriters of small offerings, including unit offerings[4], where the restrictiveness of the existing cap on compensation is most profound. Second, we provide evidence that the presence of the existing cap on underwriting spreads leads to higher levels of underpricing than would exist, after controlling for risk, if competitive forces were allowed to fully determine compensation levels. Finally, we determine the extent of economic loss to underwriters of small offerings by estimating the level of compensation that would exist in the absence of the current cap. This economic loss is

[4] Shares of stock bundled with warrants. The riskiness of these offerings is documented by Schultz (1993), Jain (1994), and How and Howe (2001).

consistent with the negative spread surplus among small IPOs documented by Hansen (2001). Our results suggest that current NASD compensation guidelines are not only restrictive but may result in a "lemons" market.

The remainder of this paper is organized as follows. Section 1 presents our hypotheses and details our methodology. In Section 2, we provide a description of our sample. The results are presented in Section 3, while the final section concludes.

1. Hypotheses and Empirical tests

We examine the potential effects of the cap on underwriter compensation by testing two hypotheses. First, we test the relationship between the gross spread and the riskiness of the issuing firm to determine if the ability to charge a differential for risk is limited in the presence of a maximum spread. Second, we examine the level of underpricing and the potential trade-off between underpricing and compensation that may exist in the presence of a cap on fees.

1.1. *Hypotheses regarding the effects of a cap on underwriter compensation*

If underwriter compensation in the U.S. is artificially capped, riskier issuers will be unable to compensate quality underwriters adequately for their level of risk. This argument leads to our first hypothesis:

> *Hypothesis 1: The portion of the spread attributable to offering risk is lower in the presence of a cap on underwriter compensation.*

In order to test Hypothesis 1, we estimate the following OLS regression:

$$Spread = \beta_0 + \beta_1 Rank + \beta_2 VB + \beta_3 Auditor + \beta_4 Proceeds + \beta_5 Shares\ ratio + \beta_6 Unit + \beta_7 Risk \quad (1)$$

Spread is the percentage of gross proceeds payable to the underwriter. *Rank* is the Carter, Dark, and Singh (1998) measure of underwriter reputation that takes a value between

zero and nine, where nine is the most prestigious underwriter and zero indicates the underwriter is unranked. Given the current clustering of IPO spreads found by Chen and Ritter (2000), we anticipate that most of the variation in spreads will be evident in the lower tier of underwriters only. Therefore, we expect a negative relation between spread and Rank. *VB*, venture backing, is an indicator variable that takes the value of one if a venture capitalist provided pre-IPO funding. *Auditor* takes the value of one if the auditor is a "Big Six" accounting firm[5]. Since the presence of venture backing and a high reputation auditor can reduce uncertainty surrounding the offering, we expect negative coefficients both on *VB* and *Auditor*. *Proceeds* is total gross proceeds, or size of the offering, in millions. In the presence of a fixed cost component to underwriting, we expect smaller offerings to incur higher spreads, or conversely larger offerings to incur lower spreads. Therefore, we expect a negative coefficient on *Proceeds* after controlling for offering risk. The *Shares ratio* is the number of IPO shares divided by the total outstanding shares after the offer. Yeoman (2001) theorizes that larger share ratios should be associated with larger spreads since price uncertainty increases as the share ratio increases. *Unit* is an indicator variable that takes the value of one if the offering is a unit IPO. As theorized by Chemmanur and Fulghieri (1997) and documented by Jain and Kini (1994), unit offerings are riskier than their share-only counterparts and therefore we expect that unit spreads will be higher.

We examine several proxies for *Risk.* Ex-post volatility, price-to-book ratio, and the offer price range serve as proxies for IPO risk. Volatility is measured as the standard deviation of daily returns in months two through thirteen following the offering. We use a dummy variable to

[5] During our sample period, 1991 – 1995, there were six major accounting firms: Ernst & Young, LLP, Coopers & Lybrand, LLP, Arthur Anderson & Company, Price Waterhouse, KPMG Peat Marwick, LLP, and Deloitte and Touche, LLP.

indicate a price-to-book ratio in the lowest quartile of the sample. The price-to-book ratio is the market price per share divided by the book value of equity per share after the IPO. Offer price range refers to the variation in the IPO offer price as measured by (high price range – low price range)/ middle price range from the preliminary prospectus. We anticipate that the coefficient on *Risk* will be positive on the basis that underwriters are expected to require higher levels of compensation from riskier firms.

If competitive forces do not determine underwriter compensation, riskier offerings could be associated with lower quality underwriters and potentially higher levels of underpricing. Another possibility is that in the absence of adequate compensation for risk, underwriters set a lower offer price to reduce the amount of effort necessary to sell the offering and mitigate their potential legal liability. These argument leads to our second hypothesis.

> *Hypothesis 2: Underpricing (initial day return) is greater in the presence of a cap on underwriter compensation after controlling for risk.*

In order to test Hypothesis 2, we use the following regression:

$$\textit{Initial day return} = \beta_0 + \beta_1 \textit{Rank} + \beta_2 \textit{Auditor} + \beta_3 \textit{VB} + \beta_4 \textit{Shares ratio} + \beta_5 \textit{Spread Cap} + \beta_6 \textit{Risk} + \beta_7 \textit{Year Dummy} + \beta_8 \textit{Unit} \quad (2)$$

Initial day return is calculated as (initial day closing price – offer price)/ offer price. *Rank, Auditor, VB, Shares ratio, Risk,* and *Unit* are as previously described. Earlier studies attribute lower underpricing to the reduced uncertainty involved when a reputable underwriter underwrites the IPO. Carter and Manaster (1990) and Carter, Dark, and Singh (1998) find evidence associating lower risk offerings and less underpricing with more prestigious underwriters, while the combined presence of a ranked underwriter and a high reputation auditor leads to a significant reduction in underpricing (see Balvers, McDonald, and Miller, 1988; Michaely and Shaw, 1995). However, in a very recent study, Carter, Cooney, Dark and Singh

(2004) find that the negative relation between underpricing and underwriter rank actually flipped in the nineties. Since our study examines IPOs in the nineties, we anticipate that the relation between underpricing and *Rank* will be positive. On the other hand, we expect the presence of a quality auditor to reduce the underpricing based on the findings of Beatty (1989), which supports the idea that the cost of hiring a prestigious auditor is justified by reduced underpricing.

The relation between venture backing and underpricing also appears to have changed directions in the nineties. In an earlier study Barry, Muscarella, Peavy, and Vetsuypens (1990) find evidence that the quality of monitoring by venture capitalists appears to be recognized by investors through lower underpricing of the IPO. However, a more recent study by Lee and Wahal (2002) finds that venture capitalists are associated with greater underpricing for IPOs. They conclude that the publicity associated with high return IPOs lures venture capital funding for future offerings.

Shares ratio is the percentage of shares in the offer divided by the number of outstanding shares after the IPO. Consistent with Yeoman (2001), if price uncertainty is increasing with the portion of the firm sold in the IPO then we expect a positive relation between this ratio and underpricing. *Spread cap* takes the value of one if the percentage of gross proceeds payable to the underwriters is ten percent, the maximum allowed. As Yeoman (2001) models, the offer price and spread are jointly determined by an investment bank in order to maximize the net proceeds that it can pay the issuing firm. This would imply a trade-off between the level of underpricing and the spread, after controlling for other differences in the offerings. In the presence of restrictions on fees, underwriters may lower the offer price in an attempt to reduce the selling effort required. If the cap has this effect on pricing, then we expect the coefficient on *Spread cap* to be positive and significant.

We control for the presence of hot and cold IPO markets during the sample period through the use of indicator variables for each year. We also control for the type of offering by including the indicator variable, *Unit*, since unit IPOs are expected to be associated with significantly higher levels of underpricing. Jain (1994), using the standard deviation of aftermarket returns as a measure for risk, finds a positive relation between risk and underpricing among unit and non-unit offerings. Furthermore, the agency cost rationale for units (Schultz, 1993) suggests that unit offerings will incur higher costs, including higher levels of underpricing.

1.2. Estimation of a Market-determined Spread Level for Units

If the level of compensation is restrictive, then the interesting question is what the spread would be if market forces were allowed to determine underwriter compensation. To estimate underwriter compensation in the absence of market restrictions, we use the coefficients from the regressions with spreads below the cap to estimate total compensation for offerings at the current cap. The estimated compensation represents the level that would exist if market forces were allowed to freely determine the compensation required to underwrite these offerings.

2. Data Description

We collect a sample of firm commitment IPOs issued between 1991 and 2000 from Securities Data Corporation (SDC). We eliminate mutual funds, REITs, and ADRs. In contrast to Chen and Ritter (2000), Hansen (2001), and Yeoman (2001), we include share-only offerings as well as unit offerings. Table 1 presents summary characteristics of a sample of IPOs issued between January 1, 1991 and December 31, 2000.

[Insert Table 1 here]

Panel A presents the statistics for unit IPOs, while Panel B presents those statistics for share-only offerings. As expected, unit IPOs are significantly smaller than share-only IPOs. The median offer size, or gross proceeds, of unit IPOs is nearly one-sixth that of the share-only sample, $6.2 million versus $35.0 million. The median initial offer price of the share-only IPOs is $12.00 versus a median offer price for unit IPOs of $5.00.

Consistent with Barry, Muscarella and Vetsuypens (1991), we find that underwriter compensation and underpricing are greater for unit IPOs. The median gross spread for unit IPOs is ten percent versus a median spread for share-only offerings of seven percent. As presented in Table 1, the median level of underpricing is significantly higher among unit offerings, 16.7 percent versus 9.4 percent for their share-only counterparts. These results are not surprising given the significantly higher risk level of unit offerings documented in previous studies and evidenced by the higher volatility as measured by the standard deviation of daily returns.

The portion of the firm sold is significantly higher for unit IPOs than their share-only counterparts. Evidence that unit IPOs have larger share ratios is consistent with the higher spreads associated with these offerings. While the volatility of the post-IPO returns indicates that unit offerings are riskier than their share-only counterparts, there is no difference in the mean or median price-to-book ratios between the two samples. On the other hand, the offer price range is actually higher for the share-only offers. This last result is due to the persistence of an offer price of $5.00, approximately thirty percent of the unit IPO sample, thus limiting the offer price range.

While it is clear from Table 1 that the median spread on unit offerings is ten percent, we examine the distribution in greater detail. Tables 2 and 3 present, by year, the average proceeds and number of offerings with spread percentages at or below seven, above seven to eight, above

eight to nine, above nine to just under ten, and exactly ten. Table 2 presents the average proceeds and frequencies for each spread range for the unit offerings, while Table 3 presents similar statistics for the share-only sample.

[Insert Table 2 here]

Regardless of the type of issue, IPOs with spreads at ten percent have smaller proceeds than those with lower spreads. For both the unit IPO and share-only IPO samples, the median offer size of issues with spreads at exactly ten percent is 5.5 million. This is not surprising since we expect that there are significant fixed costs associated with underwriting an offering. As shown in Table 2, two-thirds of unit IPOs have spreads of exactly ten percent in all years examined. On the other hand, as shown in Table 3 over eighty percent of share-only IPOs have spreads at seven percent or below, as expected based on Chen and Ritter (2000). Interestingly, there are 316 share-only offers whose spread is exactly ten percent, similar to the 370 unit offerings whose spread is at this cap.

[Insert Table 3 here]

3. Results

Hypothesis 1 predicts that the portion of the spread attributable to risk is lower in the presence of the existing cap on underwriter compensation. The results of the estimation of equation (1) appear in Table 4. We exclude AT&T Wireless Group because of the size of this offering, $9.0 billion. We find higher levels of spreads for lower ranked underwriters even after controlling for the riskiness and size of the offering. This finding is attributable to the clustering of IPO spreads at either seven or ten percent. The majority of offerings that are underwritten by investment banks with ranks below five have spreads above seven percent, and they cluster at ten

percent. On the other hand, the majority of offerings underwritten by banks with a rank above five have spreads at seven percent, with only a handful at ten. Offerings that are associated with high reputation accountants have significantly lower spreads. This finding affirms the idea that these market participants serve to certify the quality of the offering. For larger offerings, those at the upper quartile of gross proceeds, the compensation paid to the underwriters is decreasing in the offer size. On the other hand, for the lower quartile of offerings, compensation is increasing as proceeds increase. This finding is consistent with the existence of a restrictive cap on spreads.

[Insert Table 4 here]

While we do not find a relation between the shares ratio and the spread, we believe this is because price uncertainty is better captured in other control variables including *Unit* and *Risk*. Since we lose a large number of observations and shares ratio shows no significant relation with spread in Model 1, we exclude this variable in Models 2 through 4. As expected, spreads are increasing with risk as measured in this model by the standard deviation of daily returns of the issuing firm. The inclusion of the squared value of volatility provides additional explanatory power to the model. We find a negative relation between the squared volatility and spread, indicating that for the most risky firms, the current cap results in a lower spread than would occur in a competitive market. This last finding is consistent with our Hypothesis 1.

In Model 3, we replace volatility with low price to book and find a negative relation with underwriter spreads. Because of the presence of negative price to book ratios we use an indicator variable that takes the value of one if the firm's price to book ratio falls in the lower quartile of the sample, and zero otherwise. Lower values of price to book indicate that less value is being associated with future cash flows. In a sense, these offerings are less risky for the underwriter, particularly in terms of the selling effort. In Model 4, we substitute offer range for

volatility and find a negative relation between offer range and spread. While a large offer range may be viewed as a measure of risk, it can also be viewed as a measure of the underwriter's discretion in setting the price. Given a large amount of discretion, the underwriter may be willing to accept a lower spread. Furthermore, in our sample, seventy-three percent of the firms with spreads at the cap do not have an offer price range. This provides some evidence that underwriters for these offerings find other ways to reduce their risk and/or selling effort in the presence of a restrictive cap.

In Table 5, we compare mean and median spread percentages and total compensation by risk quartiles. The risk proxy used in Panels A and B is the standard deviation of daily returns for months two through thirteen following the IPO. Total underwriter compensation includes the gross spread, any non-accountable expense allowance, consulting agreements, and the value of any underwriter's warrants. Underwriter warrants are warrants to purchase the issuers' common stock (in share-only offerings) or issuers' units (in unit offerings) at a strike price expressed as a percentage of the initial offer price within a specified time period (generally within five years of the offering). These warrants are present in virtually all unit IPOs in our sample and in some share-only offerings. We value the warrants in share-only offerings using the Black-Scholes model and we use a variant of Black-Scholes to value the warrants in unit offerings as described in Garner and Marshall (2004).[6] Dunbar (1995) presents evidence that underwriter warrants are a significant form of additional underwriter compensation for many offerings. While there are

[6] For the unit IPO sample, we obtain all detail on underwriter warrant compensation from the offering prospectus. For the non-unit offerings, we obtain the warrant exercise price, term, and number of shares represented by the warrants from Securities Data Corporation (SDC). For those offerings where the SDC data is incomplete, we estimate the value of warrant compensation at 45 percent of the gross spread, based on Barry, Muscarella, and Vetsuypens (1991).

limitations placed on the number and value of warrants that can be issued to the underwriter as compensation, the basis for valuation used by NASD yields more conservative values. Furthermore, many underwriters collect a “non-accountable expense” which under NASD regulations can be as much as three percent of the offer proceeds. As exhibited in Panels A and B, the mean and median spreads and total compensation are increasing across the risk quartiles for the full sample.

[Insert Table 5]

Since the cap restriction is most severe for the smallest offerings, we examine total compensation across risk quartiles for the smallest offerings, those below $16 million dollars, in Panels C and D. For offerings with spreads below the cap, $16 million dollars is the cutoff for the lower quartile. Panels C and D report differences in total compensation for firms whose spread is below and above the cap, respectively. Because volatility is used to compute the warrant portion of total compensation, we segregate the risk quartiles using the ratio of the standard deviation to proceeds in millions, rather than volatility. In Panel C, the unrestricted cap subsample, average compensation and offer price are increasing in risk. In Panel D, the restricted cap subsample, the only difference in average compensation is for firms in the lowest quartile of risk, there are no differences in median compensation across risk quartiles. Interestingly, in this restricted sample, the average compensation for the upper quartiles of risk is just above the maximum total compensation percentage of 15 percent under NASD guidelines. The results in Panel D suggest that among smaller offerings total compensation is not increasing in risk in the presence of a restrictive cap. Panel D also suggests that as risk increases in the presence of a restricted cap there may be little incentive for underwriters to exert effort in setting the offer

price. For the riskier firms in this subsample, there is no difference in mean and median offer price.

To further explore the finding that total compensation is not increasing in risk, we expand the univariate analysis found in Table 5 to a multivariate one. Using both the percentage and dollar level of total compensation as dependant variables, we re-estimate equation (1) for offerings below $16 million. We compare the coefficients from estimating underwriter compensation for firms below (unrestricted) and at (restricted) the spread cap in Table 6.

[Insert Table 6 here]

With the exception of auditor, the coefficients of the regression on total compensation, as a percentage of proceeds, for the unrestricted subsample have the same signs as the full sample results on gross spread presented in Table 4. However, there are differences in significance on the coefficients for auditor and share ratio. For the unrestricted sample of smaller offerings, neither the presence of venture capital nor the presence of a reputable auditor serve to reduce the level of compensation when measured in percentage terms. In contrast to the full sample, for smaller issues below the cap there is evidence that underwriter compensation is increasing in the portion of the firm sold at the IPO. Finally, the contribution of risk to total compensation is statistically significant and positive for the unrestricted sample.

For the restricted sample, the primary driver of total percentage compensation is the type of offering. While the coefficient on volatility is significant for the unrestricted sample in Panel A, there is no evidence of additional compensation for risk in the presence of restrictions on compensation, even when all forms of compensation are included. This confirms our findings in the univariate setting in Table 5. When compared to the unrestricted sample, the main significant differences in determinants of percentage compensation are the rank of the underwriter, offer

size, and the ratio of shares sold in the IPO to total shares outstanding after the offering. The median underwriter rank for the unrestricted sample of 4.1 is significantly higher than the median rank of 2.1 for the restricted sample, evidence that there is little variation in underwriter quality for this subsample. For the restricted sample, underwriters are unable to charge a higher percentage of the offer size the greater the percentage of shares sold in the offering. This has two potential implications; either the underwriter is not compensated adequately for risk or issuing firms are restricted in the portion of the firm that may be sold. Since the restricted sample actually has a significantly higher mean and median ratio of IPO shares to total shares, it appears that the underwriter in the presence of a cap is unable to charge a differential for this other risk factor in an IPO.

Our results are similar when we examine total compensation measured in dollar terms in Panel B. Not surprisingly, total monetary compensation is increasing in total proceeds for both subsamples. On the other hand, although the additional monetary compensation for risk is positive and significant in both Panels A and B for the unrestricted sample, it is still insignificant for the unrestricted subsample under this alternative measure of compensation. With the exception of a positive coefficient on proceeds, there is no difference in the significance of variables between percentage and dollar total compensation regressions for the restricted sample. Although proceeds are a significant determinant of total dollar compensation for both groups, the coefficient on proceeds is significantly different between the two subsamples. When the difference in the intercept term is taken into account, it is clear that underwriters facing the restriction on spread are receiving significantly less in compensation. Since they are paying significantly less in compensation when the spread is at the cap, riskier firms at this juncture seem to be a benefactor of the limit on underwriter compensation.

Hypothesis 2 predicts that if underwriters are unable to earn a sufficient return for risk, they may reduce the effort required to sell the offering, or reduce their potential liability, by setting a low offer price. We examine the relationship between the cap on spreads and underpricing by estimating equation (2). Our results appear in Table 7. Consistent with the findings of Carter, Cooney, Dark and Singh (2004), we find a positive coefficient on underwriter rank after controlling for the riskiness of the offering. We do not find that the presence of a more reputable auditor serves to reduce the level of underpricing. This may be because over eighty-seven percent of the firms in the sample use one of the Big6 auditors.

[Insert Table 6]

Shares ratio and venture backing are significantly associated with underpricing but are not of the expected sign. Our results are supportive of Michaely and Shaw (1994) who find contrary to signaling theories that initial day return and the fraction held by insiders do not seem to explain subsequent performance of the offering. The positive coefficient on venture backing may reflect higher market demand for IPOs in more attractive industries during the time period examined and lends support to the grandstanding hypothesis of Lee and Wahal (2002) who also find this positive relation between underpricing and venture capital backing. This finding is also consistent with the positive coefficient on underwriter rank, which also changed signs in the nineties.

We find a positive relation between underpricing and the spread cap. This is evidence that underwriters may reduce the risk associated with the offering by setting a lower offer price, thereby reducing both the level of effort required to sell the offering and their potential liability. While our results in Table 6 initially suggested that riskier firms were perhaps benefactors of a

restrictive cap, given the higher levels of underpricing in Table 7, ranging from 3.4 to almost 6%, it is evident that these firms are actually "paying the piper" in an alternative form.

As expected, underpricing is increasing in firm riskiness as measured by the standard deviation of post-IPO returns, excluding the month of the offering. Furthermore, there is evidence of increased underpricing during periods of "hot" IPO markets including the dot-com mania of 1999 and 2000. Higher market demand is demonstrated by the positive and significant coefficient on year dummy variables for 1995, 1999, and 2000. As expected, underpricing is significantly higher among unit offerings.

If prices for underwriter services of small, riskier IPOs are below competitive levels, and do not adequately compensate the underwriter for the level of risk and size of the offering, then several non-productive outcomes could occur. First, in a market characterized by a restrictive cap, underwriters may attempt to circumvent the cap by using other vehicles to extract compensation. As previously mentioned, Dunbar (1995) finds evidence that the use of underwriter warrants significantly enhances underwriter compensation. Furthermore, Barry, Muscarella, and Vetsuypens (1991) and Garner and Marshall (2004) find that the warrant values assigned in regulatory cases is significantly lower than the estimates that are obtained using several option pricing models. Barry, et al conjecture that underwriter warrants are used as a mechanism to get around otherwise binding constraints as to the level of compensation that underwriters can reasonably receive. If in fact warrants are a form of compensation to underwriters as argued by Barry, Muscarella and Vetsuypens, then the underwriter spreads may not be high enough.

While obtaining additional compensation via underwriter warrants is not prohibited, it is limited under NASD guidelines. As a result, some underwriters may engage in illegal behaviors

to extract additional profits from more risky or smaller offerings.[7] Perhaps if the present cap was higher, or eliminated, there would be less incentive to engage in these behaviors or more ethical underwriters would be willing to underwrite these issues. Therefore, we are interested in determining what a more appropriate cap might be, or the average compensation level that would exist in an IPO market where market forces are allowed to set the appropriate level of compensation. Using a Heckman analysis we estimate what an "appropriate" level of compensation should be in Table 8.

[Insert Table 8]

Our sample for the estimation of total compensation in the absence of a regulatory ceiling includes only offerings below $16 million dollars. We estimate equation (1) for the sample of IPOs that meet two criteria 1) gross proceeds less than $16 million and 2) a spread of less than ten percent. In Model A, we use underwriter compensation expressed as a percentage of total proceeds, the traditional metric of compensation. We use the coefficients from this regression on the unrestricted (uncapped) sample to compute an estimated median compensation percentage of 12.78 percent for the restricted (capped) sample. This result implies that the current compensation structure is actually generous. In Model B we use underwriter compensation expressed in millions of dollars as our dependent variable. Similar to the methodology employed in Model A, we use the coefficients from the regression on the unrestricted sample to estimate dollar compensation for the restricted sample. Converting this dollar estimate to a percentage of proceeds yields a more realistic estimate of 15.37 percent. Although not presented, using the

[7] Examples of SEC investigations into irregular activities or deceptive practices among underwriters of unit IPOs include price manipulation, failure to enter trades, failure to distribute offering prospectuses.

unrestricted full sample we actually derive an estimate based on total dollar compensation that suggests a similar spread of 14.86%.

Since we only have complete prospectus data for the later years in our sample, we limit our estimation sample to the IPO period 1995-2000. Our estimated median total compensation level for the restricted sample now suggests that the current cap on total compensation is perhaps two percentage points too low. The use of contingent compensation, via underwriter warrants and the warrant solicitation fee, should encourage underwriters to perform the necessary due diligence to increase the likelihood that these forms of compensation will be realized. Because of the potential benefits of contingent compensation we do not recommend that all compensation be received in the form of a spread. However, in light of our findings and those of Chen and Ritter (2000) and Hansen (2001), consideration of a spread cap that accounts for vast differences in offer size may be appropriate.

4. Conclusion

The presence of a restrictive cap on the level of gross spreads has interesting consequences for IPOs. Specifically, we find that under current NASD guidelines underwriter compensation is not necessarily increasing in firm riskiness. Even when other forms of compensation, non-accountable expense allowances and underwriter warrants, are included there is little evidence of a risk premium component in underwriter compensation for firms at the ten percent cap on underwriter spread. It is possible that contingent compensation, such as underwriter warrants, acts as an aligning incentive inducing the underwriter to perform an appropriate level of due diligence. However, we believe that some potential consequences of the current cap are non-productive. It may discourage “better” underwriters from participating in

this market, resulting in a “lemons” market. Furthermore, it may result in less-risky, but small, IPO firms being forced to issue larger offerings than they can adequately absorb. This could potentially contribute to the underperformance results of IPOs over the long run, as cash remains uninvested or the firm potentially invests in negative NPV projects.

Another consequence of the existing cap on underwriting spreads is higher levels of underpricing. Underwriters, when faced with limits on the fees they can charge, appear to reduce the risk associated with the offering by setting a lower offer price. A lower offer price, while costly to the issuing firm, reduces the level of effort required to sell the offering and can potentially reduce any legal liability from a riskier offering. Our results suggest that the additional underpricing being born by firms exceeds the additional percentage compensation that would be reasonable in the absence of a cap. In light of our findings, a regressive spread structure where larger offerings have lower caps and smaller offerings have higher caps may be in order.

REFERENCES

Balvers, Ronald, Bill McDonald, and Robert Miller. "Underpricing of new issues and the choice of auditor as a signal of investment banker reputation." *The Accounting Review* 63, (1988), 605-622.

Barry, Christopher B., Chris B. Muscarella, John W. Peavy III, and Michael R. Vetsuypens. "The role of venture capital in the creation of public companies: Evidence from the going-public process." *Journal of Financial Economics* 27 (1990), 447-471.

Barry, Christopher B., Chris B. Muscarella, and Michael R. Vetsuypens."Underwriter warrants, underwriter compensation, and the costs of going public/" *Journal of Financial Economics* 29 (1991), 113-135.

Brav, Alon and Paul Gompers. "Myth or reality? The long-run underperformance of initial public offerings: evidence from venture and nonventure capital-backed companies." *Journal of Finance* 52 (1997), 1791-1821.

Beatty, Randolph P. "Auditor reputation and the pricing of initial public offerings." *The Accounting Review* 64 (1989), 693-709.

Benveniste, Lawrence M. and Paul.A. Spindt. "How investment bankers determine the offer price and allocation of initial public offerings." *Journal of Financial Economics* 24 (1989), 343-361.

Booth, James and Richard Smith. "Capital raising, underwriting, and the certification hypothesis." *Journal of Financial Economics* 15 (1986), 261-281.

Carter, Richard B., Frederick H. Dark, and Ajai K. Singh. "Underwriter reputation, initial returns, and the long-run performance of IPO stocks." *Journal of Finance* 83 (1998), 285-311.

Carter, Richard B., John W. Cooney, Frederick H. Dark, and Ajai K. Singh. "IPO Initial Returns and Underwriter reputation, Has the Relationship Flipped in the 1990s?" Working paper (2004).

Carter, Richard B. and Steven Manaster. "Initial public offerings and underwriter reputation." *Journal of Finance* 45 (1990), 1045-1068.

Chemmanur, Thomas J. and Fulghieri, Paolo. "Why include warrants in new equity issues? A theory of unit IPOs." *Journal of Financial and Quantitative Analysis* 32 (1997), 1-24.

Chen, Hsuan-Chi and Jay Ritter. "The seven percent solution." *Journal of Finance* 55 (2000), 1105-1131.

Dunbar, Craig. “The use of warrants as underwriter compensation in initial public offerings.” *Journal of Financial Economics* 38 (1995), 59-78.

Garner, Jacqueline and Beverly Marshall. “Valuing Underwriter Compensation in the Presence of Exotic Options.” Working paper (2004).

Hanley, Kathleen Weiss. “The underpricing of initial public offerings and the partial adjustment phenomenon.” *Journal of Financial Economics* 34 (1993), 231-251.

Hansen, Robert S. “Do investment banks compete in IPOs?: The advent of the ‘7% plus contract’.” *Journal of Financial Economics* 53 (2001), 313-346.

Jain, Bharat A. “The underpricing of ‘unit’ initial public offerings.” The *Quarterly Review of Economics and Business* 34 (1994), 309-325.

Kolb, Robert. *Futures, options, and swaps*, Fourth edition, Marden and Oxford: Blackwell Publishers (2002).

Lee, Peggy M. and Wahal, Sunil. "Grandstanding, Certification and the Underpricing of Venture Backed IPOs", Working paper (2002).

Michaely, Roni and Wayne H. Shaw. “The pricing of initial public offerings: Tests of the adverse selection and signaling theories.” *Review of Financial Studies* 7 (1994), 279-320.

Michaely, Roni and Wayne H. Shaw. “Does the choice of auditor convey quality in an initial public offering?” *Financial Management* 24 (1995), 15-30.

Ng, Chee K. and Richard L. Smith. “Determinants of contract choice: The use of warrants to compensate underwriters of seasoned equity issues.” *Journal of Finance* 51 (1996), 363-380.

Schultz, Paul. “Unit initial public offerings.” *Journal of Financial Economics* 34 (1993), 199-229.

Tinic, Seha M. “Anatomy of initial public offerings of common stock.” *Journal of Finance* 43 (1988), 789-822.

Yeoman, John C. “The optimal spread and offering price for underwritten securities.” *Journal of Financial Economics* 62 (2001), 169-198.

Table 1
Summary Statistics for Unit and Share-only Offerings

Panel A presents the mean, median, maximum, and minimum values of selected firm and offer characteristic for a sample of 558 unit initial public offerings issued between 1991 and 2000, while Panel B presents comparable statistics for 4,573 share-only offerings issued in the same time period. Proceeds are the gross proceeds from the initial public offering. Offer price is the initial offer price per share. Gross spread is the percentage of gross proceeds payable to the underwriters. Initial day return is calculated as (initial day closing price - offer price)/ offer price. Shares ratio is the number of shares offered with the IPO divided by the total number of shares outstanding after the offering. Price to book ratio is the offer price per share divided by the book value of equity per share after the IPO. Offer price range is calculated as the (high range price – low range price)/ middle range price from the preliminary prospectus. Volatility is the standard deviation of daily returns measured for months two through thirteen after the IPO.

Panel A. Unit sample statistics					
Variable	N	Mean	Median	Maximum	Minimum
Proceeds (millions)	558	8.3	6.2	114.5	1.8
Offer price	558	5.46	5.00	40.00	1.00
Gross spread (%)	558	9.4***	10.0***	10.0	5.0
Initial day return (%)	406	32.5***	16.7***	380.0	-36.5
Shares ratio	429	39.8***	38.8***	99.6	6.8
Price to book ratio	452	2.9	3.1	30.7	-180.2
Offer price range (%)	550	6.2	0.0	80.0	0.0
Volatility (%)	403	104.2***	94.2***	330.1	23.0

Panel B. Share-only sample statistics					
Variable	N	Mean	Median	Maximum	Minimum
Proceeds (millions)	4573	68.9***±	35.0***	9027.0	1.4
Offer price	4573	12.61***	12.00***	97.00	2.00
Gross spread (%)	4573	7.1	7.0	10.0	2.2
Initial day return (%)	4232	24.7	9.4	697.5	-76.4
Shares ratio	3775	31.7	29.4	99.9	0.3
Price to book ratio	3410	5.8	3.1	1515.4	-674.7
Offer price range (%)	4405	15.2***	15.4***	80.0	0.0
Volatility (%)	4424	78.6	71.6	282.5	14.9

*** Significantly larger at the 1% level.
** Significantly larger at the 5% level.
* Significantly larger at the 10% level.
± When AT&T Wireless Group is excluded the mean is $58.5 million, significantly larger than the unit IPO sample at the 1% level.

Table 2
Median Proceeds and Number of Offerings by Size of Gross Spread – Unit IPOs

The following table presents the median proceeds (in millions) and number of offerings (in italics) by gross spread for the sample of unit IPOs issued from 1991 to 2000. Proceeds is the gross proceeds from the offer. Gross spread is the percentage of gross proceeds payable to the underwriters.

	7% or Below	Over 7% to 8%	Over 8% to 9%	Over 9% to just under 10%	10%	Percent of sample at 10%
1991	40.0	12.8	7.8	6.0	4.1	
	3	*4*	*4*	*4*	*36*	70.6
1992	35.0	----	8.0	6.3	5.0	
	5	*0*	*13*	*3*	*39*	65.0
1993	13.5	14.0	7.6	8.0	5.0	
	8	*11*	*7*	*7*	*53*	61.6
1994	13.5	12.0	10.0	8.3	5.5	
	6	*10*	*10*	*6*	*73*	69.5
1995	12.0	13.3	10.0	7.7	6.0	
	3	*10*	*3*	*5*	*46*	68.7
1996	19.5	15.0	8.2	7.8	6.2	
	8	*9*	*12*	*7*	*57*	61.3
1997	18.5	9.9	7.1	8.4	6.0	
	2	*5*	*7*	*2*	*42*	72.4
1998	18.7	14.3	10.3	----	6.2	
	1	*1*	*5*	*0*	*13*	65.0
1999	15.0	----	15.5	12.5	6.6	
	1	*0*	*2*	*2*	*6*	54.6
2000	----	13.6	----	----	7.2	
	0	*2*	*0*	*0*	*5*	71.4
Total	18.7	12.6	8.4	7.9	5.5	
	37	*52*	*63*	*36*	*370*	66.3

Table 3
Median Proceeds and Number of Offerings by Size of Gross Spread – Share-only IPOs

The following table presents the median proceeds (in millions) and number of offerings (in italics) by gross spread for the sample of share-only IPOs issued from 1991 to 2000. Proceeds is the gross proceeds from the offer. Gross spread is the percentage of gross proceeds payable to the underwriters.

	7% or Below	Over 7% to 8%	Over 8% to 9%	Over 9% to just under 10%	10%	Percent of sample at 10%
1991	34.0	18.3	7.6	----	4.6	
	217	*47*	*8*	*0*	*28*	9.3
1992	34.5	13.7	6.0	8.2	4.8	
	297	*58*	*12*	*3*	*43*	10.4
1993	33.0	13.5	7.4	7.1	5.1	
	400	*55*	*18*	*4*	*44*	8.4
1994	30.0	14.7	6.2	8.0	5.7	
	280	*62*	*16*	*3*	*40*	10.0
1995	36.0	16.5	8.1	7.3	5.0	
	361	*31*	*17*	*2*	*45*	9.9
1996	39.2	15.0	9.4	7.0	6.0	
	616	*59*	*16*	*2*	*58*	7.7
1997	39.0	19.1	7.1	10.3	6.0	
	453	*38*	*10*	*4*	*28*	5.2
1998	45.6	13.2	9.5	10.1	7.2	
	287	*22*	*4*	*6*	*20*	5.9
1999	59.5	14.0	14.7	8.5	7.8	
	460	*13*	*9*	*2*	*5*	1.0
2000	70.0	22.6	9.0	----	7.2	
	358	*6*	*1*	*0*	*5*	1.4
Total	42.0	15.0	7.8	8.0	5.5	
	3729	*391*	*111*	*26*	*316*	6.9

Table 4
OLS Regression of Underwriter Spreads – Full Sample

The following table presents the results of estimating an ordinary least squares (OLS) regression with spread as the dependent variable for the full sample of IPOs. Spread is the percentage of gross proceeds payable to the underwriters. Rank is the underwriter rank according to Carter, Dark, and Singh (1998) on a scale of zero to nine. Venture backing is an indicator variable that takes the value of one if a venture capitalist provided pre-IPO funding. Auditor takes the value of one if the auditor is one of the Big Six accounting firms. Proceeds is gross proceeds from the offer in millions. High proceeds (Low proceeds) takes the value of the log of proceeds in millions if the IPO size is in the upper (lower) quartile of the sample. Shares ratio is the number of IPO shares divided by the total outstanding shares after the offer. Unit offering takes the value of one if the offering is a unit IPO, and zero otherwise. Volatility is the standard deviation of daily returns for months two through thirteen following the IPO. Squared volatility is the squared value of volatility. Low price to book takes the value of one if the offer price divided by the book value of equity after the IPO falls in the lower quartile of the sample. Offer range is the high minus low range divided by the midrange offer price.

Variable	1	2	3	4
Intercept	8.320 (101.05)***	8.317 (121.60)***	8.895 (155.27)***	9.021 (165.61)***
Rank	-0.183 (-27.30)***	-0.184 (-30.03)***	-0.194 (-27.45)***	-0.191 (-29.84)***
Venture backing	0.030 (1.31)	0.024 (1.13)	0.060 (2.51)**	0.126 (5.90)***
Auditor	-0.360 (-10.19)***	-0.336 (-10.13)***	-0.324 (-8.73)***	-0.284 (-8.41)***
High proceeds	-0.081 (-15.31)***	-0.082 (-16.80)***	-0.074 (-12.63)***	-0.095 (-18.19)***
Low proceeds	0.314 (17.98)***	0.292 (18.06)***	0.316 (17.00)***	0.293 (17.42)***
Shares ratio	0.066 (0.99)			
Unit offering	0.967 (19.68)***	0.973 (21.12)***	0.763 (16.31)***	0.657 (14.97)***
Volatility	0.791 (7.65)***	0.808 (8.51)***		
Squared volatility	-0.211 (-4.37)***	-0.208 (-4.64)***		
Low price to book			-0.216 (-8.53)***	
Offer range				-1.600 (-11.02)***
Adjusted R squared (%)	69.72	68.15	67.67	66.65
N	3807	4583	3677	4674

***Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

Table 5
Comparison of Spreads by Risk Quartiles

Panel A in the following table presents comparisons of mean and median spread percentages for the sample by risk quartile. Medians are denoted by italics. Spread is the percentage of gross proceeds payable to the underwriters. Panel B presents comparisons of mean and median total underwriter compensation. Total compensation includes the gross spread, any non-accountable expense allowance, consulting agreements, and the value of any underwriter's warrants issued. The risk proxy used in Panels A and B is ex-post volatility, the standard deviation of daily returns for months two through thirteen following the IPO. Panel C presents a comparison of total compensation by quartile for the subsample of firms with proceeds less than $16 million and gross spread below ten percent. Panel D provides a similar comparison of total compensation for the subsample of firms with proceeds below $16 million and a gross spread at the cap of ten percent. In Panels C and D, segregate the sample on the basis of the standard deviation divided by the offer proceeds in millions. Panels C and D also show the mean and median offer prices of the sample when segregated by this measure of risk.

Panel A				
	Lowest risk *(N = 1207)*	Low risk *(N = 1207)*	High risk *(N = 1206)*	Highest risk *(N = 1207)*
Mean spread	6.78^{D}	7.34^{C}	7.51^{B}	7.71^{A***}
Median spread	$\mathit{7.00}^{D}$	$\mathit{7.00}^{C}$	$\mathit{7.00}^{B}$	$\mathit{7.00}^{A**}$
Panel B				
	Lowest risk *(N = 1207)*	Low risk *(N = 1207)*	High risk *(N = 1206)*	Highest risk *(N =1207)*
Total compensation	7.04^{D}	8.26^{C}	8.70^{B}	9.37^{A***}
Total compensation	$\mathit{7.00}^{D}$	$\mathit{7.00}^{C}$	$\mathit{7.00}^{B}$	$\mathit{7.00}^{B}$
Panel C				
	Lowest Risk/proceeds *(N = 169)*	Low Risk/proceeds *(N = 169)*	High Risk/proceeds *(N = 169)*	Highest Risk/proceeds *(N = 169)*
Total compensation	8.34^{C}	8.87^{C}	10.45^{B}	11.75^{A***}
Total compensation	$\mathit{7.02}^{B}$	$\mathit{7.50}^{B}$	$\mathit{9.17}^{A***}$	$\mathit{10.09}^{A***}$
Price	9.00^{D}	7.83^{C}	7.08^{B}	5.97^{A***}
Price	$\mathit{9.00}^{D}$	$\mathit{7.50}^{C}$	$\mathit{7.00}^{B}$	$\mathit{5.50}^{A***}$
Panel D				
	Lowest Risk/proceeds *(N = 134)*	Low Risk/proceeds *(N = 134)*	High Risk/proceeds *(N = 134)*	Highest Risk/proceeds *(N = 134)*
Total compensation	14.25^{B}	15.42^{A**}	15.99^{A***}	15.49^{A**}
Total compensation	*14.03*	*15.39*	*15.90*	*14.45*
Price	5.60^{D}	5.07^{B}	4.78^{A**}	4.66^{A***}
Price	$\mathit{5.00}^{D}$	$\mathit{5.00}^{B}$	$\mathit{5.00}^{A**}$	$\mathit{5.00}^{A***}$

Groups denoted by the letter A***, A**, and A* are significantly larger than groups denoted by the letter B at the 1%, 5%, and 10% levels, respectively, and C and D at the 1% level. Groups denoted by the letter A or B are significantly larger than the groups denoted by the letter C at the 1% level. Groups denoted by the letters A, B, or C are significantly larger than the groups denoted by the letter D at the 1% level. Groups with the same letters are not statistically different.

Table 6
OLS Regression of Total Compensation for the Lower Quartile of Proceeds: Unrestricted vs. Restricted

The following table presents the results of estimating an ordinary least squares (OLS) regression with total compensation as the dependent variable for the sample of IPOs with proceeds below $16 million. Total compensation is measured in both percentage and dollar terms in Panels A and B, respectively. The model is estimated for two subsamples: 1) firms with a gross spread below ten percent and 2) firms with a gross spread at the cap of ten percent. Spread is the percentage of gross proceeds payable to the underwriters. Rank is the underwriter rank according to Carter, Dark, and Singh (1998) on a scale of zero to nine. Venture backing is an indicator variable that takes the value of one if a venture capitalist provided pre-IPO funding. Auditor takes the value of one if the auditor is one of the Big Six accounting firms. Proceeds is gross proceeds from the offer in millions. Shares ratio is the number of IPO shares divided by the total outstanding shares after the offer. Unit offering takes the value of one if the offering is a unit IPO, and zero otherwise. Volatility is the standard deviation of daily returns for months two through thirteen following the IPO.

Variable	Total Compensation Percent of Proceeds (Panel A)			Total Compensation Millions of Dollars (Panel B)		
	Unrestricted	Restricted	Difference	Unrestricted	Restricted	Difference
Intercept	12.814 (18.42)***	14.098 (11.04)***	1.284 (0.93)	0.307 (4.47)***	-0.076 (-1.04)	-0.383 (-3.80)***
Rank	-0.623 (-10.51)***	-0.004 (-0.02)	0.619 (3.44)***	-0.071 (-12.16)***	0.005 (0.43)	0.076 (5.79)***
Venture backing	0.093 (0.34)	-0.855 (-1.23)	-0.948 (-1.43)	-0.005 (-0.19)	-0.040 (-1.02)	-0.035 (-0.72)
Auditor	0.134 (0.43)	-0.105 (-0.24)	-0.239 (-0.44)	0.010 (0.33)	-0.006 (-0.22)	-0.016 (-0.39)
Proceeds	-0.188 (-5.05)***	0.030 (0.24)	0.218 (1.97)**	0.080 (21.89)***	0.148 (21.27)***	0.068 (8.36)***
Shares ratio	2.164 (2.33)**	-2.037 (-1.20)	-4.201 (-2.29)**	0.217 (2.36)***	-0.049 (-0.51)	-0.266 (-1.99)**
Unit offering	1.415 (3.19)***	1.891 (4.25)***	0.476 (0.70)	0.140 (3.19)***	0.128 (5.07)***	-0.012 (-0.24)
Volatility	1.130 (3.11)***	0.757 (1.54)	-0.373 (-0.60)	0.102 (2.85)***	0.037 (1.36)	-0.065 (-1.43)
Adjusted R squared (%)	37.01	4.08	43.17	51.82	52.89	54.64
N	519	410	929	519	410	929

***Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

Table 7
OLS Regression of Underpricing

The following table presents the results of estimating an ordinary least squares (OLS) regression with underpricing, initial day return, as the dependent variable. Underpricing is calculated as (initial day closing price – offer price)/ offer price. Rank is the underwriter rank according to Carter, Dark, and Singh (1998) on a scale of zero to nine. Auditor takes the value of one if the auditor is one of the Big Six accounting firms. Venture backing is an indicator variable that takes the value of one if a venture capitalist provided pre-IPO funding. Shares ratio is the number of IPO shares divided by the number of outstanding shares after the offer. Spread cap takes the value of one if the percentage of gross proceeds payable to the underwriters is at the cap of ten percent, and zero otherwise. Volatility is the standard deviation of daily returns for months two through thirteen following the IPO. Year 1995, 1999, and 2000 are dummy variables that take the value of one if the issue was in that year respectively, and zero otherwise. Unit is a dummy variable that takes the value of one if the offering is a unit IPO, and zero otherwise.

Variable	I	II	III
Intercept	-1.779 (-0.65)	4.140 (1.54)	9.651 (4.73)***
Rank	1.713 (6.93)***	1.020 (4.22)***	
Hirank			5.500 (5.71)***
Auditor	-1.507 (-0.98)	-1.460 (-0.99)	-1.164 (-0.80)
Venture backing	4.002 (4.21)***	4.044 (4.43)***	4.769 (5.30)***
Shares ratio	-30.211 (-10.68)***	-23.764 (-8.65)***	-24.118 (-8.82)***
Spread cap	4.840 (2.48)**	5.964 (3.18)***	3.418 (2.00)**
Volatility	21.993 (17.38)***	11.709 (8.40)***	11.769 (8.55)***
Year 1995		8.955 (6.56)***	8.971 (6.57)***
Year 1999		25.059 (17.01)***	23.731 (16.05)***
Year 2000		14.884 (8.35)***	14.008 (5.71)***
Unit	15.623 (7.07)***	16.531 (7.78)***	15.307 (7.30)***
Adjusted R^2 (%)	15.89	22.41	22.48
N	3812	3812	3818

***Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.

Table 8
Estimation of Total Compensation in the Absence of a Restrictive Cap

The following table presents the results of estimating an OLS regression with total underwriter compensation as the dependent variable for the unrestricted subset of IPOs with proceeds below $16 million and spreads below the ten percent cap. Total underwriter compensation includes gross spread, any non-accountable expense allowance, consulting agreement, and the value of any underwriter's warrants issued. In Models A, total underwriter compensation is expressed as a percentage of gross proceeds, while in Model B it is expressed in millions of dollars. Rank is the underwriter rank according to Carter, Dark, and Singh (1998) on a scale of zero to nine. Venture backing takes the value of one if a venture capitalist provided pre-IPO funding. Auditor takes the value of one if the auditor is one of the Big Six accounting firms. Proceeds is gross proceeds from the offer in millions. Shares ratio is the number of IPO shares divided by the total outstanding shares after the offer. Unit takes the value of one if the offering is a unit IPO, and zero otherwise. Volatility is the standard deviation of daily returns for months two through thirteen following the IPO. Total compensation for the restricted sample, IPOs with proceeds below $16 million and gross spreads at the ten percent cap, is estimated using the coefficients from the unrestricted sample regression.

Variable	Total Compensation Percent A	 Millions of dollars B
Intercept	12.814 (18.42)***	0.307 (4.47)***
Rank	-0.623 (-10.51)***	-0.071 (-12.16)***
Venture backing	0.093 (0.34)	-0.005 (-0.19)
Auditor	0.134 (0.43)	0.010 (0.33)
Proceeds	-0.188 (-5.05)***	0.080 (21.89)***
Shares ratio	2.164 (2.33)**	0.217 (2.36)***
Unit	1.415 (3.19)***	0.140 (3.19)***
Volatility	1.130 (3.11)***	0.102 (2.85)***
Adjusted R squared (%)	37.01	51.82
N	519	519
Mean estimated total compensation for the restricted sample	12.78%	15.37%
Mean estimated total compensation for the restricted sample (using parameter estimates from 1995-2000 unrestricted sample)	13.74%	17.08%
Mean actual total compensation for the restricted sample	15.35%	

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.