Directed Share Program in IPO Underwriting and Agency Problems

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Abstract

In this paper I analyze directed share programs (DSPs) that are associated with the underwriting contracts of initial public offerings (IPOs). A DSP reserves IPO shares for officers, directors, employees, customers and vendors. About 87% of all IPOs had such a program between January 1999 and August 2003. DSPs have been criticized in the academic literature because they may create incentives to underprice IPOs. The popular press has called it a "disturbing phenomenon". Moreover, the NASDAQ/NYSE IPO Advisory Committee has recommended that regulatory restrictions be imposed on these programs. Contrary to this criticism, I find no evidence that the beneficiaries of these programs are expropriating wealth from non-beneficiary shareholders. Specifically, I find evidence inconsistent with larger DSPs causing more underpricing. On the other hand, expectation of higher underpricing increases the program size. Finally, revealed preference suggests that top underwriters with primarily institutional clientele lose from this underwriting contract feature.

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I. Introduction

"My granddad played the ponies. My pop bought Lotto tickets. …. I work in Silicon Valley, where the name of the game is "friends and family" stock … more formally known as the directed share program."

- Chris Nolan

This statement appeared in an article published in the September 6, 1999 issue of *Fortune* magazine entitled *"How I Got a Chance at Dot.com Wealth"*. The author, a Silicon Valley columnist and freelance writer, went on to suggest *"(The directed share program) is an easy way to make some cash, and a huge, disturbing phenomenon."*.[1]

Directed share programs reserve a specified number of shares in an IPO offering for persons or entities associated with the issuer, usually the directors, officers and employees, and occasionally customers and suppliers. Under the program, intended beneficiaries may purchase the shares reserved for them from the underwriter at the offer price, but are not obligated to do so. Critics of these programs argue either implicitly or explicitly that beneficiaries of these programs may be able to expropriate wealth from shareholders of the firm if they have the power to influence the level of underpricing in an IPO. Consider, for example, a manager who is only a minority shareholder and also a beneficiary of a directed share program. If she can collude with the underwriter to increase the amount of underpricing in the offering, then she will directly benefit from this increased underpricing by exercising her option to purchase the firm's stock at the offer price. At the same time most of the cost of this increased underpricing will be borne by other shareholders.

Directed share programs have also been criticized by the regulators. In a 2003 report, the NYSE/NASDAQ IPO advisory committee, convened at the request of SEC chairman Harvey Pitt, cautioned that "when misused or overused, an issuer's friends and family program (directed share

[1] The author of the Fortune article invested $7,000 in shares of an IPO and ended up with $16,500 a few days later.

program) may compromise the IPO process". The committee urged that the SEC as well as the NYSE and NASDAQ establish "reasonable parameters" for the fair use of directed share programs. On the academic front Ljungqvist and Wilhelm (2003) have noted that "a directed share program creates an incentive to underprice an offering in order to benefit the targeted clienteles."

Absent from the academic literature, however, has been a critical analysis of whether such an abuse exists. The purpose of this paper is to address this gap in the literature. The hypothesis that directed share programs create an opportunity for wealth expropriation has specific testable implications. For example, if certain beneficiaries have the ability to expropriate wealth from some existing shareholders then we would expect to see a causal relationship between the size of directed share programs and the level of underpricing. For the first time I test this and other implications of the expropriation hypothesis to gauge the extent to which abuse exists. By way of preview, I do not find evidence consistent with the expropriation hypothesis based on this and other empirical tests. My findings have significant policy implications with regard to the regulatory initiatives that are focused on directed share programs. Specifically, my results cast doubt on the wisdom of the NASDAQ/NYSE IPO Advisory Committee's decision to recommend regulatory restrictions on the use of directed share programs.

The remainder of the paper is organized as follows. Section II describes the institutional details of directed share programs. Section III describes the data and the methodology used to analyze directed share programs and the extent to which these programs are used to expropriate wealth. The results are discussed in Section IV. In Section IV, I also discuss some implications of my results regarding the prospect theory of IPO underpricing proposed by Loughran & Ritter (2002) that argues that IPO issuers become complacent when they observe good news and fail to negotiate optimally. Section V concludes.

II. Institutional details about the Directed Share Program:

Directed share programs (henceforth DSPs) show much higher variability than other terms of trade for the IPO.[2] This suggests that they may be the most negotiated term of the IPO underwriting contract after price and quantity. The DSP resembles an American call option. To examine the option-like features of a DSP please refer to Appendix A.1. The payoff to the option-holder is: max [(first-day trading price after the IPO – IPO offer price), 0]. Hence, in contrast to other non-price underwriting terms, it has a direct and immediate impact on the wealth of the option holders which include the key decision-makers of the IPO issuers, such as the directors and the officers. Other beneficiaries of the DSP are employees, customers, suppliers, consultants and other business associates and persons affiliated with the issuer. While DSPs could be used as soft money to pay expenses that do not show up in the financial statements, such expenses would not be tax-deductible.

The option quantity -- the maximum number of shares reserved under the program -- is disclosed in the final prospectus. While the intended beneficiaries may indicate interest in purchasing shares under this program, they are not obligated to do so. Beneficiaries interested in purchasing reserved shares indicate the desired quantity to the underwriters in advance. In case of oversubscription, allocation is decided based on a predetermined method such as random number generation, proportional allocation or management discretion. The option expires one business day after the offer, i.e. shares may be purchased until one working day after the day of the issue.

Due to limitations of the data, I do not observe the option exercise decision by the holders. Hence I assume that all the options will be exercised if in the money, or the first-day return for the underlying shares is positive. To the extent that shares are purchased under this program, allocation to the general public is proportionally reduced. Issuers need to get prior approval from the SEC for having a DSP but

[2] With respect to other terms of the contract: For the underwriting spread, the middle 90% of the distribution is clustered around the 7% sample mode. For lock-up feature, the middle 85% are clustered around 180 days. By comparison, only one-third of the directed share programs are clustered around the size of 5%, the sample mode. The standard deviation for DSP size is 75% of its mean while the standard deviation is 18% of the mean for the number of post IPO analysts and 28% of the mean for the number of market makers. Ellis, Michaely and O'Hara (2006) argue that analyst coverage and market making services are part of the IPO underwriting service.

the program size is not regulated. The program is administered by the underwriter. Shares sold under the DSP are underwritten, unless otherwise specified, and hence the underwriters earn their spread on these shares. Unless otherwise specified, these shares are equivalent to the rest of the shares sold in the IPO and are freely tradable. Hence, shares distributed under the DSP program reduce the number shares available to the public.

A timeline for a DSP is shown in figure I. An initial registration statement is filed at time t = 0. At this time, some of the underwriting terms are known. While the exact offer price is not known at t = 0, a proposed range for the offer price is specified (i.e., a range within which the final offer price is expected to fall). An offer quantity is specified, but this quantity is often updated subsequently. If a DSP exists, intended beneficiary groups are known, but not the number of shares reserved under the program. Subsequently, but before the final offer date; the offering range may be updated. On offer date t, the final offer price and quantity become known. At this time, the quantity of the shares reserved under the DSP is also revealed.

III. Data, Sample Selection and Key Variable Construction

My primary data comes from the Securities Data Corporation's SDC platinum. I start with 2296 IPOs between January 1, 1997 and August 17, 2003. I pick January 1997 as the electronic prospectus and registration statements filed with SEC before 1997 are of considerably poor image quality. August 17, 2004 was the date when I started collecting the IPO data and SDC provided data only until one year before the date of data collection. I eliminate 94 ADRs, 104 spin-offs, 149 issues with more than one class of common stock, 9 limited partnerships and limited liability interests, 17 IPOs with prior LBOs, 2 mutual to stock conversions, 7 unit offerings and 2 subordinated voting shares. In addition, 416 financial firms were also eliminated. Hence, I am left with 1496 IPOs. I started collecting the underwriting contract terms backward from August 17, 2003. In the process, I have manually eliminated another 9 spin offs, 4 dual class IPOs, 4 ADRs and 2 unit offerings. So far, I have 700 issues in my sample from January 01, 1999 to August 17, 2003 out of which 599 are NASDAQ IPOs. I do not plan to extend the

sample back to January 01, 1997 because I observe a discrete jump in both choice and size of DSP only in 1999. I focus exclusively on the NASDAQ-listed issues because this gives me a better control over the size of the issuer and the quality of the market making service provided by the underwriters.

I collect IPO underwriting contract data manually from the registration statements and the prospectus filed with the SEC using Thomson Financial. These include the restriction on sale to discretionary accounts by the underwriter, details of the DSP and the quantity of the over-allotment shares granted by the shareholders and issuer, as well as details of the lock-up contract. There have been some concerns about the quality of the SDC data for primary and secondary shares offered. Hence, I verify the correctness of those data by cross referencing with the final prospectus. I also hand collect the number of shares outstanding after the offering from the final prospectus, as the data reported by SDC have a severe downward bias for this variable during my sample period.

I use the I/B/E/S data from CRSP for analyst coverage and also use CRSP for post-issue price and market-maker count data. I categorize the top-10 underwriters into institutional, mixed and retail managers based on Corwin & Schultz (2005). For my measure of investor sophistication, I get the venture capital reputation related data from VentureExpert. Reputation rank of the VC is computed based on the capital raised between quarter 1 of 1990 and quarter 4 of 1999. If I did not find the name of the VC firm in the VentureExpert data, I assigned it an arbitrary rank of 4000, where the highest ranking or the lowest reputation VC in the database had a rank of 3199. I use another arbitrary rank of 8000 for those firms that did not have a VC investment. Underwriter reputation ranking data was obtained from Jay Ritter's website on March 7, 2006.

III.A Data for DSP and Pre-IPO Ownership Structure

In the registration statement, the information related to the DSP appears as in the example below:

"The underwriters have reserved for sale at the initial public offering price up to 555,555 shares of the common stock for employees, directors and other persons associated with us who have expressed an interest in purchasing common stock in the offering. …… "

The above is an excerpt from the registration statement of Cosi Inc. that went public in Nov 21, 2002. Cosi offered 5,555,556 primary shares and no secondary shares in the IPO. Hence, 10% of the IPO shares were reserved under DSP. We also observe that "directors", "employees" and "associated persons" were the intended beneficiaries of the DSP. My data, however, does not allow me to examine the exact dollar gain of each beneficiary class from DSP because 1) I do not observe the option exercise and 2) In case of multiple listed beneficiaries, usually I do not observe the exact allocation for each of these groups.[3]

I collect pre-IPO share ownership data of all listed officers and seven largest non-officer shareholders from the prospectus. I also use the term officers and managers interchangeably. In my sample, the median board consisted of seven directors (average of 6.8). Hence, I chose the number seven. In more than 95% of my sample, these seven shareholders and five officers covered more than 99% of the holding of the listed shareholders. If the seven largest shareholders (some of which are officers) had exactly 50% of the board seats, then I used the position of chairman to break the tie and determine board control. In case there was no chairman, I used the rank of President or CEO for the same purpose.

III.B Summary Statistics

Figure I shows the time-series trends of DSP size and the first-day return for the associated IPO. In table I, I compare the issuer characteristics of the two groups of IPOs – with or without DSP. On average, IPOs with DSP have 44% higher initial return and 21% lower share ownership of officers than the IPOs without DSP. IPOs without a DSP have a moderately concentrated ownership structure and a higher ownership by the officers and directors.

Small IPOs and very large IPOs typically do not have a DSP. Some of these IPOs also have a less severe underpricing problem. Average initial return for issuers with a DSP during the sample period was 73%. The average size of a DSP was 7.6% of the offer. Employees are the most frequent beneficiaries of the program followed by the directors. Officers appear as beneficiaries in about half of the DSPs and customers and vendors in slightly more than one third.

[3] I observe share allocation for individuals or beneficiary groups in less than 5% of my sample.

IV Empirical Analysis and Results

IV.A DSP Choice

The empirical models to test the relationship between choice of DSP and pre-IPO ownership including ownership by the officers, investor sophistication and the underwriter clientele take the following general form:

$$DSP_i^* = \mu_0 + \mu_1 \cdot VC_i + \mu_2 \cdot OfficerHolding_i + \mu_3 HHI_i + \mu_4 \cdot UnderwriterRank_i \cdot Top10Institutional_i + \mu_5 \cdot X_1 + \omega_i$$

(DSP choice equation 7)

where

$DSP_i = 1$ *if* $DSP_i^* > 0$

and

$DSP_i = 0$ *if* $DSP_i^* \leq 0$

DSP_i = *1* if the i[th] IPO has a DSP

VC_i = 1 if the issuer has a VC investor, 0 otherwise

$OfficerHolding_i$ = Shares owned by the officers / Total shares outstanding before IPO for i^{th} IPO

HHI_i = Pre-IPO Herfindahl index for five largest shareholders or officers of i^{th} IPO, standard method used for calculation of $HHI = \sum_{n=1}^{5} S_n^2$

S_n= shares owned by the n^{th} largest shareholder / total pre-IPO shares outstanding for i^{th} IPO

$Top10Institutional_i$ = 1 if the book running manager is one of the top 10 and has primarily institutional client base. Data taken from Corwin and Schultz (2005).

The equations could be estimated using any qualitative limited dependent variable regression such as a probit or a logit model where X_1 is a vector of control variables. Dummies have been used for two digit SIC codes following Corwin & Schultz (2005). I expect to observe a positive value for μ_1 and negative value for μ_4. Venture capital investors are sophisticated and we expect them to DSP more frequently to mitigate the risk of excessive underpricing.

If we believe that IPOs are underpriced to provide information rent to institutional investors as suggested by Benveniste & Spindt (1989), and institutional investors are earning only the equilibrium rent then μ_4 should be zero. If we observe a negative value for μ_4, then book managers with primarily institutional clientele and/or their clients may be earning more than equilibrium rent and are likely to lose because of the DSP.

Table II reports the results. When venture capital investors are among the pre-IPO shareholders, probability of a DSP increases by at least 77%. For an IPO with VC investment, a one standard deviation increase in the ownership of officers and directors on the other hand, reduces the probability of a DSP by 22%. Assuming correct model specifications, these results may suggest the existence of an agency problem. Similarly, the coefficients for the institutional book managers have the predicted sign but they are not statistically significant either. Although not reported here, in the later sample period I also observe a 4% - 7% higher probability of a DSP if the board is controlled by the top seven shareholders.

IV.B DSP Size

According to Benveniste & Spindt (1989), IPO underpricing is an incentive for the institutional investors to reveal "good news". Hence, if the underpricing is in equilibrium, a DSP will increase underpricing and will hurt the pre-IPO shareholders. If the underpricing is above equilibrium, DSP may or may not increase underpricing and may be beneficial to the pre-IPO shareholders. For a cost benefit analysis of DSP and a numerical solution for the relationship between DSP and underpricing, please see Appendix A.2.

To test the relationship between shares reserved under DSP and potential beneficiaries, I propose the following general model:

$$DSPqty_i = \tau_0 + \tau_1 \cdot Beneficiary:OfficerDirector_i + \tau_2 \cdot Beneficiary:Customers_i + \tau_3 \cdot Beneficiary:Employees_i + \tau_4 \cdot Pricerevision_i + \tau_5 \cdot Top10Institutional_i + \tau_6 \cdot X_2 + \varepsilon_i$$

(DSP quantity equation 8)

where

$DSPqty_i$ = shares reserved under DSP / total shares offered in the IPO of i

*$Beneficiary:OfficerDirectors_i$ = 1 if officers **and** directors are among intended beneficiaries for issue i, zero otherwise. Other beneficiaries are defined likewise*

$Pricerevision_i$ = [amended offer price before IPO – original midpoint of filing range] /original midpoint of the filing range for the i^{th} IPO

The equation could be estimated using a tobit regression where the left hand side variable is censored at 0 and X_2 is a vector of control variables. Intended beneficiaries are decided before the initial registration statements are filed and I take that choice as exogenously given. The values for τ_1, τ_2 and τ_3 suggest how the quantity of shares reserved under DSP is influenced by the choice of beneficiaries. As the officers are likely to negotiate the IPO terms, incentive compatibility argument suggests τ_1 should be positive but I have no prior about τ_2 and τ_3.

The results are reported in table III. When prices are adjusted upward before the IPO, officers and directors rationally expect a high first day return and a high payoff from the DSP. Hence, they negotiate a larger program. A one standard deviation increase in the expected offer price is associated with a 16% increase (from 6.9% of IPO offer size to 8%) in program size. This evidence is inconsistent with the prospect theory of IPO underpricing proposed by Loughran & Ritter (2002) where they argue that IPO issuers become complacent when they observe "good news", i.e. an increase in the final offer price for the IPO, and fail to negotiate optimally.

Unless we have a frictionless market, we can not establish whether pricing choice is optimal by using price data only, as Loughran & Ritter (2003) do. DSP, on the other hand, has a direct impact on the wealth of the officers and the directors and decided along with the final IPO offer price. By analyzing how DSP size is adjusted in response to the ex-ante "good news", i.e. an upward adjustment in the offer price before the IPO, we can infer whether the officers and directors behave rationally. If Loughran & Ritter (2002)'s argument was true and managers of IPO issuers became complacent and failed to negotiate the offer price optimally upon observing good news, then we should have seen a negative relationship between the offer price revision before the IPO and DSP size. We see the opposite. This can be construed as evidence against the prospect theory version of IPO underpricing. For a more formal argument, please see Appendix A.3.[4]

When customers are among the beneficiaries of a DSP, program size increases by about 1%. The reverse happens when employees are among the beneficiaries – the program size decreases by approximately 1%. When officers and directors are among the beneficiaries, the program size increases by a statistically insignificant 0.5%.

The univariate statistics presented in figure III and table VII confirms the regression results that compare the potential aggregate gain from DSP for each beneficiary group for two cases depending on whether the beneficiary group is included or excluded. Given the regression results, it is not surprising that exclusion of officers as beneficiaries have no impact on the gains from the DSP. If officers were negotiating the offer price sub-optimally when they were among the beneficiaries of the program, we should have observed a higher ex-post gain for those programs in which they participate. As we do not observe the DSP exercise choice I assume that the option embedded in DSP will be exercised only when the first-day return is higher than 1%. Potential gain is computed by multiplying the number of shares

[4] I assume that complacent managers unwilling to negotiate cash offer price would not negotiate hard for the terms of a DSP. Initial price revision (before IPO) is the normalized difference between the latest amended and the original midpoint of the price range. Using the final offer price revision instead of the initial price revision would implicitly assume a negotiation sequence where final offer price is decided prior to DSP size negotiation. If I use the final offer price revision, the economic significance of good news remains similar but the statistical significance decreases.

reserved under the DSP with the difference between the first day closing price and the IPO offer price when the first day return is 1% or higher and zero otherwise. In table VII, I do not observe any significant difference, either economic or statistical, in potential payoff from DSP for these two cases.

In sharp contrast, customers are included in those DSP where the average gain at 9.5 million dollars (8.1% of the IPO proceeds) is almost twice (5.1% of the IPO proceeds) relative to those DSPs where customers do not participate.

IV.C Sample Selection Bias for DSP Choice and Size

The expected benefit of the DSP is unobservable ex-ante, and hence can not be estimated directly. IPO issuers or the issuers' agents, however, will demand a DSP only when they expect the benefit of the program to be greater than the cost. This problem is analogous to the issues frequently encountered in labor economics. For instance, while estimating the wage of women, a woman's decision whether to work or not may depend on the wage she expects to earn. Hence, estimating wage based on the observed data of working women will introduce self-selection bias. Similarly, estimating the parameters of equation 8, while ignoring such self-selection, will incorporate an upward bias.

A modified Heckman or Heckit procedure is used which rejects the null of no sample selection bias at 10% (p value 0.054 but surprisingly the correlation coefficient obtained was negative) but results are not reported.[5] A common criticism against the Heckman procedure is that the parameter estimates are very sensitive to the distributional assumption underlying the model.[6] Hence, I control for such self selection bias by estimating the DSP choice and size jointly by using a maximum likelihood procedure. The results are reported in table IV.

Once the sample selection bias has been controlled for, we observe two major changes. First, for the IPOs with VC investment, ownership level of officers and directors no longer influences the choice of DSP. In contrast, institutional book managers now have significant

[5] Heckit is a modified A Heckman two-stage estimation procedure where the second stage is a tobit regression instead of a least squares. The DSP size data is censored at 0 on the left hand side and hence the tobit regression.

[6] For a detailed discussion on this strand of literature and issues involved see Heckman (1979, 1990).

negative bias towards DSP. Probability of a DSP is 17% lower if the underwriter is a top 10 institutional book manager such as CSFB, Goldman Sachs and FleetBoston compared to the rest of the underwriters. Revealed preference suggests that either the institutional buyers of the IPO shares or the underwriters whose primary clients are such institutions may lose because of a DSP.

IV.D DSP Size and IPO Underpricing using OLS

The following equation tests the relationship between the size of a DSP and the first-day return:

$$InitialRet_i = \kappa_0 + \kappa_1 \cdot DSPqty_i + \kappa_2 \cdot X_3 + \upsilon_i$$

(underpricing regression equation 9)

where

$InitialRet_i$ = [first-day closing price – offer price] / offer price for the i^{th} IPO

This equation can be estimated using an OLS regression where X_3 is a vector of standard control variables used in the literature. The results in table V suggest that a one standard deviation increase in DSP is associated with a 2% higher first day return. This estimation strategy, however, is flawed as it does not address the reverse causality problem. For example, does 1) a large quantity of shares reserved under DSP is results in a lower offer price and hence, a high initial return or 2) the expectation of a high first-day return based on the belief that the offer price is too low is responsible for a large size of DSP. Hence, I propose the following system of equations as a better identification strategy.

IV.E Endogeneity - DSP Size and IPO Underpricing using IV

The general strategy for addressing the endogeneity concern is to estimate the following system of linear equations using a set of instrument variables:

$$DSPqty_i = \gamma_0 + \gamma_1 \cdot InitialRet_i + \gamma_2 \cdot Beneficiary : OfficerDirectors_i + \gamma_3 \cdot Beneficiary : Vendors_i + \gamma_4 \cdot Beneficiary : Employees_i + \gamma_5 \cdot X_4 + \theta_i$$

(DSP quantity equation 10.1)

$$InitialRet_i = \delta_0 + \delta_1 \cdot DSPqtyi + \delta_2 \cdot Beneficiary : OfficerDirectors_i + \delta_3 \cdot Beneficiary : OfficerDirectors_i \cdot DSPqty_i + \delta_4 \cdot Marketmaker_i + \delta_5 \cdot Analyst_i + \delta_6 \cdot X_4 + \xi_i$$

(Underpricing regression equation 10.2)

where

$Marketmaker_i$ = Number of market-makers for the i^{th} IPO t trading days after the IPO where t = 1, 5, 10, 20 and the average over these periods

$Analyst_i$ = Number of analysts from the underwriting syndicate that initiate coverage of the i^{th} issuer between the 26^{th} calendar day (quiet period is over) and 115^{th} calendar day after the IPO.

Underwriters may adjust IPO offer price for providing market-making service and analyst coverage. Cost of providing such services will be reflected in the first-day return and is unlikely to be adjusted through the DSP. Hence, I use the variables *Analyst* and *Marketmaker* for identifying the DSP size equation.

The quantity of shares reserved under the DSP may be influenced by whether vendors and employees are the potential beneficiaries of the DSP. It is unlikely that the officers and directors will deliberately negotiate a sub-optimal offer price for the benefit of these groups. If IPO issuers want to offer cash incentives to employees and vendors, they do not need to do it through a DSP. They can raise the cash through IPO without a DSP, and make an adjustment to the prices of labor and/or goods or services provided. Hence, as beneficiaries of DSP, employees and vendors are unlikely to influence the offer price, and as a result, initial return. Therefore, I use the dummy variables *Beneficiary:Vendors* and *Beneficiary:Employees* for identification of the underpricing equation. The system of equations is estimated using an iterative three stage least square (IT3SLS).

The results are reported in table VI. Once we control for endogeneity, DSP has a large positive, albeit statistically significant influence on the first day return. A one standard deviation increase in the DSP size is associated with a statistically insignificant 41.7% higher first day return. If the concern about DSP abuse were true, we should have observed a positive and statistically significant coefficient here. When officers and directors are among the beneficiaries, DSP size increases by a statistically insignificant 0.5% and the first-day return remains unaffected. In contrast, a one standard deviation increase in the first-day return results in a statistically significant 16% higher DSP size (relative to the median DSP size of 6%). Hence, I reject the null that DSPs create incentives for officers and directors to underprice shares for their own benefit.

IV.F Robustness Check

IV.F.1 Validity of the instruments

Are the instruments used for estimating DSP size and first-day returns valid? The economic rationale for using employees and vendors to identify the underpricing regression is the following. If issuers want, they can easily adjust to the prices of labor and goods provided to benefit the employees and vendors, respectively, rather than using a DSP. Similarly, for underwriters, it is easier to adjust the IPO offer price to reflect the services provided such as market making and analyst coverage instead of increasing or reducing the DSP size.

I use several diagnostic tests for weak instruments outlined by Staiger and Stock (1997) and Stock and Yogo (2004). For the first stage regression in the 3SLS, the F-statistic for identifying the first-day return is 32.88. The equation for directed share program is not as well identified. When both number of market makers and number of analysts are used as instruments, the F-statistic is 5.49. The F-statistic improves to 33.64 when I use only the number of market makers as an instrument. Hence, the number of market makers is a better instrument than the number of analysts. The Shea partialled R^2 for the excluded instruments (number of market makers and number of analysts) is 0.045 and the partialled F-statistic is 4.13.

For the second stage, the Darwin-Wu- Hausman test statistic proposed by Davidson and MacKinnon (1993) is 25.15 and a p-value of 0.000 under a χ^2 distribution with one degree of freedom. Hence, the null that OLS is efficient is rejected. The Basman test (Hansen J test) for overidentifying restrictions, on the other hand has a p value of 0.046 (0.032) and rejects the null that all the instruments are exogenous for the identification of the directed share program size equation. Next, I do the Sargan test which is a joint test of the model specification and the validity of the instruments. I obtain a Chi-sq statistic of 0.218 and a p-value of 0.641. Hence, I fail to reject the null that the instruments are exogenous. Dahlberg, Johansson and Tovmo (2002) examine the power properties of the Sargan test using panel data set and conclude the following. When the independent variable (DSP size) is treated as endogenous and it does not have any measurement error, then at 1% level, the Sargan test rejection rate is 0.1%, 1.0% and 0.8% for a sample size of 100, 500 and 1000, respectively. Hence, I eliminate the concern that Sargan test under-rejects the null for my sample size of 700.

IV.F.2 Lock up

Occasionally, shares purchased under a DSP may be under lock-up when purchased by individuals who also own shares that are locked up as part of the underwriting contract. In such cases, the number of days of lock-up for shares purchased under the DSP by such persons may be the same as the regular lock-up contract or better for the buyer, i.e. the lock-up period may be shorter. I observe such lock-ups in about 2% of my sample so far. My results remain similar even if I exclude those observations or compute the gain from the DSP once such a lock-up expires. I also repeat the tests in table IV and V after including the details of the lock up contract such as normalized lock up days and the percentage of pre-IPO shares that are locked up. The results are very similar in both the cases.

IV.F.3 Impact of overallotment option

Underwriters usually sell 115% of the nominal offer size. If the price in the secondary market falls below the offer price, underwriters purchase the remaining 15% shares from the open market. On the other hand, if price goes up in the secondary market after the IPO, the underwriters exercise the overallotment option (henceforth OAO) and buy shares from the IPO issuer or a few individual

shareholders or both. The first case is equivalent to each pre-IPO shareholder granting the option in proportion to their ownership.

The OAO granted to the underwriters has characteristics that are somewhat opposite to those of the DSP and should also be analyzed. Payoff from the OAO is: min [- (day 1 price – 93% of IPO offer price), 0][7]. Granting this option will have a negative impact on the individual shareholders' wealth when the first-day return is positive. The OAO quantity is a standard underwriting term usually fixed at 15% of the offer size. Hence, the results should not be affected by the total OAO quantity. In any case, I re-estimate the parameters in table III to IV after subtracting OAO size from DSP with the sample is truncated at -0.15. The results remain virtually same with a shift in the intercept.

Individual shareholders, however, are less likely to grant OAO when they expect high first-day return, i.e. when more shares are reserved under the DSP. If pre-IPO shareholders behave consistently, then we should observe a negative relationship between the dummy variable that describes if individual shareholders granted OAO and the size of a DSP. DSP size is 1.3% smaller (p-value 0.025) relative to the offer size for those IPOs where individual shareholders grant OAO. This is an 18% reduction over the average DSP size of 7.4%.

IV.F.4 Influence of the founder(s)

Founders may be a special group of shareholders and could influence the choice and size of DSP in a manner different than the officers and other large shareholders. Hence, tests in table II to VI were repeated after including founder-specific variables. The variables included are 1) the number of active co-founders, 2) the number of co-founders listed as executive officers, 3) the number of co-founders that are listed as directors, 4) whether the chairman, president or CEO of the firm going public is a (co-)founder and 5) the cumulative shareholding of active co-founders. I define active as those who are (i) directors or executive officers or (ii) neither a director nor an officer but have at least 5% holding and are

[7] Payoff to Underwriters will be max [(day 1 price – 93% of IPO offer price), 0] as the underwriters earn the standard 7% discount on the shares sold under OAO. Strike price, however is the offer price and not 93% of offer price because below offer price the underwriter is expected to provide price support and purchase the shares from open market. This also assumes that the first-day trading price is the unbiased estimate of the expected price over the 30 days after the IPO. The option usually expires after 30 days for more than 90% of the IPOs.

associated with the issuer in the capacity of consultant or scientific advisor. I do not specifically include the shareholding of the co-founder with largest ownership. This is because more than 25% of my sample has two or more active co-founders and in most of these cases co-founders own equal or comparable number of shares. Including a variable for ownership of the co-founder with largest holding would incorrectly represent such cases.

A founder acting as a chairman significantly influences both the choice and size of the program only after March 16, 2000 and founders as president or CEO have no significant influence. Once the founder specific information has been controlled for, ownership and concentration of the shares held by the officers do not matter. Founder as a chairman is associated with a 6% lower probability of a DSP. A one standard deviation increase in shares held by the (co)founder(s) is also associated with a 3% decrease in the probability of a DSP. In univariate tests between the IPOs with and without a DSP, however, no significant difference was observed for co-founders' holding or if the chairman was a co-founder.

Surprisingly, founder as a chairman had the opposite influence on program size. After March 16, 2000, when the chairman was a co-founder, program size increased by 0.6% to 0.9%. This is a 9% - 14% increase relative to the average program size of 6.4%. One possible explanation could be that founder-chairmen wielded some influence over underwriters and were able to negotiate a better offer price than non-founder chairmen and hence, needed a DSP less frequently. At the same time, when founder-chairmen needed a DSP, they were able to negotiate a larger program size. The influence of rest of the founder-specific variables on choice or size of DSP is significant neither economically nor statistically. For the full sample, influence of founder-chairman is not significant statistically at the conventional level.

IV.F.5 IPOs from NYSE and Amex

The results reported are for NASDAQ IPOs only. I repeat the tests after including NYSE and AMEX IPOs between January 1, 2000 and August 17, 2003. Introducing NYSE and AMEX IPOs incorporate a higher degree of variability in IPO size. These IPOs also add extra mass to the left hand tail of the DSP size distribution. In general, I obtain similar results when I repeat the tests in table IV and VI

except the economic significance for *beneficiary: officers and directors* (on program size) decrease substantially.

IV.F.6 Miscellaneous

Instead of looking at whether the seven largest shareholders control the board, I also look at whether n largest shareholders control the board where n is the number of directors in the board of the i^{th} IPO. I also control for the total number of recipient groups for DSP size estimation. DSPs are smaller (statistically insignificant) when number of recipient groups is large. The rest of the results are very similar.

VI. Conclusions

This paper contributes to the literature by examining whether directed share programs create an agency problem between pre-IPO shareholders and officers and/or directors. The agency problem can arise because officers and directors who may have very little ownership in the IPO firm and bear only a small fraction of the cost of underpricing, can reap most of the benefits of these programs from underpricing. I find evidence inconsistent with the hypothesis that these directed share program beneficiaries are able to expropriate wealth from pre-IPO shareholders. In particular, I find no significant relationship, either economic or statistical, between the ownership level of the officers and directors and the choice and size of the programs, once I control for sample selection bias. Although officers and directors are among the beneficiaries of DSP, their participation does not influence the program size. On the other hand, I find that probability of a DSP is 17% lower when the lead book manager is among the top 10 underwriters and has primarily institutional investors as clients. The last might imply that these underwriters lose from directed share programs.

Second, when offer prices are revised upward before the IPO, which is an ex-ante measure of "good news" and undepricing, issuers negotiate a larger program size. This suggests that the IPO issuers expect a profitable DSP and hence they negotiate a larger program size. This evidence is inconsistent with the prospect theory of IPO underpricing proposed by Loughran & Ritter (2003) where they argue that IPO

decision makers become complacent and do not negotiate optimally when they observe "good news". Yet, when I estimate underpricing and DSP size jointly, I do not find that DSPs cause underpricing. Hence, the hypothesis that directed share programs create an opportunity for wealth expropriation by the officers and the directors is rejected. Based on these results, I argue against the regulatory restrictions recommended by the NASDAQ/NYSE IPO Advisory Committee to limit the size of these programs.

Appendix – A.1

Characteristics of the two IPO underwriting options:

	DSP	OAO
Type of Option	Call	Call
Beneficiaries (holder of the option)	One or more of the following: officers, directors/shareholders, employees, customers/vendors.	Underwriters
Counterparty (writer of the option)	Underwriters	Issuer / Shareholders[8]
Strike Price	IPO Offer Price	IPO Offer Price
Expires	1 day after IPO	30 days after IPO
Payoff to shareholders/issuers	max [(day 1 price – IPO offer price), 0]	min [- (day 1 price – 93% of IPO offer price), 0][9]

[8] By default issuer grants 15% of the offer size as OAO. We are, however, looking at the fraction of 15% that is granted by the shareholders, if any.

[9] Payoff to Underwriters will be max [(day 1 price – 93% of IPO offer price), 0][9] as the underwriters earn the standard 7% discount on the shares sold under OAO. Strike price, however is the offer price and not 93% of offer price because below offer price the underwriter is expected to provide price support and purchase the shares from open market.

Appendix - A.2

Cost and Benefit of DSP

Let's begin with the cost of DSP. Consider two identical IPOs, one with a DSP and one without. For each IPO, S_0 shares are sold. Let's also assume that during the marketing process, both sets of issuers and underwriters learn that the IPOs are expected to do well in the secondary market. I assume that on the first-trading day (figure 1) closing prices for both the IPOs will be P_1 and this is common knowledge for the issuers and the underwriters. I also assume that pricing error will be M for each of the two IPOs. Following Benveniste & Spindt (1989), we can think of M as the incentive provided to informed buyers of IPO shares for revealing good news and is strictly positive. We can consider institutional investors as informed.

The IPO with a DSP reserves S_d shares under the program. Hence, shares available for distribution for this IPO is $[(S_0 - S_d), S]$ and depends on the actual exercise of the option under DSP. I make a simplifying assumption that when M is positive, the entire quantity of the option is exercised and shares available for distribution is $(S_0 - S_d)$. As shares available for distributed decreases from S to $(S_0 - S_d)$, so does the aggregate incentive of the informed investors and they will demand additional compensation. In equilibrium, underwriters will pass on the cost of such compensation to issuers and each of these $(S_0 - S_d)$ shares of IPO with a DSP will have to be priced lower than the shares of the equivalent IPO without a DSP. Under the uniform pricing method, all S shares of the IPO with a DSP will be sold at a lower price and will earn a higher initial return than the IPO without a DSP.

Lowering the offer price and passing on the entire cost of the program to the issuers could be costly to the underwriters as the dollar amount of underwriting discount per share, usually fixed at 7% of the offer price according to Chen and Ritter (2000), would decrease. Issuers, however, have a certain capital raising objective and if the offer price decreases, I assume the quantity of shares offered will be increased and the dollar value of the gross underwriting discount will remain the same.

For each share of IPO without and with a DSP, underwriters will offer P_0 and P_d, respectively. P_d is lower than P and reflects only the cost of redirecting some of the IPO shares and does not include any inventory risk associated with the size of the program that underwriter may bear.

Therefore, we obtain the following equality:

$$S_0 \cdot (P_1 - P_0) = (S_0 - S_d) \cdot (P_1 - P_d) = M \qquad (1)$$

After canceling terms and rearranging,

$$P_d \cdot (S_0 - S_d) = S_0 \cdot P_0 - S_d \cdot P_1 \qquad \text{or} \qquad P_d = \frac{P_0}{(S_0 - S_d)} \cdot \left(S_0 - S_d \cdot \frac{P_1}{P_0} \right)$$

$$\frac{P_d}{P_1} \cdot \frac{P_1}{P_0} = \frac{S_0}{(S_0 - S_d)} \cdot \left(1 - \frac{S_d}{S_0} \cdot \frac{P_1}{P_0} \right)$$

Substituting, $r_0 = \frac{P_1}{P_0} - 1$, $r_d = \frac{P_1}{P_d} - 1$ and $DSPqty = \frac{S_d}{S_0}$ we obtain,

$$\frac{(1 + r_0)}{(1 + r_d)} = \frac{1}{(1 - DSPqty)} \cdot [1 - DSPqty \cdot (1 + r_0)]$$

or,

$$(1 + r_d) = \frac{(1 + r_0) \cdot (1 - DSPqty)}{[1 - DSPqty \cdot (1 + r_0)]}$$

Simplifying[10],

$$r_d = \frac{r_0}{1 - DSPqty \cdot (1 + r_0)} \qquad (2)$$

Here, r_0 and r_d are equivalent first-day returns without and with DSP, respectively, and DSPqty is the normalized size of DSP, expressed as percentage of offer size. From equation (2), for positive values of r_0, r_d increases in the size of DSP. For large values of r_0 as well as DSPqty, r_d becomes negative. Hence, this analysis applies only for certain range of r_0 and DSPqty. For instance, when r_0 is 60% which

[10] $\frac{(1+y)\cdot(1-x)}{1-x\cdot(1+y)} = 1 + \frac{y}{1-x\cdot(1+y)}$

was the average first day return for IPOs during my sample period, an IPO that reserves 10% of the shares under DSP will have 71.4% first-day return. When $r_0 = 0.2$, however, an IPO with a DSP of the same size will have 22.7% first-day return. If underwriter adjusts the offer price for the inventory risk originated from the DSP, then r_d will be higher. A numerical solution for equilibrium return at different values of DSPqty is presented in appendix A.2.1 and figure A.I.

Let us now discuss the benefit of a DSP. If IPO issuers believe that the price offered by the underwriters is low and excessively so relative to their expectation of the first day trading price and information rent for institutional investors, they will attempt to redirect part of M through a DSP. We can write the benefit, B and cost, C of DSP as:

$$B = (1-\alpha) \cdot S_d \cdot (P_1 - P_d) \tag{3}$$

where α is a measure of indirect loss from DSP and can take any value in [0, 1].

$$C = S_0 \cdot (P_0 - P_d) \tag{4}$$

IPO issuers will want a DSP only when the benefit of the program at least equals the cost. Hence, in equilibrium, a DSP will be observed only when the following inequality holds:

$$(1-\alpha) \cdot S_d \cdot (P_1 - P_d) \geq S_0 \cdot (P_0 - P_d) \tag{5}$$

$$(1-\alpha) \cdot \frac{S_d}{S_0} \geq \left(\frac{P_0 - P_d}{P_1 - P_d} \right)$$

Substituting for $DSPqty = \frac{S_d}{S_0}$, $r_0 = \frac{P_1}{P_0} - 1$ and $\beta = \frac{P_d}{P_0}$ where $0 < \beta < 1$,

$$DSPqty \geq \frac{1}{(1-\alpha)} \cdot \left(\frac{1-\beta}{1+r_0-\beta} \right) \tag{6}$$

We can think of β as the price concession that issuers must offer to the underwriters in exchange for a DSP. In Equation 6, both α, and β are constrained in [0, 1] but initial return, r_0 is not. This suggests that for high initial return, the threshold size beyond which a DSP can be beneficial for issuers becomes lower even if β decreases as long as α is held constant and does not approach 1. A numerical solution for

DSPqty for $\alpha = 0.25$ and 0.4 and a range of values for β and r_0 is presented in section A.2.2, A.2.3 and figure A.II. When initial return is as high as 60%, issuers that negotiate a DSPqty of at least 9.62% are better off than identical issuers without a DSP despite a 25% indirect loss from DSP and a 5% discount in offer price. A DSpqty of 5% is beneficial for the issuers on the zone left of the zigzag lines in appendices A.2.2 and A.2.3.

The term α may be interpreted as a loss to the shareholders. In an arms length negotiation, such losses may happen when beneficiaries of the program such as employees, including officers, and vendors make less than equivalent concession in wages and prices for their services and goods, respectively. Similarly, customers' agents may benefit from the program but this may not necessarily create loyalty for the IPO issuer. Finally, officers with insignificant ownership in the issuer may expropriate wealth from other shareholders through the program. Large shareholders may expropriate minority shareholders in a similar fashion. As long as α and β does not approach one and zero, respectively, in a high underpricing regime, pre-IPO shareholders may still be willing to let other stakeholders such as employees, officers, customers and suppliers of the firm benefit from the program.

Directed share program may also act as a deterrent against sub-optimal pricing. It reduces the incentive of the underwriter to lowball the issuer because such an offer increases the probability that options will be in the money and hence, exercised.

Appendix – A.2.1

Adjusted initial return in equilibrium for IPOs with DSP

r_d	Shares reserved under DSP (DSPqty)										
	0.00	***0.05***	***0.10***	***0.15***	***0.20***	***0.25***	***0.30***	***0.35***	***0.40***	***0.45***	***0.50***
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.04
0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.06	0.06
0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.06	0.07	0.08	0.08
0.05	0.05	0.05	0.06	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.11
0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.09	0.10	0.10	0.11	0.13
0.07	0.07	0.07	0.08	0.08	0.09	0.10	0.10	0.11	0.12	0.14	0.15
0.08	0.08	0.08	0.09	0.10	0.10	0.11	0.12	0.13	0.14	0.16	0.17
0.09	0.09	0.10	0.10	0.11	0.12	0.12	0.13	0.15	0.16	0.18	0.20
0.10	0.10	0.11	0.11	0.12	0.13	0.14	0.15	0.16	0.18	0.20	0.22
0.11	0.11	0.12	0.12	0.13	0.14	0.15	0.16	0.18	0.20	0.22	0.25
0.12	0.12	0.13	0.14	0.14	0.15	0.17	0.18	0.20	0.22	0.24	0.27
0.13	0.13	0.14	0.15	0.16	0.17	0.18	0.20	0.22	0.24	0.26	0.30
0.14	0.14	0.15	0.16	0.17	0.18	0.20	0.21	0.23	0.26	0.29	0.33
0.15	0.15	0.16	0.17	0.18	0.19	0.21	0.23	0.25	0.28	0.31	0.35
0.16	0.16	0.17	0.18	0.19	0.21	0.23	0.25	0.27	0.30	0.33	0.38
0.17	0.17	0.18	0.19	0.21	0.22	0.24	0.26	0.29	0.32	0.36	0.41
0.18	0.18	0.19	0.20	0.22	0.24	0.26	0.28	0.31	0.34	0.38	0.44
0.19	0.19	0.20	0.22	0.23	0.25	0.27	0.30	0.33	0.36	0.41	0.47
0.20	0.20	0.21	0.23	0.24	0.26	0.29	0.31	0.34	0.38	0.43	0.50
0.25	0.25	0.27	0.29	0.31	0.33	0.36	0.40	0.44	0.50	0.57	0.67
0.30	0.30	0.32	0.34	0.37	0.41	0.44	0.49	0.55	0.63	0.72	0.86
0.35	0.35	0.38	0.40	0.44	0.48	0.53	0.59	0.66	0.76	0.89	1.08
0.40	0.40	0.43	0.47	0.51	0.56	0.62	0.69	0.78	0.91	1.08	1.33
0.45	0.45	0.49	0.53	0.58	0.63	0.71	0.80	0.91	1.07	1.29	1.64
0.50	0.50	0.54	0.59	0.65	0.71	0.80	0.91	1.05	1.25	1.54	2.00
0.55	0.55	0.60	0.65	0.72	0.80	0.90	1.03	1.20	1.45	1.82	2.44
0.60	0.60	0.65	0.71	0.79	0.88	1.00	1.15	1.36	1.67	2.14	3.00
0.65	0.65	0.71	0.78	0.86	0.97	1.11	1.29	1.54	1.91	2.52	3.71
0.70	0.70	0.77	0.84	0.94	1.06	1.22	1.43	1.73	2.19	2.98	4.67
0.75	0.75	0.82	0.91	1.02	1.15	1.33	1.58	1.94	2.50	3.53	6.00
0.80	0.80	0.88	0.98	1.10	1.25	1.45	1.74	2.16	2.86	4.21	8.00
0.85	0.85	0.94	1.04	1.18	1.35	1.58	1.91	2.41	3.27	5.07	11.33
0.90	0.90	0.99	1.11	1.26	1.45	1.71	2.09	2.69	3.75	6.21	18.00

r_0 (initial return without DSP)

Appendix – A.2.2

Threshold size for a profitable DSP (for α = 0.25). A DSP size of 5% is profitable for the issuer at the left of the zigzag line.

DSPqty	Discount factor for Offer Price of IPOs with DSP (β)													
	1.00	***0.99***	***0.98***	***0.97***	***0.96***	***0.95***	***0.94***	***0.93***	***0.92***	***0.91***	***0.90***	***0.85***	***0.80***	***0.75***
0.01	0.00	0.67	0.89	1.00										
0.02	0.00	0.44	0.67	0.80	0.89	0.95	1.00							
0.03	0.00	0.33	0.53	0.67	0.76	0.83	0.89	0.93	0.97	1.00				
0.04	0.00	0.27	0.44	0.57	0.67	0.74	0.80	0.85	0.89	0.92	0.95			
0.05	0.00	0.22	0.38	0.50	0.59	0.67	0.73	0.78	0.82	0.86	0.89	1.00		
0.10	0.00	0.12	0.22	0.31	0.38	0.44	0.50	0.55	0.59	0.63	0.67	0.80	0.89	0.95
0.15	0.00	0.08	0.16	0.22	0.28	0.33	0.38	0.42	0.46	0.50	0.53	0.67	0.76	0.83
0.20	0.00	0.06	0.12	0.17	0.22	0.27	0.31	0.35	0.38	0.41	0.44	0.57	0.67	0.74
0.25	0.00	0.05	0.10	0.14	0.18	0.22	0.26	0.29	0.32	0.35	0.38	0.50	0.59	0.67
0.30	0.00	0.04	0.08	0.12	0.16	0.19	0.22	0.25	0.28	0.31	0.33	0.44	0.53	0.61
0.35	0.00	0.04	0.07	0.11	0.14	0.17	0.20	0.22	0.25	0.27	0.30	0.40	0.48	0.56
0.40	0.00	0.03	0.06	0.09	0.12	0.15	0.17	0.20	0.22	0.24	0.27	0.36	0.44	0.51
0.45	0.00	0.03	0.06	0.08	0.11	0.13	0.16	0.18	0.20	0.22	0.24	0.33	0.41	0.48
0.50	0.00	0.03	0.05	0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.31	0.38	0.44
0.55	0.00	0.02	0.05	0.07	0.09	0.11	0.13	0.15	0.17	0.19	0.21	0.29	0.36	0.42
0.60	0.00	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.17	0.19	0.27	0.33	0.39
0.65	0.00	0.02	0.04	0.06	0.08	0.10	0.11	0.13	0.15	0.16	0.18	0.25	0.31	0.37
0.70	0.00	0.02	0.04	0.05	0.07	0.09	0.11	0.12	0.14	0.15	0.17	0.24	0.30	0.35
0.75	0.00	0.02	0.03	0.05	0.07	0.08	0.10	0.11	0.13	0.14	0.16	0.22	0.28	0.33
0.80	0.00	0.02	0.03	0.05	0.06	0.08	0.09	0.11	0.12	0.13	0.15	0.21	0.27	0.32
0.85	0.00	0.02	0.03	0.05	0.06	0.07	0.09	0.10	0.11	0.13	0.14	0.20	0.25	0.30
0.90	0.00	0.01	0.03	0.04	0.06	0.07	0.08	0.10	0.11	0.12	0.13	0.19	0.24	0.29
0.95	0.00	0.01	0.03	0.04	0.05	0.07	0.08	0.09	0.10	0.12	0.13	0.18	0.23	0.28
1.00	0.00	0.01	0.03	0.04	0.05	0.06	0.08	0.09	0.10	0.11	0.12	0.17	0.22	0.27
1.20	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.15	0.19	0.23
1.40	0.00	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.09	0.13	0.17	0.20
1.60	0.00	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.11	0.15	0.18
1.80	0.00	0.01	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.06	0.07	0.10	0.13	0.16
2.00	0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.06	0.09	0.12	0.15
2.20	0.00	0.01	0.01	0.02	0.02	0.03	0.04	0.04	0.05	0.05	0.06	0.09	0.11	0.14
2.40	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.08	0.10	0.13
2.60	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.05	0.07	0.10	0.12
2.80	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.07	0.09	0.11
3.00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.06	0.08	0.10

r_0 (initial return without DSP)

Appendix – A.2.3

Threshold size for a profitable DSP (for α = 0.40). A DSP size of 5% is profitable for the issuer at the left of the zigzag line.

DSPqty	Discount factor for Offer Price of IPOs with DSP (β)													
	1.00	***0.99***	***0.98***	***0.97***	***0.96***	***0.95***	***0.94***	***0.93***	***0.92***	***0.91***	***0.90***	***0.85***	***0.80***	***0.75***
0.01	0.00	0.83												
0.02	0.00	0.56	0.83											
0.03	0.00	0.42	0.67	0.83	0.95									
0.04	0.00	0.33	0.56	0.71	0.83	0.93								
0.05	0.00	0.28	0.48	0.63	0.74	0.83	0.91	0.97						
0.10	0.00	0.15	0.28	0.38	0.48	0.56	0.63	0.69	0.74	0.79	0.83			
0.15	0.00	0.10	0.20	0.28	0.35	0.42	0.48	0.53	0.58	0.63	0.67	0.83	0.95	
0.20	0.00	0.08	0.15	0.22	0.28	0.33	0.38	0.43	0.48	0.52	0.56	0.71	0.83	0.93
0.25	0.00	0.06	0.12	0.18	0.23	0.28	0.32	0.36	0.40	0.44	0.48	0.63	0.74	0.83
0.30	0.00	0.05	0.10	0.15	0.20	0.24	0.28	0.32	0.35	0.38	0.42	0.56	0.67	0.76
0.35	0.00	0.05	0.09	0.13	0.17	0.21	0.24	0.28	0.31	0.34	0.37	0.50	0.61	0.69
0.40	0.00	0.04	0.08	0.12	0.15	0.19	0.22	0.25	0.28	0.31	0.33	0.45	0.56	0.64
0.45	0.00	0.04	0.07	0.10	0.14	0.17	0.20	0.22	0.25	0.28	0.30	0.42	0.51	0.60
0.50	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.20	0.23	0.25	0.28	0.38	0.48	0.56
0.55	0.00	0.03	0.06	0.09	0.11	0.14	0.16	0.19	0.21	0.23	0.26	0.36	0.44	0.52
0.60	0.00	0.03	0.05	0.08	0.10	0.13	0.15	0.17	0.20	0.22	0.24	0.33	0.42	0.49
0.65	0.00	0.03	0.05	0.07	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.31	0.39	0.46
0.70	0.00	0.02	0.05	0.07	0.09	0.11	0.13	0.15	0.17	0.19	0.21	0.29	0.37	0.44
0.75	0.00	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.28	0.35	0.42
0.80	0.00	0.02	0.04	0.06	0.08	0.10	0.12	0.13	0.15	0.17	0.19	0.26	0.33	0.40
0.85	0.00	0.02	0.04	0.06	0.07	0.09	0.11	0.13	0.14	0.16	0.18	0.25	0.32	0.38
0.90	0.00	0.02	0.04	0.05	0.07	0.09	0.10	0.12	0.14	0.15	0.17	0.24	0.30	0.36
0.95	0.00	0.02	0.03	0.05	0.07	0.08	0.10	0.11	0.13	0.14	0.16	0.23	0.29	0.35
1.00	0.00	0.02	0.03	0.05	0.06	0.08	0.09	0.11	0.12	0.14	0.15	0.22	0.28	0.33
1.20	0.00	0.01	0.03	0.04	0.05	0.07	0.08	0.09	0.10	0.12	0.13	0.19	0.24	0.29
1.40	0.00	0.01	0.02	0.03	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.16	0.21	0.25
1.60	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.14	0.19	0.23
1.80	0.00	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.09	0.13	0.17	0.20
2.00	0.00	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.12	0.15	0.19
2.20	0.00	0.01	0.02	0.02	0.03	0.04	0.04	0.05	0.06	0.07	0.07	0.11	0.14	0.17
2.40	0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.10	0.13	0.16
2.60	0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.04	0.05	0.06	0.06	0.09	0.12	0.15
2.80	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.08	0.11	0.14
3.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.08	0.10	0.13

r_0 (initial return without DSP)

Figure A.I. Adjusted first-day return for an IPO with a DSP

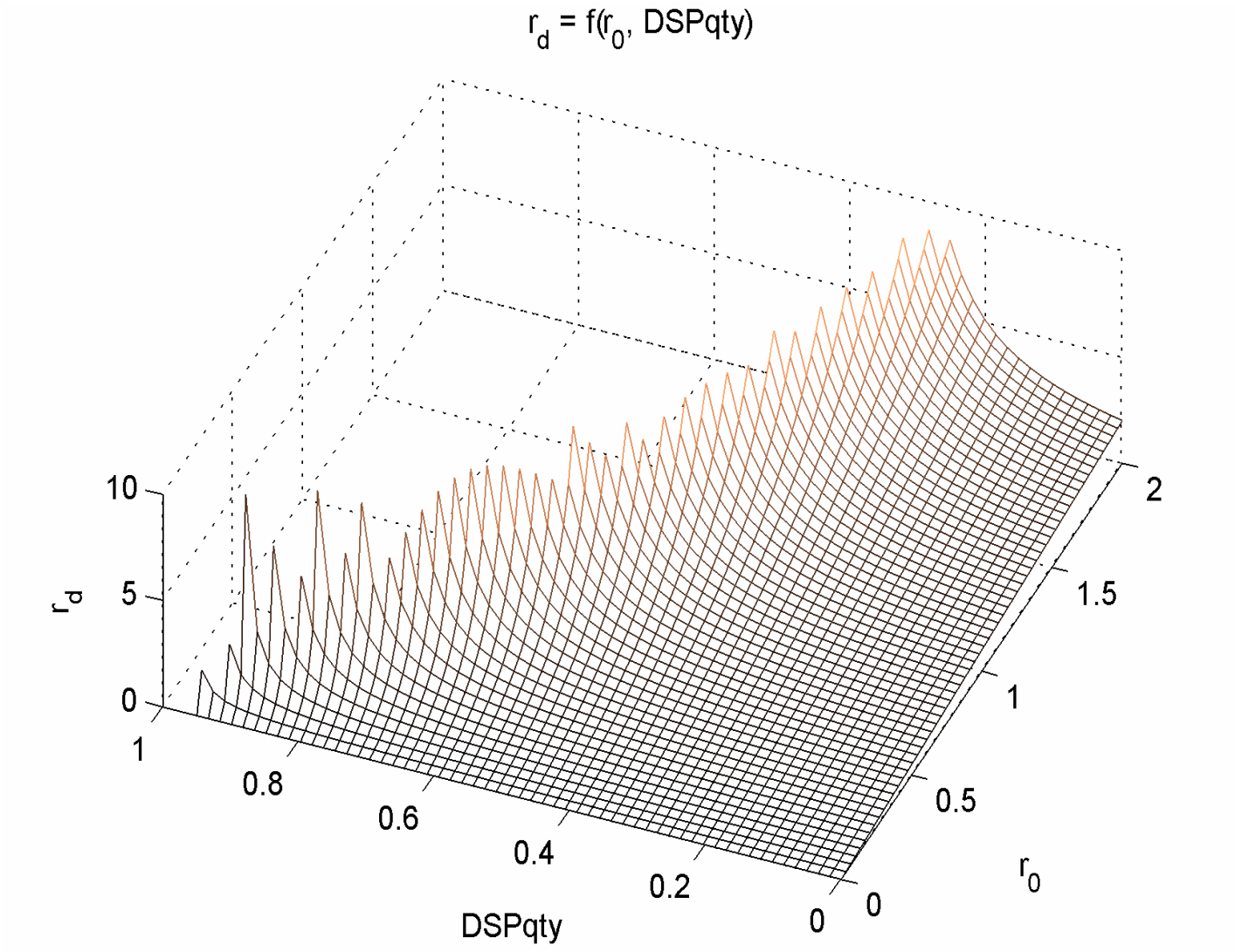
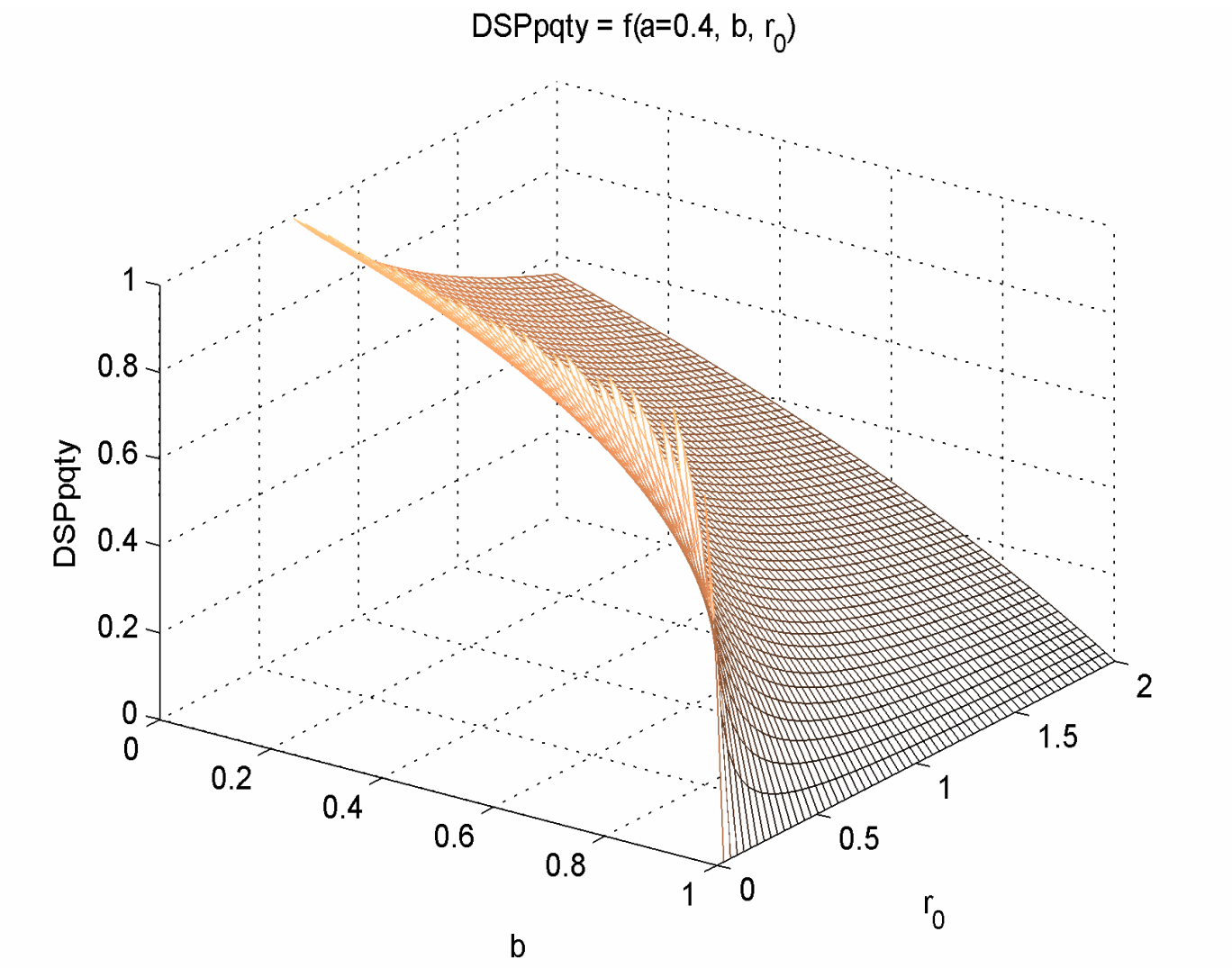


Figure A.II. Threshold values for DSPqty that make a DSP beneficial for the issuer (α = 0.4)



Appendix - A.3

I assume that an irrationally "complacent" manager unwilling to negotiate the IPO offer price is also less likely to negotiate non-price considerations such as the DSP. This assumption rests on a market structure where price has the first order of importance among the terms of trade and everything else follows. Therefore, a seller who is content with the price will not engage in a costly negotiation of a DSP, a non-price consideration.

When a manager observes a proxy for "good news", an upward revision in either 1) the filing range in the amended registration documents or 2) the final offer price, she has to decide how hard to negotiate the terms of the DSP. If DSP is negotiated before the final offer price, she observes only the first signal, but if DSP is negotiated after the final offer price, then she observes both. In any case, her choice depends on 1) her expectation about the relationship between the actual (or latest expected) offer price and the price in the first-day trading and 2) whether she is a rational utility-maximizing agent or suffers from behavioral biases such as complacency. The manager would not negotiate for a larger quantity of the option with a payoff of max [(first-day trading price – IPO offer price), 0] if 1) the expected payoff is zero and she is rational or 2) the expected payoff is positive but she is irrationally complacent because of the good news. On the other hand, a rational manager would negotiate for a larger quantity of this option if and only if she believes her expected payoff would be positive.[11] Hence, if I observe a larger quantity of this option given good news, it indicates that the manager expects a positive payoff. I do not observe behavioral bias on part of the officers and directors, or lack thereof, directly. Yet, the payoff is positive only when the offer price is less than the first-day trading price. Therefore, all else being equal, if a large quantity of shares are reserved upon observing good news, then we can conclude that they are either 1) trying to minimize the indirect cost of raising capital or 2) expropriating from shareholders. In each of these cases, by revealed preference, officers and directors are rational even though the second case is not desirable. Managerial irrationality, however, could not be inferred from observing a smaller quantity of this option. A smaller quantity of the option could also imply that she is rational but believes the payoff from the option is zero.

Ex-post, if we observe that the realization or the payoff from the option is consistent with her expectation, then we can conclude that the rational decision of the officers and directors have positive wealth impact. For instance, if the quantities of these options are a strong predictor of the actual payoff or the first-day return, then the strategy has been successful.

This test of managerial rationality also works as a test for the assumption that mangers anchor the expected value of the IPO shares at the midpoint of the initial filing range. This was the key assumption made in the prospect theory of IPO underpricing.

Assumption regarding anchoring of expected price

The prospect theory of IPO underpricing proposed by Loughran and Ritter (2002) suggests that underpricing occurs when the following condition is satisfied.

[11] As negotiation is costly, there will be no negotiation for an option with a zero expected payoff.

$$[\text{shares retained}_i + \text{secondary shares sold}_i\,][OP - MP] + \text{shares retained}_i\,[P\text{-}OP] > [P\text{-}OP][\text{secondary shares sold}_i + \text{primary shares sold}\,(\text{shares retained}_i / \text{shares retained})] \quad \ldots\ldots \quad (a1)$$

where

shares retained$_i$ = shares owned by the shareholder i after the IPO
secondary shares sold$_i$ = shares sold by the managers/directors at the IPO
OP = IPO offer price
MP = 0.5(original high filing price + original low filing price) = MP_0*
P = share price at the end of the first-day trading after the IPO
primary shares sold = shares sold by the issuer at the IPO
shares retained = restricted shares not sold at the IPO

Rearranging (a1), I obtain

$$[OP - MP] \quad x \quad [\text{secondary shares sold}_i + \text{shares retained}_i] > [P\text{-}OP] \quad x \quad [\text{secondary shares sold}_i + \text{shares retained}_i\,(\text{primary shares sold/shares retained} - 1)] \quad \ldots\ldots \quad (a2)$$

Loughran and Ritter (2002) do not suggest whether and how the expectation of the managers about P changes prior to the offering.[12] Consistent with the assumption about anchoring the expected offer price on MP, I assume that the expectation about P does not change either. Also, for the moment, let's assume that the quantities of primary and secondary shares sold are exogenously given. Further, for the sake of simplicity, let's ignore the impact of any secondary shares sold at the IPO for the moment. In my sample, only 17% of the IPOs sold secondary shares and secondary shares sold at IPO in my sample are less than 1.5% of the total pre-IPO shares.[13] I will relax the last two assumptions at a later stage.

From (a2), there exists a threshold expected first-day closing price $P=P^*$ below which the inequality is satisfied and the manager is apparently complacent and does not wish to negotiate OP further. All else being equal, an increase in OP while holding P constant will augment the left hand side of the inequality more than the right, unless primary shares sold/shares retained$\rightarrow$0, which is hardly the case.[14] This will imply greater issuer complacency and less inclination to negotiate OP. If the manager is not inclined to negotiate OP, she should be even less inclined to negotiate the terms of the DSP. Dividing both sides of the inequality (a2) by MP, we obtain the traditional measure of price improvement multiplied by a constant on the left hand side, and a modified version of initial return multiplied by another constant on the right. Hence, as the price improvement increases, so does the managerial complacency and we should observe a lower quantity of shares reserved under the DSP. On the other hand, if we observe a higher quantity of shares reserved given there had been good news, then the

[12] This was not a problem for Ljungqvist & Wilhelm (2005) as their test was *ex-post* and the manager had the perfect knowledge of P.
[13] Habib & Ljungqvist (2001), however, show that when shareholders sell secondary shares at the IPO, the magnitude of underpricing decreases.
[14] In my sample the ratio of primary shares sold to retained shares is 0.21.

manager is not complacent. In such cases, the manager is either unable to negotiate offer price further, or she is not willing to do so because of agency conflict.

If we introduce a positive quantity of secondary shares sold, all else being equal, an increase in OP again will boost the left hand side of the inequality (a2) by OP*Tot where Tot is the total shareholding of the managers/directors prior to the IPO. The right hand side of the inequality, however, will increase only by OP*[Tot *(1-f) – (2-f)*secondary shares sold by the managers/directors]. Here, f is the ratio of the primary shares sold to total shares retained by all shareholders, a strictly positive number. Hence, introducing a positive quantity of secondary shares sold does not change the nature of the analysis.

The midpoint of the original filing range, MP_0, gives the price-anchoring manager the only expectation about the offer price. A rational manager, however, updates her expectation of the offer price to MP_t every time there has been an amendment in the high and low filing prices HP_t and LP_t. Assuming a fixed P, amendment(s) with upward revision in MP_t will make the left hand side of the inequality (a2) smaller for the rational manager while the right hand side remains the same. Hence, given the upward price revision in the amended registration documents prior to the offer, a manager who anchors her expected price will still be complacent while a rational manager may not be. Such a rational manager should demand a higher OP which will increase the left hand side of the inequality more than the right, therefore increasing the manager's satisfaction.

Yet, such a non-anchoring rational manager may not always be successful in obtaining a higher offer price than the observed OP. Underpricing may exist for several reasons. Jegadeesh, Weinstein and Welch (1993) among others found weak evidence in support of signaling theory. Tinic (1988) and Lowry and Shu (2002) found empirical evidence supporting the litigation risk theory. As the damage in such cases is based on the offer price, a low offer price (high underpricing) may reduce potential litigation cost and at the same time the option reduces the cost of insurance. Hanley (1993) found empirical evidence supporting the dynamic information acquisition theory of Benveniste and Spindt (1989). Any of these phenomena described above may make it difficult for a manager to further negotiate the price even if she is rational. But it is possible to negotiate the option and a rational manager is going to do exactly the same while an anchoring and complacent manager will not care to do so.

So far we have been treating the primary and secondary shares sold as exogenously given. It is more likely that prices and quantities are determined jointly. When there has been an upward revision of MP before the offer date, [OP- MP] appear higher to the anchoring manager than to the rational manager, while the distance between P and OP stays the same. On both occasions, the number of primary and/or secondary shares sold may be higher by the anchoring manager. Using the same line of argument as in the earlier analyses, a higher quantity of primary, secondary, or both type of shares sold will increase the satisfaction of both types of managers after an upward price revision, but the impact will be higher on the anchoring manager than the non-anchoring one. Hence, the nature of the analysis does not change even after accounting for the impact of the endogenously chosen quantity of primary and secondary shares sold.

References:

2005, EBC I, Inc. v. Goldman Sachs & Co., Opinion number 61 (New York Court of Appeals).

Baker, Malcolm, and Paul Gompers, 2003, The Determinants of Board Structure at the Initial Public Offering, *Journal of Law and Economics* 46, 569 - 598.

Benveniste, Lawrence M., and Paul A. Spindt, 1989, How investment bankers determine the offer price and allocation of new issues, *Journal of Financial Economics* 24, 343-361.

Carter, Richard, and Steven Manaster, 1990, Initial Public Offerings and Underwriter Reputation, *Journal of Finance* 45, 1045-1067.

Chen, Hsuan-Chi, and Jay R. Ritter, 2000, The Seven Percent Solution, *The Journal of Finance* 55, 1105-1131.

Corwin, Shane A., and Paul Schultz, 2005, The Role of IPO Underwriting Syndicates: Pricing, Information Production, and Underwriter Competition, *The Journal of Finance* 60, 443-486.

Field, Laura Casares, and Gordon Hanka, 2001, The Expiration of IPO Share Lockups, *Journal of Finance* 56, 471-500.

Greene, William H., 2000. *Econometric Analysis* (Prentice Hall).

Hanley, Kathleen Weiss, 1993, The underpricing of initial public offerings and the partial adjustment phenomenon, *Journal of Financial Economics* 34, 231-250.

Hellmann, Thomas, 1998, The allocation of control rights in venture capital contracts, *The Rand Journal of Economics* 29, 57.

Jegadeesh, Narasimhan, Mark Weinstein, and Ivo Welch, 1993, An empirical investigation of IPO returns and subsequent equity offerings, *Journal of Financial Economics* 34, 153-176.

Ljungqvist, Alexander, and William J. Wilhelm, 2003, IPO Pricing in the Dot-com Bubble, *The Journal of Finance* 58, 723-752.

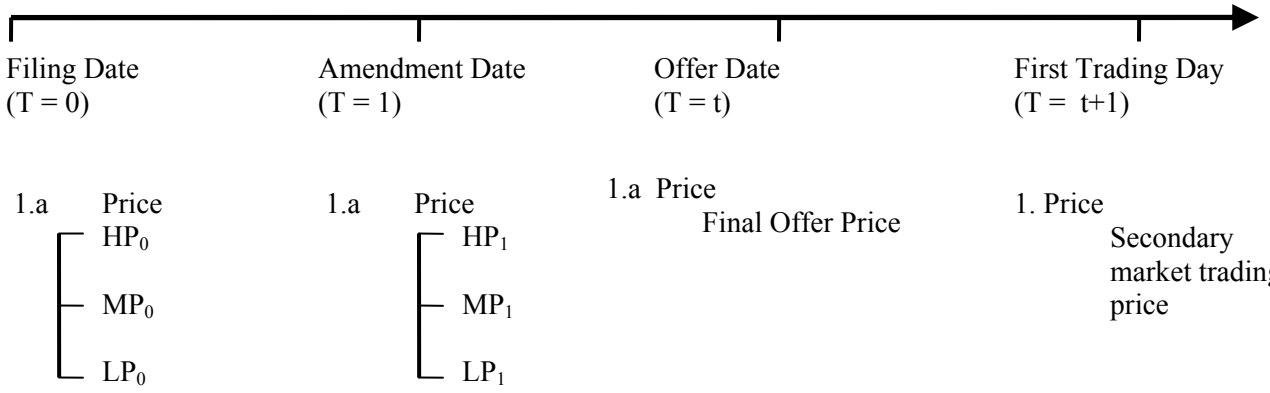
Loughran, Tim, and Jay R. Ritter, 2002, Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs?, *Rev. Financ. Stud.* 15, 413-444.

Lowry, Michelle, and Susan Shu, 2002, Litigation risk and IPO underpricing, *Journal of Financial Economics* 65, 309-335.

Nolan, Chris, 1999, "How I Got a Chance at Dot.com Wealth", *Fortune*, September 6, 1999, 261

Tinic, Seha M., 1988, Anatomy of Initial Public Offerings of Common Stock, *Journal of Finance* 43, 789-822.

Figure I. Timing and information related to the option:



where

HP_t = High Filing Price at time t

LP_t = Low Filing Price at time t

$MP_t = 0.5* (HP_t + LP_t)$

MP_0 = anchor for expected price

Figure II. **Shares reserved under DSP and first-day return during the sample period.**

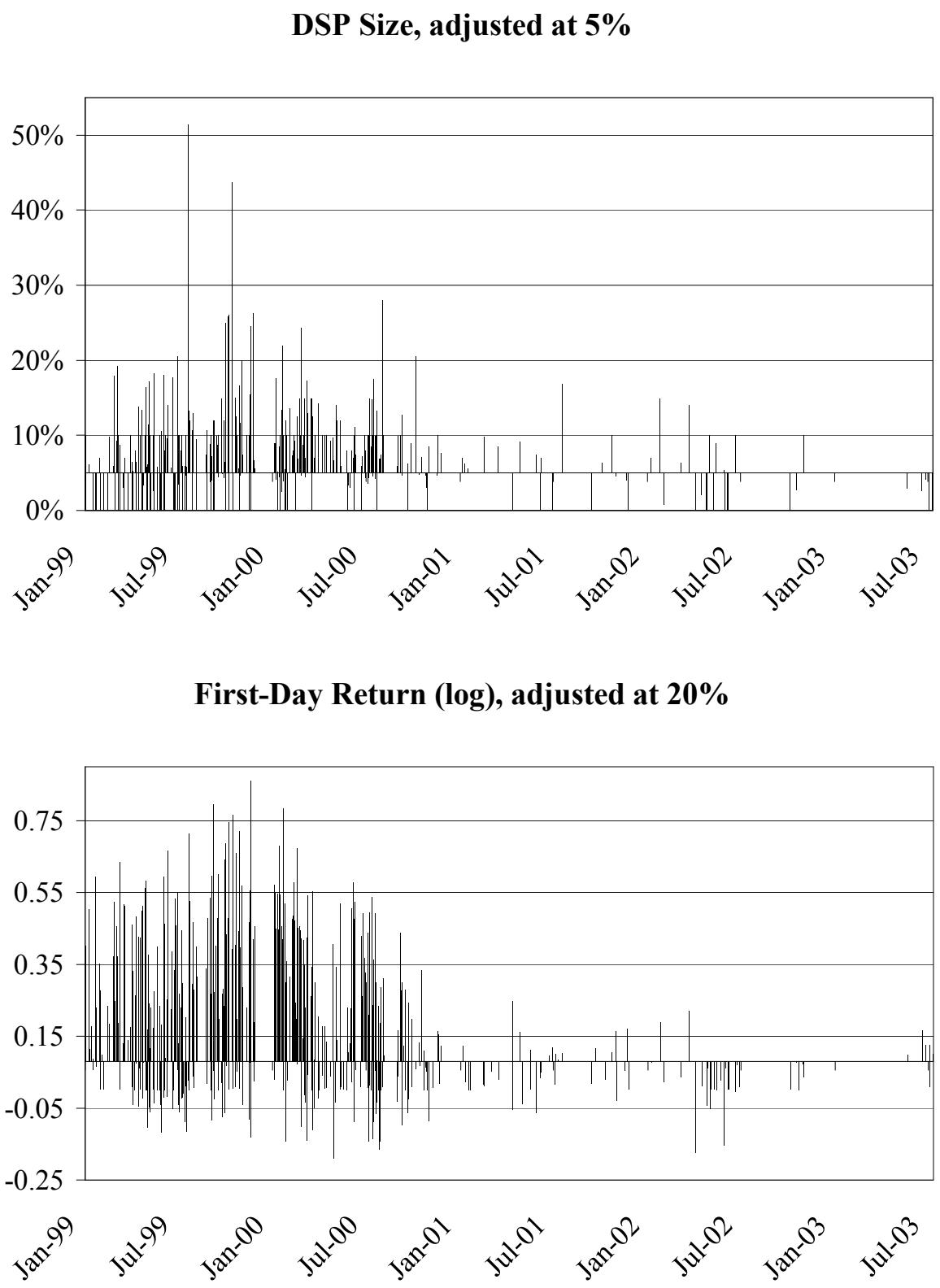


Figure III. Potential gain from the DSP when certain beneficiary group is excluded.

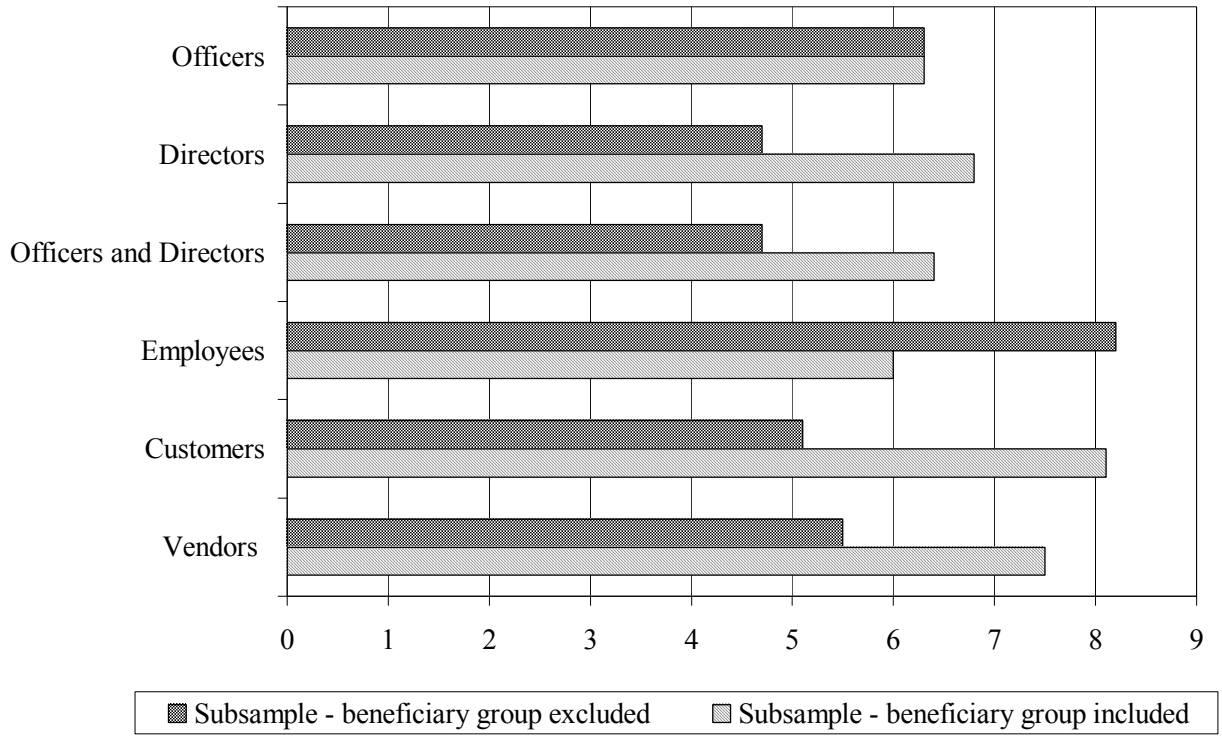


Table I. Summary statistics

***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Variable		DSP Does Not Exist	DSP Exists	p-value for the difference
First-day return, %				
	Mean	28.3	72.7	0.000***
	Median	26.8	54.5	0.000***
	Std. Dev	56.3	93.6	
	N	98	600	
Pre-IPO shareholding, Executive Officers and Directors, %				
	Mean	73.1	64.8	0.000***
	Median	63.3	47.8	0.002***
	Std. Dev	22.2	24.8	
	N	98	600	
Pre-IPO shareholding, Executive Officers, %				
	Mean	49.3	28.6	0.000***
	Median	68.4	47.0	0.000***
	Std. Dev	33.0	26.2	
	N	98	598	
Pre-IPO ownership of the Officer with largest holding, %				
	Mean	30.4	15.6	0.000***
	Median	66.3	47.3	0.000***
	Std. Dev	27.2	16.9	
	N	97	594	
Ownership of the largest Shareholder who is not an Officer %				
	Mean	28.7	29.3	0.041**
	Median	43.9	51.0	0.096*
	Std. Dev	28.1	21.9	
	N	98	598	
HHI for ownership of Five Executive Officers				
	Mean	0.174	0.057	0.000***
	Median	0.051	0.011	0.000***
	Std. Dev	0.232	0.119	
	N	97	596	
HHI for ownership of Five largest shareholders that are not Officers				
	Mean	0.158	0.145	0.057*
	Median	0.070	0.086	0.192
	Std. Dev	0.209	0.173	
	N	98	598	
VC Investment, %				
	Mean	41.0	78.5	0.000***
	Std. Dev	49.4	41.1	
	N	100	600	

Table I. (continued)

Variable		DSP Does Not Exist	DSP Exists	p-value for the difference
Expected Proceeds, million $				
	Mean	60.5	70.7	0.000***
	Median	42.0	60.0	0.000***
	Std. Dev	60.3	42.0	
	N	98	600	
Shares reserved under DSP, % of offer size				
	Mean		7.6	
	Median		6.0	
	Std. Dev		4.5	
	Max		51.5	
	Min		0.8	
	N		600	
Beneficiaries of DSP				
Officers, %				
	Mean		53.9	
	Std. Dev		49.9	
	N		597	
Directors, %				
	Mean		76.9	
	Std. Dev		42.2	
	N		597	
Employees, %				
	Mean		87.6	
	Std. Dev		33.0	
	N		597	
Customers, %				
	Mean		37.2	
	Std. Dev		48.4	
	N		597	
Vendors, %				
	Mean		35.7	
	Std. Dev		48.0	
	N		597	

Table II. Choice of DSP

VC is a dummy variable that takes the value of 1 if the IPO firm has venture capital investment and zero otherwise. Officerholding is the percentage of pre-IPO shares owned by the officers of the issuing firm. HHI is the concentration ratio of the top five shareholders Underwriter Rank is the adjusted Carter Manaster (1990) reputation rank of the highest ranking book manager for the IPO based on underwriter prestige taken from Jay Ritter's website on 3/7/2006. Top 10 Institutional and Retail Book Manager is a dummy variable that takes the value of 1 if the book running manger is one of the top 10 underwriters and has primarily institutional clients and primarily retail clients. Non-top 10 book managers and mixed book managers among top 10 underwriters have been left out. Size quintile 5 contains the largest size firms. The smallest quintile has been left out of the regression. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

$$DSP_i^* = \mu_0 + \mu_1 \cdot VC_i + \mu_2 \cdot OfficerHolding_i + \mu_3 HHI_i + \mu_4 \cdot UnderwriterRank_i \cdot Top10Institutional_i + \mu_5 \cdot X_1 + \omega_i$$

(DSP choice equation 7)

where $DSP_i = 1$ *if* $DSP_i^* > 0$ and $DSP_i = 0$ *if* $DSP_i^* \leq 0$

	Marginal Effect									
Dependent Variable	Probability of a Directed Share Program									
Key Ownership Variables:										
VC Investment	0.920***	1.364***	1.148***	1.146***	1.010***	1.063***	1.096***	1.083***	0.766***	1.210**
	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
VC Investment * Ownership **Level** of the Officers and Directors		-0.662**								-0.986***
		(0.021)								(0.007)
VC Investment * Ownership **Concentration** of the top five shareholders (including officers)			-1.222**						-1.188**	
			(0.015)						(0.052)	
VC Investment * Ownership **Level** of the Officers				-0.729**				-0.778**		
				(0.019)				(0.017)		
VC Investment * Ownership **Concentration** of the top five Officers					-1.665**					
					(0.038)					
VC Investment * Ownership of the largest officer owner						-0.873				
						(0.101)				
VC Investment * Ownership of the largest non-officer owner							-0.594			
							(0.126)			

Table II. (continued)

Key Underwriter Variables:										
Underwriter Rank									0.352***	0.360***
									(0.000)	(0.000)
Underwriter Rank * Top 10 Institutional Book Manager									-0.884	-0.858
									(0.135)	(0.151)
Underwriter Rank * Top 10 Retail Book Manager									0.061	0.061
									(0.448)	(0.455)
Control Variables:										
Expected Overhang									-0.007	-0.007
									(0.618)	(0.600)
Size Quintile 2									0.149	0.145
									(0.495)	(0.507)
Size Quintile 3									0.864***	0.852***
									(0.002)	(0.003)
Size Quintile 4									0.568**	0.596**
									(0.048)	(0.039)
Size Quintile 5									-0.111	-0.108
									(0.684)	(0.694)
Underwriter Fixed-Effect	No	No	No	No	No	No	No	Yes	Yes	Yes
Industry Dummy	No	No	No	No	No	No	No	No	Yes	Yes
Year Dummy	No	No	No	No	No	No	No	No	Yes	Yes
Intercept	0.485***	0.491***	0.491***	0.486***	0.491***	0.481***	0.491***	0.322***	-2.627***	-2.682***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)
Number of Observations	*700*	*696*	*696*	*696*	*696*	*696*	*696*	*696*	*694*	*694*
Pseudo-R^2	*0.095*	*0.105*	*0.106*	*0.106*	*0.104*	*0.126*	*0.104*	*0.165*	*0.357*	*0.363*

Table III. Size of DSP - quantity of IPO shares reserved under the program.

DSPqty or shares reserved under DSP is: shares reserved under the DSP / total shares offered in the IPO. Beneficiary:OfficerDirector is a dummy variable that takes the value of 1 if "officers" and "directors" are mentioned as one of the intended recipients of the shares and 0 otherwise. Other beneficiaries are defined likewise. The dummy for vendors, consultants and other business associates has been left out of the regression. Underwriter Rank is the adjusted Carter Manaster (1990) reputation rank of the highest ranking book manager for the IPO based on underwriter prestige taken from Jay Ritter's website on 3/7/2006. Top 10 Institutional Book Manager is a dummy variable that takes the value of 1 if the book running manger is one of the top 10 underwriters and has primarily institutional clients. Non-top 10 book managers and retail managers among top 10 underwriters have been left out. Size quintile 5 contains the largest size firms. The smallest two quintiles have been left out of the regression.
***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

$$DSPqty_i = \tau_0 + \tau_1 \cdot Beneficiary:OfficerDirector_i + \tau_2 \cdot Beneficiary:Customers_i$$
$$+ \tau_3 \cdot Beneficiary:Employees_i + \tau_4 \cdot \Pr icerevision_i + \tau_5 \cdot Top10Institutional_i + \tau_6 \cdot X_2 + \varepsilon_i$$

(DSP quantity equation 8)

	Marginal Effect					
Dependent Variable	Shares Reserved under Directed Share Program					
Key Variables:						
Upward Revision of Price before IPO	0.017**	0.018***	0.018***	0.013**	0.013**	0.014**
	(0.006)	(0.003)	(0.004)	(0.049)	(0.049)	(0.035)
Intended Beneficiary: Directors but **not** Officers	0.016***					
	(0.000)					
Intended Beneficiary: Directors **and** Officers		0.007**		0.005	0.005	0.005
		(0.027)		(0.126)	(0.129)	(0.146)
Intended Beneficiary: Directors **and** Officers*Ownership of Directors and officers			0.008**			
			(0.049)			
Intended Beneficiary: Employees	-0.011**	-0.009*	-0.008*	-0.008*	-0.008*	-0.009*
	(0.019)	(0.072)	(0.084)	(0.096)	(0.099)	(0.056)
Intended Beneficiary: Customers	0.010***	0.008**	0.008**	0.008**	0.008**	
	(0.002)	(0.020)	(0.017)	(0.019)	(0.018)	
Intended Beneficiary: Vendors						0.003
						(0.429)
Control Variables:						
Underwriter Rank					-0.001	
					(0.824)	
Size Quintile 2				*-0.001*	*-0.001*	*0.000*
				(0.866)	*(0.885)*	*(0.960)*
Size Quintile 3				0.011**	0.011**	0.012**
				(0.028)	(0.028)	(0.018)
Size Quintile 4				0.007	0.008	0.008
				(0.221)	(0.213)	(0.163)
Size Quintile 5				0.006	0.007	0.007
				(0.261)	(0.252)	(0.201)
Underwriter Fixed-Effect	No	No	No	Yes	Yes	Yes
Industry Dummy	No	No	No	Yes	Yes	Yes
Year Dummy	No	No	No	Yes	Yes	Yes
Intercept	0.066***	0.073***	0.072***	0.061***	0.065***	0.064***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Number of Observations	*599*	*599*	*597*	*599*	*597*	*599*
Log Likelihood	*-1110.0*	*-1104.0*	*-1098.0*	*-1128.0*	*-1123.0*	*-1125.0*

Table IV. Joint Estimation of Choice and Size of a DSP

Intended Beneficiary:OfficerDirector is a dummy variable that takes the value of 1 if "officers" and "directors" are mentioned as one of the intended recipients of the shares and 0 otherwise. Other beneficiaries are defined likewise. The dummy for vendors, consultants and other associates has been left out of the regression. Underwriter Rank is the adjusted Carter Manaster (1990) reputation rank of the highest ranking book manager for the IPO based on underwriter prestige taken from Jay Ritter's website on 3/7/2006. Top 10 Institutional Book Manager is a dummy variable that takes the value of 1 if the book running manger is one of the top 10 underwriters and has primarily institutional clients. Non-top 10 book managers and retail managers among top 10 underwriters have been left out. Size quintile 5 contains the largest size firms. The smallest quintile has been left out of the regression.
***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Marginal Effect	
Dependent Variable	Probability of a DSP	Shares Reserved under DSP
Key Variables:		
VC Investment	0.182**	-0.007
	(0.001)	(0.370)
VC Investment*Ownership **level** of the Officers and directors	-0.097	0.001
	(0.134)	(0.831)
		0.013**
Upward Revision of Price before IPO		(0.041)
Underwriter Rank * Top 10 Institutional Book Manager	-0.170**	
	(0.037)	
Intended Beneficiary: Directors **and** Officers		0.005
		(0.169)
Intended Beneficiary: Employees		-0.007
		(0.128)
Intended Beneficiary: Customers		0.008**
		(0.018)
Control Variables:		
Underwriter Rank	0.128**	
	(0.000)	
Size Quintile 2	0.059	0.001
	(0.171)	(0.831)
Size Quintile 3	0.135**	0.013**
	(0.002)	(0.027)
Size Quintile 4	0.104**	0.008
	(0.025)	(0.210)
Size Quintile 5	-0.002	*0.009*
	(0.972)	*(0.130)*
Underwriter Fixed-Effect	Yes	Yes
Industry Dummy	Yes	Yes
Year Dummy	Yes	Yes
Intercept	-0.439**	0.068**
	(0.000)	(0.000)
ρ	*-0.018*	
Number of Observations	*689*	
Log Likelihood	*-813.9*	

Table V. Shares Reserved under DSP and First-Day Return

First day return or InitialRet is [(closing price at the first day of trading after IPO – Offer Price)]]/Offer Price]. Price improvement or Pricerev is [(final offer price - midpoint of initial filing range)/ midpoint of initial filing range]. Shares reserved under DSP is: shares reserved under the DSP / total shares offered in the IPO. Overhang is [(shares outstanding post offer - total shares offered at IPO)/total shares offered at IPO]. Underwriter Rank is the adjusted Carter Manaster (1990) reputation rank of the highest ranking book manager for the IPO based on underwriter prestige taken from Jay Ritter's website on 3/7/2006. Reputation Rank of VC is for the highest ranked VC associated with the IPO and is based on the amount of capital raised between 1990 and 1999; rank 1 is for the highest reputation, natural log taken. Size quintile 5 contains the largest size firms. . The smallest quintile has been left out of the regression. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Marginal Effect					
Dependent Variable	First day return					
Intercept	0.325***	0.491***	0.326***	-0.282**	-0.273	-0.386*
	(0.000)	(0.000)	(0.000)	(0.011)	(0.125)	(0.076)
Key Variable:						
Size of the DSP	5.457***	5.139***	3.063***	2.480***	2.352***	2.050***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Control Variables:						
Adjustment in the final offer price			1.627***	1.468***	1.443***	1.287***
			(0.000)	(0.000)	(0.000)	(0.000)
Number of Market Makers immediately after the IPO				0.029***	0.026***	0.038***
				(0.000)	(0.000)	(0.000)
Number of Analysts				0.037**	0.028*	0.037**
				(0.011)	(0.066)	(0.015)
Ownership concentration of the top five shareholders		-0.684***	-0.417***	-0.344***	-0.267*	-0.221
		(0.000)	(0.001)	(0.006)	(0.053)	(0.115)
Overhang					0.016***	0.009*
					(0.001)	(0.052)
Underwriter Rank					-0.006	0.018
					(0.769)	(0.496)
Reputation Rank of VC					0.060	0.048
					(0.345)	(0.449)
Size Quintile Dummy	No	No	No	No	No	Yes
Underwriter Fixed-Effect						
Industry Dummy	No	No	No	No	No	Yes
Year Dummy	No	No	No	No	No	Yes
	No	No	No	No	No	Yes
Number of Observations	*693*	*693*	*689*	*671*	*671*	*671*
Adjusted R^2	*0.069*	*0.093*	*0.488*	*0.513*	*0.520*	*0.545*

Table VI. Two Stage Least Square Estimation of the First-Day Return

Shares reserved under DSP or DSPqty is the natural log [1+ (shares reserved under the DSP / total shares offered in the IPO)]. First day return or InitialRet is [(closing price at the first day of trading after IPO – Offer Price)]]/Offer Price]. Price improvement or Pricerev is [(final offer price - midpoint of initial filing range)/ midpoint of initial filing range]. Expected overhang is [(shares expected to be outstanding post offer - total shares to be offered at IPO)/total shares to be offered at IPO] based on latest filing. Ln(expected proceeds) is the natural logarithm of the proceeds expected to be raised in million dollars. Beneficiary:OfficerandDirector is a dummy that takes the value of 1 if "officers" and "directors" are mentioned among the intended recipients of the shares reserved under the DSP and 0 otherwise. Other beneficiaries are defined likewise. The dummy for customers have been left out of the regression. Marketmaker is the average number of market-makers for the first 10 trading days after IPO. Analyst is the number of analysts from the IPO syndicate that initiate coverage for the issuer between 26^{th} and 115^{th} calendar days after the IPO.
***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	IT3SLS - Overidentified	
	Size of the DSP	First-day return
Key Variables:		
Size of the DSP		24.912
		(0.318)
First-day return	0.011**	
	(0.044)	
Intended Beneficiary: Officers & Directors	0.005	0.012
	(0.155)	(0.914)
Intended Beneficiary: Employees	-0.004	
	(0.396)	
Intended Beneficiary: Customers	0.010**	-0.021
	(0.015)	(0.860)
Intended Beneficiary: Vendors	-0.006*	
	(0.086)	
Control Variables:		
Adjustment in the initial offer price	0.009	1.331***
	(0.209)	(0.000)
Shareholder Concentration (HHI-7 largest)	-0.010	-0.176
	(0.315)	(0.561)
Presence of VC Investors	-0.007	0.045
	(0.115)	(0.728)
Underwriter Reputation Rank	-0.001	0.028
	(0.695)	(0.680)
Number of Market Makers immediately after the IPO		0.017
		(0.671)
Number of Analysts belonging to the IPO syndicate that initiate coverage immediately after the quiet period		0.023
		(0.217)
Expected Overhang	0.000	0.012
	(0.176)	(0.176)
Intercept	0.068***	-1.830
	(0.001)	(0.839)
Size Quintile	Yes	Yes
Underwriter Fixed-Effect	Yes	Yes
Industry Dummy	Yes	Yes
Year Dummy	Yes	Yes
System R^2	0.318	
No. of Obs.	583	
Basmann's Test of Overidentification Restriction (p-value)	0.046	0.295

Table VII. Potential gain from the DSP when certain beneficiary group is excluded.

***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	1% transaction cost			2% transaction cost			no transaction cost, not an option		
Beneficiary Groups	beneficiary group(s) excluded -	beneficiary group(s) included	p-value for the diff.	beneficiary group(s) excluded	beneficiary group(s) included	p-value for the diff.	beneficiary group(s) excluded	beneficiary group(s) included	p-value for the diff.
Officers									
Mean	6.3	6.3	0.370	6.2	6.3	0.360	6.3	6.3	0.337
Median	2.3	2.7	0.218	2.2	2.7	0.218	2.3	2.8	0.194
Std. Dev	11.2	11.0		11.1	10.9		11.4	11.2	
N	278	325							
Directors									
Mean	4.7	6.8	0.050**	4.7	6.7	0.047**	4.7	6.8	0.051**
Median	1.6	2.7	0.022**	1.6	2.7	0.022**	1.6	2.8	0.028**
Std. Dev	7.2	11.9		7.2	11.8		7.4	12.2	
N	139	464							
Officers and Directors									
Mean	4.7	6.4	0.000***	4.7	6.3	0.000***	4.7	6.4	0.000***
Median	1.0	2.7	0.000***	1.0	2.7	0.000***	1.0	2.8	0.000***
Std. Dev	10.0	11.0		9.9	10.9		10.2	11.2	
N	380	320							
Employees									
Mean	8.2	6.0	0.014**	8.0	5.9	0.013**	8.1	6.0	0.017**
Median	4.0	2.3	0.041**	3.9	2.3	0.041**	4.0	2.3	0.041**
Std. Dev	10.5	11.0		10.4	10.9		10.7	11.2	
N	74	528							
Customers									
Mean	5.1	8.1	0.000***	5.1	8.0	0.000***	5.1	8.2	0.000***
Median	1.8	3.5	0.001***	1.8	3.5	0.001***	1.9	3.5	0.002***
Std. Dev	8.3	14.3		8.2	14.1		8.5	14.5	
N	377	225							
Vendors									
Mean	5.5	7.5	0.014**	5.5	7.4	0.013**	5.5	7.5	0.013**
Median	2.1	3.2	0.017**	2.1	3.1	0.017**	2.2	3.2	0.017**
Std. Dev	9.7	12.9		9.6	12.8		9.9	13.1	
N	385	217							