Directed Share Programs in IPO Underwriting - Agency Problem or Supply Assurance?

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Abstract

I analyze directed share programs (DSPs) associated with the underwriting contracts of initial public offerings (IPOs) to answer 1) whether such programs create an agency problem between some beneficiaries of the program and non-beneficiary shareholders and thus exacerbate IPO underpricing and 2) why these programs exist? A DSP reserves IPO shares for issuers' stakeholders such as officers, directors, employees, customers and vendors. It is the third most negotiated underwriting contract term after price and quantity and 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 create incentives to under-price IPOs. The popular press has called it a "disturbing phenomenon". Moreover, in 2004, the NASDAQ/NYSE IPO Advisory Committee recommended that regulatory restrictions be imposed on these programs. Contrary to this criticism, empirical evidence does not support the idea that the beneficiaries of these programs expropriate wealth from non-beneficiary shareholders. Specifically, I find evidence inconsistent with allegations that larger DSPs cause more underpricing. The causality in this case is reverse - a one standard deviation increase in underpricing results in a 16.2% increase in the number of shares reserved under a DSP. Second, revealed preference also suggests that top underwriters with primarily institutional clientele lose from this underwriting contract feature. Third, the quantity of shares reserved under a DSP and the participation of an issuing firm's customers and vendors are highly correlated. I argue that DSPs are used as an upstream and downstream supply assurance mechanism in a multilateral purchasing relationship. Although shares purchased by customers and vendors under a typical DSP may not be considered as a case of vertical integration, supply assurance becomes critical for economic viability of young firms where several of them have similar technologies and expect input rationing or severe product market competition. The primary determinant of inclusion of customers or vendors as the beneficiaries of the program is whether the firm's supply or purchase relationship is based on long term contracts or purchase orders. Long term contracts with customers and vendors are associated with 15% - 19% higher probability that customers and vendors are among the beneficiaries of a DSP. In contrast, the length of the product development and/or sales cycle, collaboration with customers or vendors and the importance of the issuer's or its supplier's intellectual property do not predict whether customers or suppliers are included as the beneficiaries of a DSP.

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, also known as friends and family 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 purchase the shares reserved for them from the underwriter at the offer price. 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.

Directed share programs have also been criticized by 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 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." The authors suggested that directed

[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.

share programs was one of the four major causes of severe IPO underpricing during the dot-com bubble of late 1990s.

Absent from the literature, however, has been a critical analysis of why directed share programs exist and whether an abuse of DSPs as mentioned above took place.[2] This paper contributes to the literature by addressing this gap. The hypothesis that directed share programs create an opportunity for wealth expropriation has specific testable implications. 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 set a lower than equilibrium price for the offering, then she will directly benefit from an increased level of underpricing because she can purchase the firm's shares at the offer price and selling those shares at a higher price in the aftermarket.[3] She will bear a fraction, which equals her ownership percentage, of the total cost for such underpricing and the rest of the cost of this increased underpricing will be borne by other shareholders. Thus, the nature of the agency problem here is similar to the one described in Jensen and Meckling (1976) and is between the officers and/or the directors and the outside shareholders.

To satisfy the necessary condition for the existence of such an agency problem we must first demonstrate a negative relationship between the ownership of the officers and directors of a firm and the probability of the firm having a directed share program. Such a negative relationship in itself is not sufficient to prove that an agency problem exists. We must also establish 1) that the officers and directors were the beneficiaries of the DSP and 2) a causal relationship between the size of the program and the level of underpricing. For the first time I test these.

I do not find any evidence consistent with the expropriation hypothesis. Specifically, for those firms with venture capital investment, about 75% of all firms in my sample, ownership level of officers and directors have no impact, either economic or statistical, on the choice of DSP once I control for

[2] Directed share programs continue to be observed for more than 50% of all IPOs as late as in the year 2005.
[3] This assumes there is no lock up associated with these shares. As these shares are equivalent to the other shares sold in the IPO without any lock up, the default assumption is of no lock up unless otherwise specified in the prospectus.

sample selection bias. In addition, increasing the number of shares reserved under a DSP does not cause higher underpricing. In contrast, a one standard deviation increase in underpricing results in a 16.2% increase in the number of DSP shares.

If we believe in the evidence that DSPs do not cause underpricing, these programs transfer some of the discretionary ability to allocate IPO shares in a high-underpricing environment from a book-manager to the issuer's management. Both the IPO literature and the popular press have long argued that book managers in the late 1990s have used severely underpriced or hot IPO shares as a currency for side payment to their clients to generate excessive brokerage commission (citation). If we also believe that institutional investors have a higher ability than retail investors to trade more intensely and thus generate excessive brokerage commission for financial institutions, then we should expect that underwriters with primarily institutional clientele would be reluctant to the idea of a DSP. While I do not offer a direct test, consistent with this idea, I observe that the probability of a DSP is lower by 17% when an IPO's book running manager is a top 10 underwriter with primarily institutional clientele.

Yet, transferring the allocation ability for some of the IPO shares from an IPO's book-manager to the issuer's management may not always be in the best interest of the pre-IPO shareholders. If we assume that issuing firms with venture capital investment are better governed and we observe a positive relationship between the existence of a venture capital investor and the probability of a DSP, then transferring some of the discretionary allocation ability from the book-manager to the issuer's management may at the very least be a benign act. In contrast to the 17% lower probability of a DSP when the issuer's book manager is a top 10 underwriters with primarily institutional clientele, such probability is 18% higher when the issuing firm has a venture capital investor.

How do the management of IPOs with a directed share program use their allocation discretion presumably acquired after hard negotiations?[4] My findings could be interpreted as consistent with Bolton

[4] Directed share programs show much higher variability of incidence than other features of the IPO contract. This suggests that they may be the most negotiated term of the IPO underwriting contract after price and quantity. 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,

and Whinston (1993) where several downstream firms compete for inputs that are in limited supply and firm boundaries gets redrawn. While participation of suppliers and customers in a DSP is not a case of vertical integration it may be used as a supply and demand assurance mechanism. Firms with long term supply contracts with their customers or suppliers have a 15% to 19% higher probability of including their customers or suppliers as beneficiaries of their DSP.

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. The results are discussed in Section IV. Section V concludes.

II. Institutional details about the Directed Share Program:

About 87% of all IPOs had a directed share program (henceforth DSP) in my sample of IPOs between January 1999 and August 2003. The incidences of DSPs immediately before 1998 and after 2000 (until 2006) are between 50% and 60%. In contrast to other non-price underwriting terms such as analyst coverage and market making services, it has a direct and immediate impact on the wealth of 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 size of a DSP, i.e. the maximum number of shares reserved under the program, is disclosed in the final prospectus. 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. Shares reserved under DSP may be purchased until one working day after the day of the issue.

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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.

Due to limitations of the data, I do not observe the individual purchase decision by the beneficiaries of the DSP. 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 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 actual share purchase under the DSP and 2) In case of multiple listed beneficiaries, usually I do not observe the exact allocation for each of these groups.[5]

I use keyword search in the IPO prospectus to obtain the following data: 1) the importance of strategic relationships for the issuers with their customers and vendors, 2) the importance of human capital and management expertise for the issuing firm and 3) the importance of intellectual property (IP) for the issuer’s success.[6] A strategic relationship is assumed to exist if the issuer has a long term supply or purchase contract with its customer or issuer, has a technical or marketing collaboration. I use “customer”, “supplier”, “vendor”, “purchase order”, “collaboration”, “strategic”, “employee”, “management”, “intellectual property”, “IP”, “patent”, “trade secret”, “confidentiality agreement”, “non-compete” as keywords and read the relevant content and code the data in. For specific examples of how the data have been coded, please refer to Appendix A.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

[5] I observe share allocation for individuals or beneficiary groups in less than 5% of my sample.
[6] Where the original prospectus is not machine readable I use an optical character recognition software to make it machine readable.

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.

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

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

and

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

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.

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. Potential gain is computed by multiplying the number of shares 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.[7] A common criticism against the Heckman procedure is that the parameter estimates are very sensitive to the distributional assumption underlying the model.[8] 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 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.

[7] 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.

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

IV.D DSP Size and IPO Underpricing using OLS

To make sure that I obtain results consistent with earlier literature when using the same methodology, I use 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 ith 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 DSP and Importance of Customer, Supplier and Employee Relationship

If a firm has difficulty obtaining required inputs or selling its output in the open market, such a firm would attempt to maintain a strategic relationship with its customers and vendors. Similarly, if skilled employees are short in supply in the labor market and recruiting and retaining such employees are difficult, the firm may decide to use its underpriced DSP shares as a currency if it is unable to compensate the employees with adequate cash wage. To test whether such is the case, I estimate the following three equations using discrete choice models such as a probit or a logit for a subset of firms:

$$DSPbenefic\ iary : Customer_i = \beta_0 + \beta_1 \cdot LongContra\ ct_i + \beta_2 \cdot LongCycle_i + \beta_3 \cdot Collaborat\ ion_i + \beta_4 \cdot IPCritical + \beta_5 \cdot X_5 + \zeta_i$$

(Beneficiary equation 11.1)

$$DSPbenefic\ iary : Vendor_i = \phi_0 + \phi_1 \cdot LongContra\ ct_i + \phi_2 \cdot InputRatio\ ning_i + \phi_3 \cdot Collaborat\ ion_i + \phi_4 \cdot VendorIPCr\ itical + \phi_5 \cdot X_6 + \psi_i$$

(Beneficiary equation 11.2)

$$DSPbenefic\ iary : Employee_i = \pi_0 + \pi_1 \cdot HumanCapit\ alCritical_i + \pi_2 \cdot Management\ ExpertiseC\ ritical_i \pi_3 \cdot X_7 + \varsigma_i$$

(Beneficiary equation 11.3)

where

DSPbeneficiary: X_i = 1 i*f X is among the beneficiaries of the DSP for the* i^{th} *firm where X = customers, vendors, employees and management, 0 otherwise*

$LongContract_i$ *= 1 if the* i^{th} *firm has a long term purchase contract with its customers or a supply contract with its vendors, respectively for equation 11.1 and 11.2, 0 otherwise*

$LongCycle_i$ = 1 if the i^{th} firm reports to have a long product development or sales cycle, 0 otherwise

$Collaboration_i$ =1 if the i^{th} firm has a technical or marketing collaboration with its customers or vendors, respectively for equation 11.1 and 11., 0 otherwise

$IPCritical_i$ =1 if the i^{th} firm considers its own intellectual property critical to its success, 0 otherwise

$VendorIPCritical_i$ = 1 if the i^{th} firm has a vendor with intellectual property critical to its success, 0 otherwise

$HumanCapitalCritical_i$ = 1 if the i^{th} firm considers its employees human capital critical to its success, 0 otherwise

$ManagementExpertiseCritical_i$ =1 if the i^{th} firm considers the expertise of its management critical to its success, 0 otherwise

We expect β_1 and φ_1 to be positive and significant. If a firm is unable to acquire raw material in the open market and has to lock in the supplier in a contractual relationship longer than a spot contract or a short term purchase order, then the firm places some value in maintaining a strong relationship with its supplier. Similar argument can be made for supply agreements with its customers. Long sales or development cycle makes it costly for both the firm and its customers to assess the efficacy, quality or economics of the product frequently. Hence, we should observe a positive sign for β_2 as well. A collaborative arrangement with customers and vendors also suggest a firm's reliance on its business associates. Therefore, we expect β_3 and φ_3 to be positive and statistically significant. If a firm's intellectual property makes its products or services unique to its customers, then β_4 should be negative or close to zero. Similarly, if a supplier has a unique intellectual property or its products are difficult to substitute, or are in short supply, then the issuer is likely to see value in developing a relationship with its supplier. Hence, we expect φ_2 and φ_4 to be positive.

The results for a sub-sample of 208 firms are reported in panels A and B of table VIII. Nature of purchase and supply contracts of a firm is the only strong predictor of whether its customers or suppliers would be included in its DSP. Firms with long term supply contracts with their customers or suppliers have a 15% to 19% higher probability of including their customers or suppliers as beneficiaries of their DSP. Somewhat surprisingly, a firm's collaborations, reliance on intellectual property of its own or its suppliers or limited supply of its inputs are not strong predictors of whether its customers or vendors will be included as beneficiaries in its DSP. While it is possible that the nature of its contracts with its customers and/or suppliers adequately convey these information, it is also possible that the measures I use are noisy. The results reported are from probit regressions but they do not change if I use logit.

Firms also have human capital that may not be easily procured in the open market and turnover may be high. There may be limited supply of skilled professional and researchers, especially in engineering, technology and natural sciences. Managerial talent and expertise may also be in short supply. If so, firms would like to reward their employees and management with DSP shares even if these stakeholders are minority shareholders of a firm or DSP shares may be used as a substitute for cash compensation. If so, we expect π_1 and π_2 to be positive and statistically significant. I use managerial expertise for estimating whether employees are among the beneficiaries of a DSP because some officers may be eligible to obtain DSP shares as employees and I have no way of ensuring that they do not. The results for a sub-sample of 129 firms are reported in panel C of table VIII. Surprisingly, neither employee human capital nor management expertise is a strong predictor of whether these stakeholders will be included as beneficiaries. The results reported are from probit regressions but they do not change if I use logit.

IV.G Robustness Check

IV.G.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.G.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.G.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 quantity is a standard underwriting term usually fixed at 15% of the offer size. Payoff from the OAO is: min [- (day 1 price – 93% of IPO offer price), 0][9]. Granting this option will have a negative impact on the individual shareholders' wealth when the first-day return is positive. 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%.

[9] 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.

IV.G.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 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.G.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.G.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.

V. Conclusions

This paper contributes to the literature by examining 1) whether directed share programs create an agency problem between pre-IPO shareholders and officers and/or directors of the firms and 2) why such contracts exist. The agency problem may exist 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 by negotiating a sub-optimal IPO offer price. I find evidence inconsistent with the hypothesis that beneficiaries of directed share programs expropriate wealth from non-beneficiary shareholders. In particular, for the VC backed IPOs, 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. Hence, for 75% of the firms in my sample do not even satisfy the necessary condition for expropriation hypothesis. On the other hand, I find that the 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. This might imply that top underwriters with institutional clients 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 expected undepricing, issuers negotiate a larger program size. This suggests that the IPO issuers expect a positive payoff for the beneficiaries from the DSP and hence they negotiate a larger program size. Yet, when I estimate underpricing and DSP size jointly, I do not find that DSPs cause underpricing. The causality in this case is reverse - a one standard deviation increase in underpricing results in a 16.2% increase in the number of shares reserved under a DSP. Hence, the sufficient condition for expropriation is not met and the hypothesis that directed share programs create an incentive for wealth expropriation from pre-IPO shareholders to the beneficiaries of the program is rejected.

Finally, a positive relationship between shares reserved under the program and customers and/or supplier participation suggests that DSPs might have been used for strategic business reasons. Specifically, the number of shares reserved under a DSP increases by 13.3% when customers are included among the beneficiaries of a DSP. Many of the issuing firms in my sample described at great length the importance of maintaining close relationships with their customers and vendors. I also observe a 15% - 19% higher probability of customer or supplier participation in a DSP when the issuing firm has a long term purchase or supply contract with its customers or a supplier. Collaboration with customers or vendors, however, is not a significant factor in predicting the participation of these stakeholders in a DSP.

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_0 (initial return without 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

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

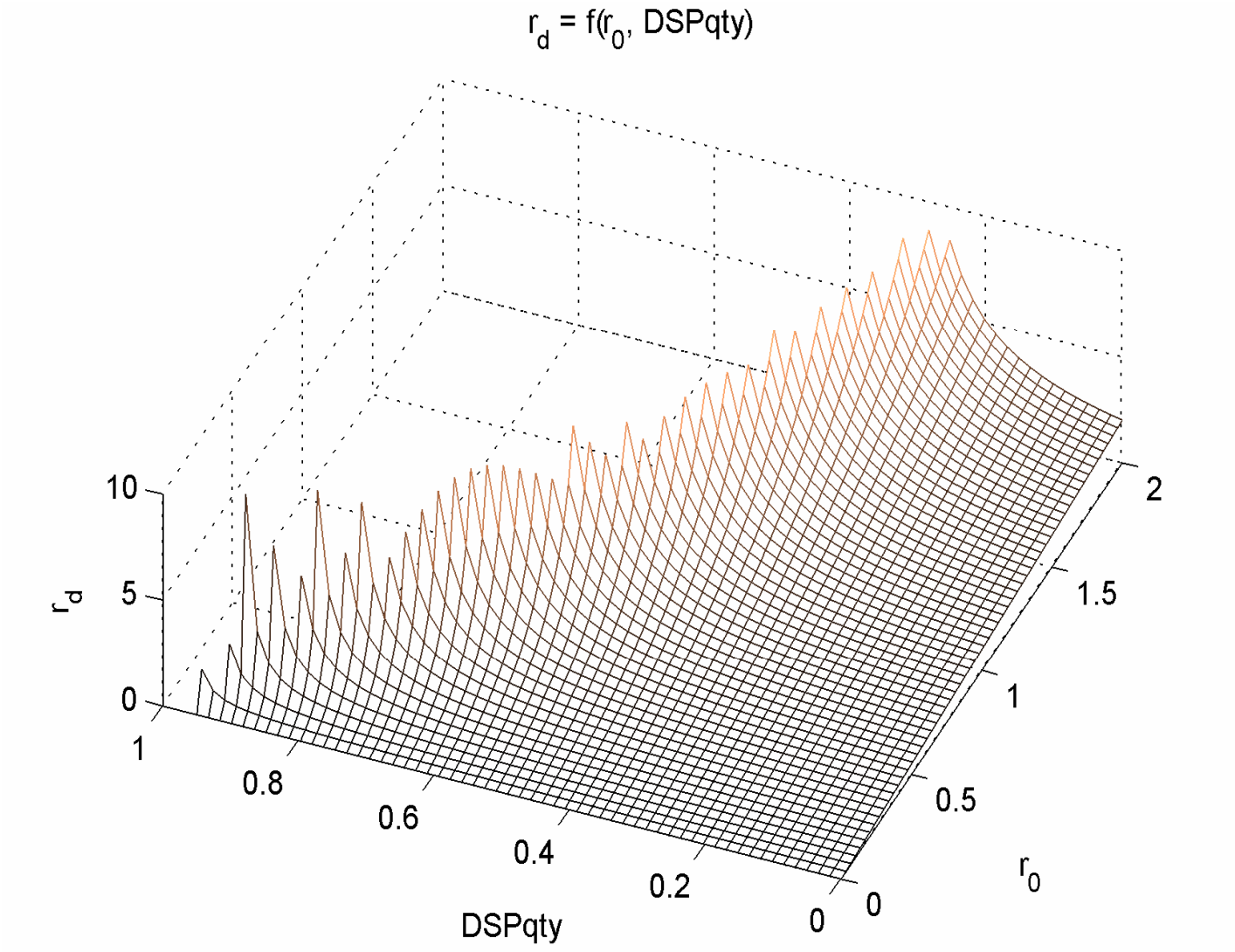

Figure A.II. Threshold values for DSPqty that make a DSP beneficial for the issuer (α = 0.4)

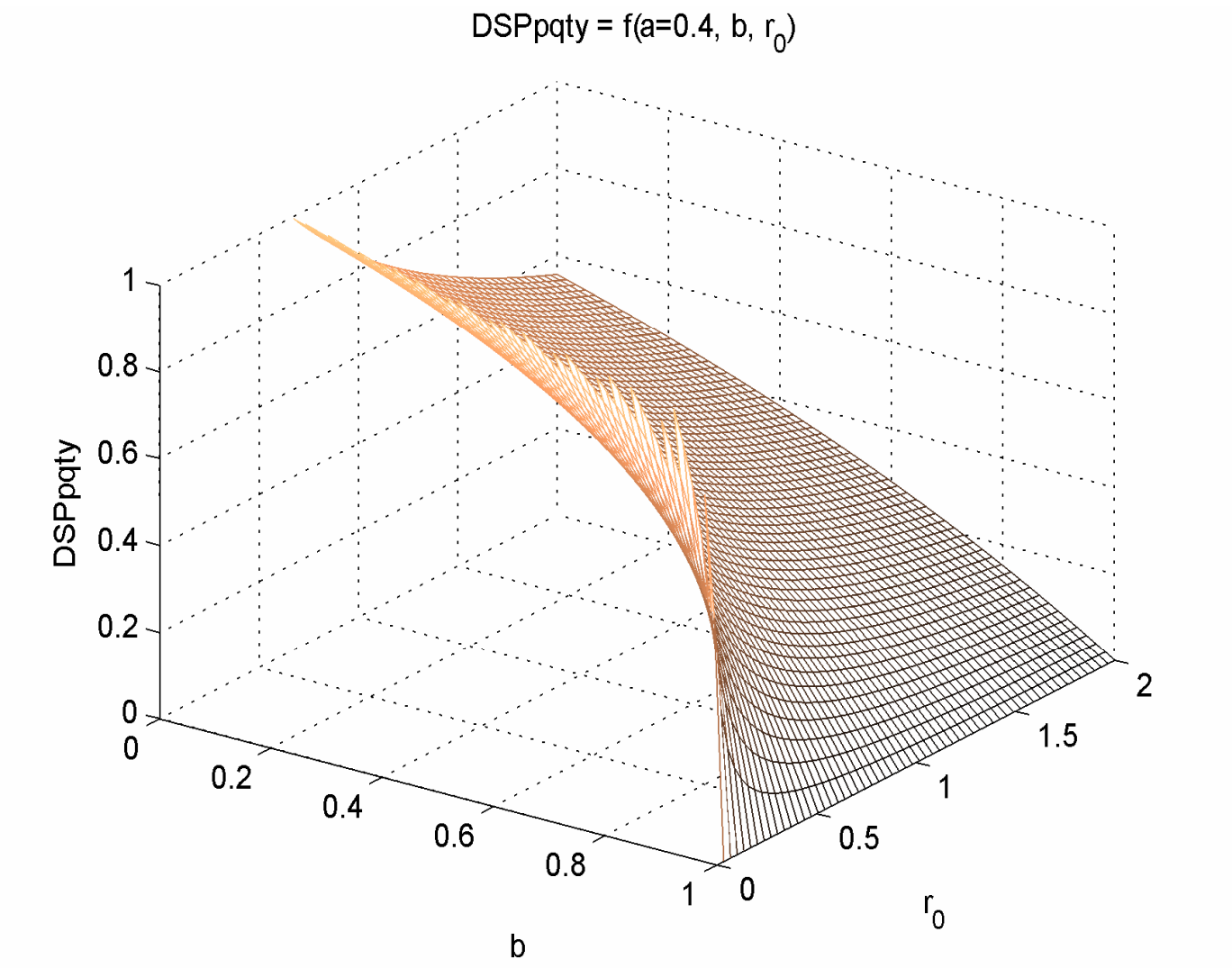

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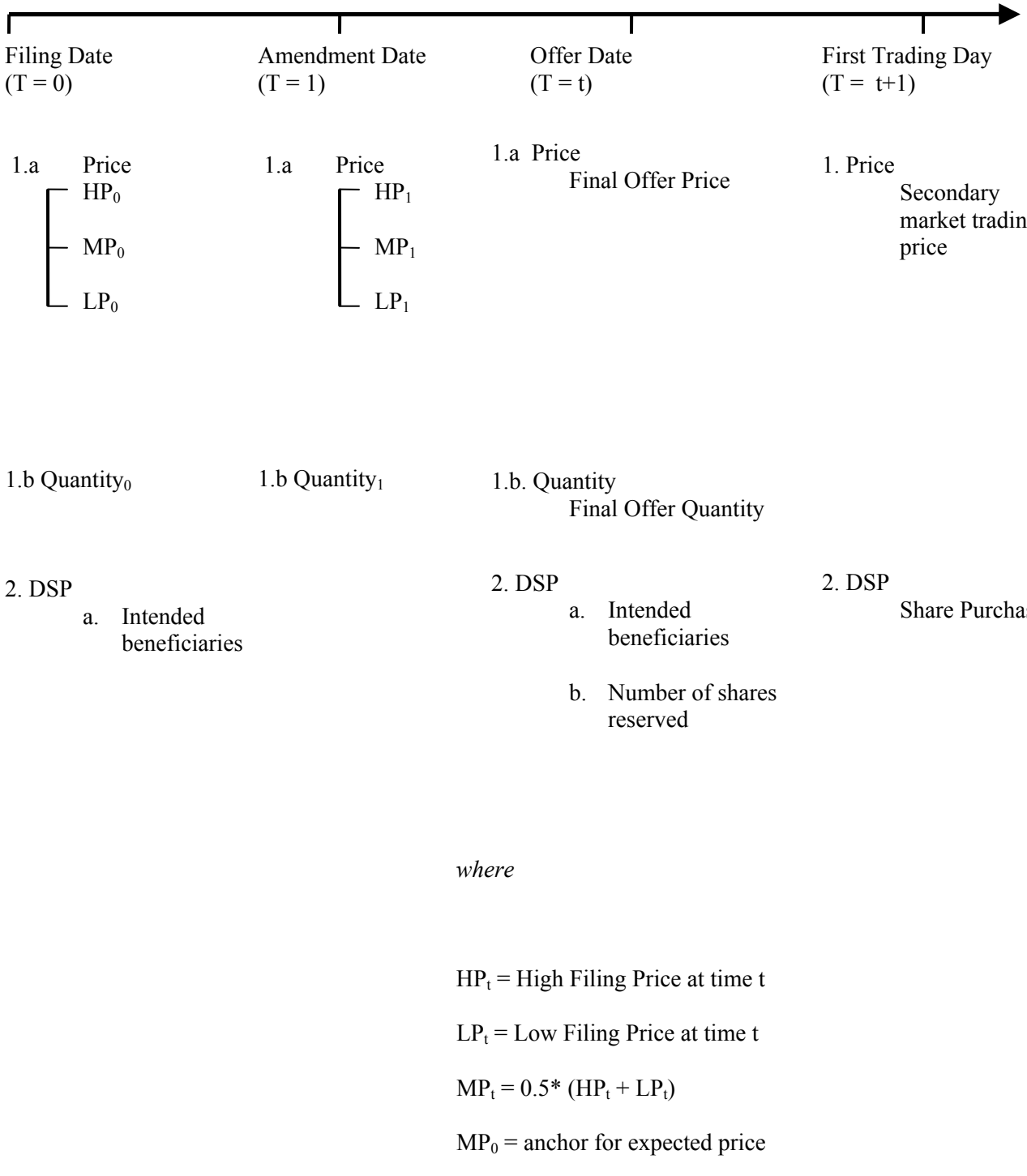
Figure I. Timing and information related to DSPs:



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.**

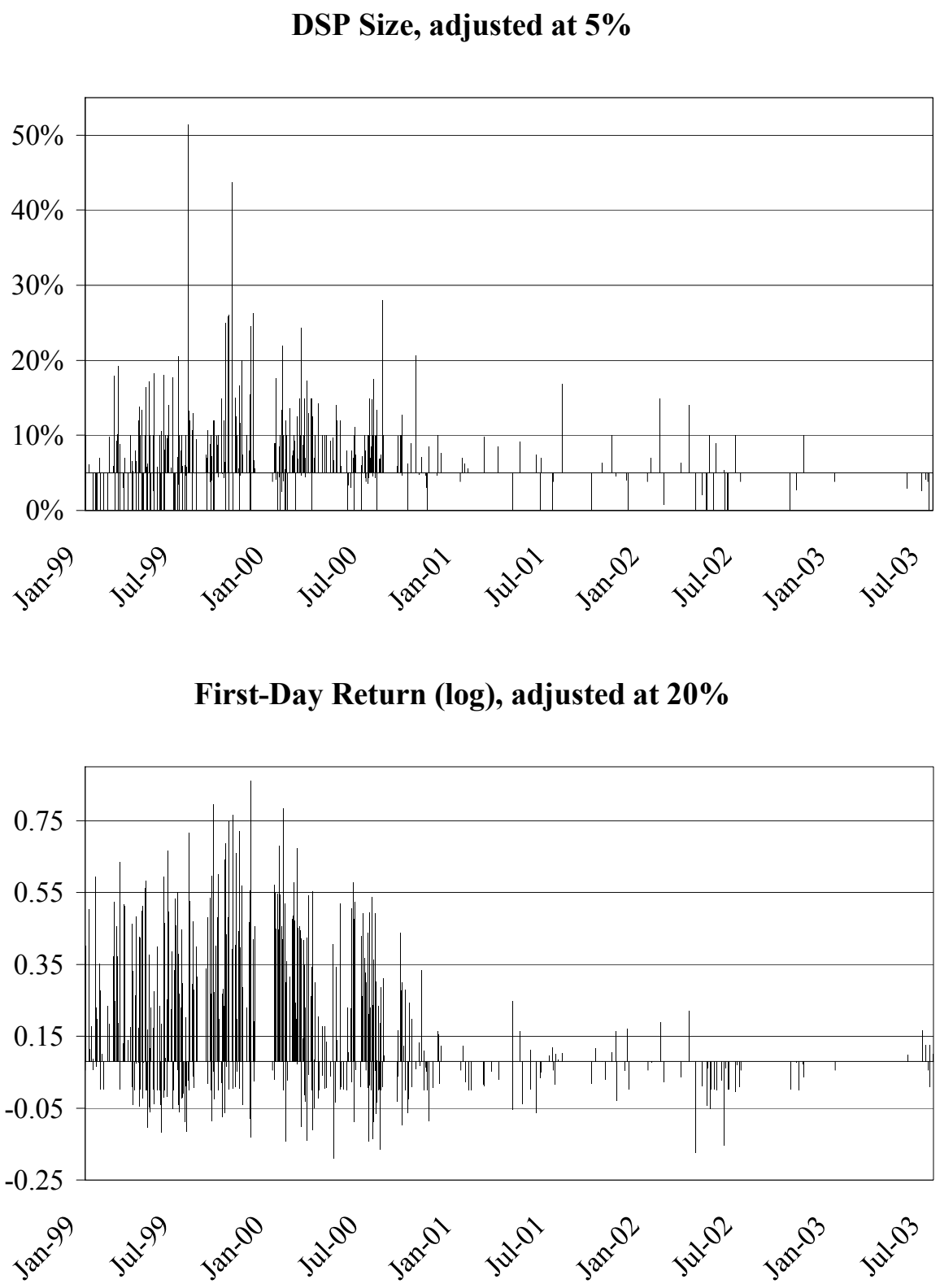


Figure III. Potential gain from the DSP when certain beneficiary group is excluded**.**

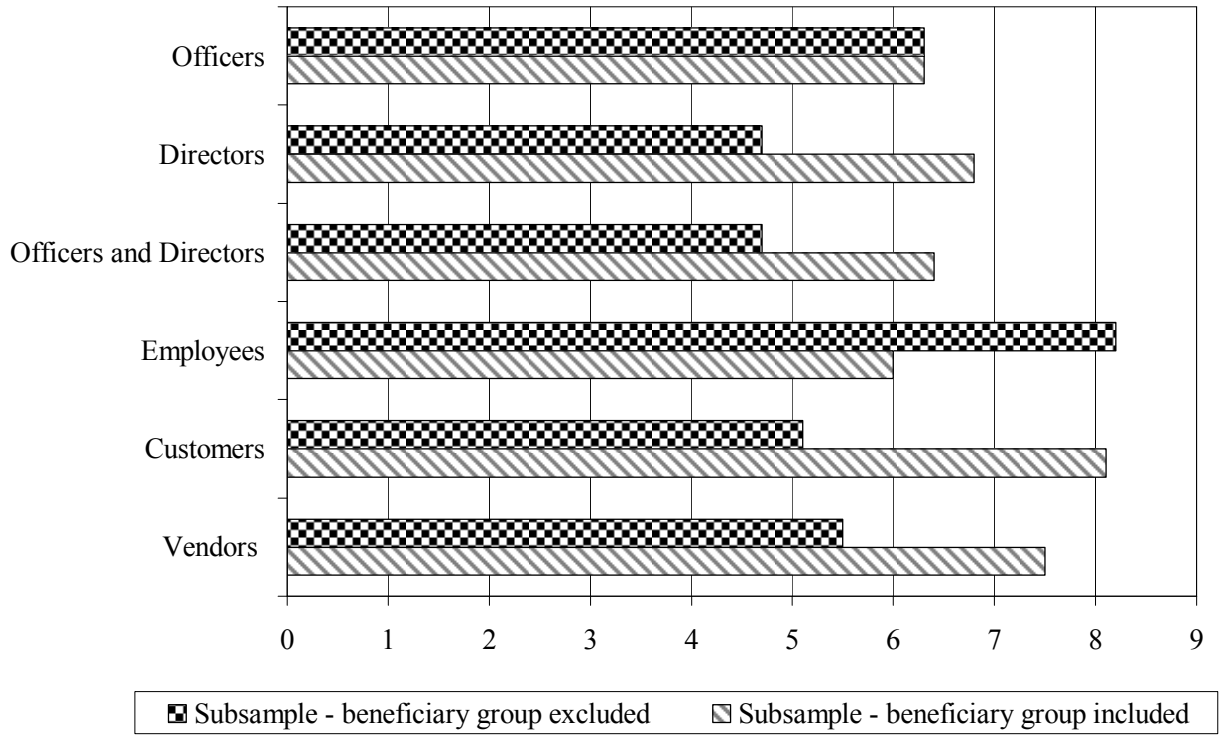


Table I. Summary statistics

***, **, 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	No	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 – OLS Regression

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. Three Stage Least Square Estimation of DSP and 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)
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. Transaction costs are assumed to be incurred while liquidation of holding.

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

	1% transaction cost			2% transaction cost		
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.
Officers						
Mean	6.3	6.3	0.370	6.2	6.3	0.360
Median	2.3	2.7	0.218	2.2	2.7	0.218
Std. Dev	11.2	11.0		11.1	10.9	
N	278	325				
Directors						
Mean	4.7	6.8	0.050**	4.7	6.7	0.047**
Median	1.6	2.7	0.022**	1.6	2.7	0.022**
Std. Dev	7.2	11.9		7.2	11.8	
N	139	464				
Officers and Directors						
Mean	4.7	6.4	0.000***	4.7	6.3	0.000***
Median	1.0	2.7	0.000***	1.0	2.7	0.000***
Std. Dev	10.0	11.0		9.9	10.9	
N	380	320				
Employees						
Mean	8.2	6.0	0.014**	8.0	5.9	0.013**
Median	4.0	2.3	0.041**	3.9	2.3	0.041**
Std. Dev	10.5	11.0		10.4	10.9	
N	74	528				
Customers						
Mean	5.1	8.1	0.000***	5.1	8.0	0.000***
Median	1.8	3.5	0.001***	1.8	3.5	0.001***
Std. Dev	8.3	14.3		8.2	14.1	
N	377	225				
Vendors						
Mean	5.5	7.5	0.014**	5.5	7.4	0.013**
Median	2.1	3.2	0.017**	2.1	3.1	0.017**
Std. Dev	9.7	12.9		9.6	12.8	
N	385	217				

Table VIIIA. Customers as Beneficiaries of DSPs

This table reports the results from the probit regressions (marginal effects reported) of determinants of customers as the beneficiaries of a DSP. The left hand side variable takes a value of 1 if customers are included as beneficiaries of a DSP and 0 otherwise. All key variables are discrete and data are obtained from the IPO prospectus. The dummy for customers with purchase contract have been left out of the equation. Long sales cycle is either firm defined or takes the value of 1 if sales cycle is 4 months or longer. Customer collaboration takes the value of 1 if the firm has a technical, distribution or marketing collaboration with its customer. IP Critical takes the value of 1 if the firm states that patents, trade secrets, confidentiality agreements or non-compete clause is critical to its success. ***; **; and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable	**Beneficiaries:Customers**		
Key Variables:			
Long Term Purchase Commitment by Customer	0.150**	0.148**	0.148**
	(0.027)	(0.034)	(0.035)
Long Development and/or Sales Cycle	0.085	0.081	0.083
	(0.241)	(0.296)	(0.281)
Customer Collaboration		0.012	0.010
		(0.878)	(0.895)
IP Critical	0.041	0.039	0.040
	(0.568)	(0.594)	(0.594)
Control Variables:			
Log (Proceeds)			-0.004
			(0.924)
High Tech Industry Dummy	No	No	Yes
Year Fixed Effect	No	No	Yes
Log Likelihood	-109.26	-109.24	-109.21
Wald Chi-sq	13.2	13.3	13.9
Chi-sq p-value	0.0043	0.0099	*0.0305*
No of Obs	*208*	*208*	*208*
Pseudo R^2	0.057	0.057	0.057

Table VIIIB. Determinants of Vendors or Suppliers as Beneficiaries

This table reports the results from the probit regressions (marginal effects reported) of determinants of vendors or suppliers as the beneficiaries of a DSP. The left hand side variable takes a value of 1 if vendors or suppliers are included as beneficiaries of a DSP and 0 otherwise. All key variables are discrete and data are obtained from the IPO prospectus. The dummy for vendors with purchase contract have been left out of the equation. Collaboration with vendor takes the value of 1 if the firm has a technical, distribution or marketing collaboration with its customer. Input rationing equals 1 if the firm states that it's supplier is the sole source for certain raw material or inputs and there is no economically viable substitute or currently there is a market wide shortage for products from its supplier. Supplier IP Critical takes the value of 1 if the firm states that its suppliers' technology is critical to its own product development. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable	**Beneficiaries:Vendors**		
Key Variables:			
Long Term Supply Contract with Vendor	0.188***	0.181***	0.190***
	(0.004)	(0.009)	(0.006)
Collaboration with Vendor	0.109	0.108	0.078
	(0.112)	(0.115)	(0.244)
Input Rationing	0.073	0.066	0.077
	(0.219)	(0.315)	(0.245)
Supplier IP Critical		0.022	0.004
		(0.758)	(0.959)
Control Variables:			
Log (Proceeds)			-0.032
			(0.491)
High Tech Industry Dummy	No	No	Yes
Year Fixed Effect	No	No	Yes
Log Likelihood	-102.02	-101.97	-99.22
Wald Chi-sq	20.45	21.02	21.75
Chi-sq p-value	0.0001	0.0003	0.0013
No of Obs	*208*	*208*	*208*
Pseudo R^2	0.102	0.102	0.126

Table VIIIC. Determinants of Employees and Officers as Beneficiaries

This table reports the results from the probit regressions (marginal effects reported) of determinants of officers or employees as the beneficiaries of a DSP. The left hand side variable takes a value of 1 if Officers or Employees are included as beneficiaries of a DSP and 0 otherwise. All key variables are discrete and data are obtained from the IPO prospectus. Employee human capital is critical takes the value of 1 if the firm declares that it relies on its technical, engineering or scientific skills of its employees for its success and 0 otherwise. Management Expertise is Critical is defined likewise. Management expertise is included in both set of regressions because it is not possible to establish whether the officers of an IPO with a DSP acquires shares as an employee. Ownership of Officers is obtained by dividing the number of shares held by the top five officers with the total number of pre-IPO shares. Ownership of officers is included as it is not clear whether officers are included as DSP beneficiaries because of their management expertise or because they are also owners of the firm. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable	Beneficiaries:Officers		Beneficiaries:Employees	
Key Variables:				
Employee Human Capital is Critical	-0.131	-0.134	0.057	0.057
	(0.373)	(0.363)	(0.509)	(0.531)
Management Expertise is Critical	0.182	0.181	0.144*	0.153*
	(0.106)	(0.112)	(0.061)	(0.052)
Owenership of Officers	-0.081	-0.099		
	(0.711)	(0.654)		
Control Variables:				
Log (Proceeds)		0.032		-0.004
		(0.681)		(0.926)
High Tech Industry Dummy	No	Yes		Yes
Year Fixed Effect	No	No		No
Log Likelihood	-87.58	-86.99	-51.35	-50.10
Wald Chi-sq	2.78	3.76	5.29	11.3
Chi-sq p-value	0.4269	0.5849	0.0711	0.0234
No of Obs	*129*	*129*	*129*	*129*
Pseudo R^2	0.017	0.024	0.050	0.074