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**NANYANG
TECHNOLOGICAL
UNIVERSITY**

Three Essays on Corporate Finance

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NANYANG BUSINESS SCHOOL

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Essay One: Does Corporate Social Responsibility Matter? Evidence from New Equity Issues

Abstract

This paper examines the relevance of corporate social responsibility (CSR) from the perspective of new equity issues. Overall, our findings support the theory that CSR affects equity demand; which, in turn, affects equity valuation. First, in support of the hypothesis that equity demand is negatively (positively) affected by CSR concerns (strengths) of the issuer, we find that (1) issuers with greater CSR concerns are more likely to revise downwards the terms (offer price, number of shares offered, and total proceeds raised) of their stock offerings; (2) the probability of the over-allotment option being exercised is negatively related to CSR concerns in SEO issues, but is positively related to CSR strengths in IPO issues; (3) firms with greater CSR strengths (concerns) are more likely to choose fully-marketed offers (accelerated offers); and (4) the change in the percentage of institutional holdings around the issue date is positively (negatively) related to CSR strengths (concerns). Second, our findings indicate that CSR is an important factor that influences equity valuation in both IPO and SEO markets. We find that (1) IPOs with greater CSR concerns are more likely to be overvalued, while SEOs with greater CSR strengths have higher underpricing; (2) CSR concerns are negatively related to abnormal returns around SEO announcement dates; and (3) SEO firms with high CSR concerns underperform SEO firms with low CSR concerns over both three-year and five-year post-issue periods.

JEL Classification: G14; G32; L2; M14

Keywords: Corporate Social Responsibility (CSR); Environmental, Social and Governance (ESG); Initial Public Offerings; Seasoned Equity Offerings; Equity Demand; Price Revisions; Over-allotment Option; SEO marketing; Fully-market Offers; Accelerated Offers; Underpricing; SEO Announcement Returns; Long-run Return Performance.

1. Introduction

Corporate social responsibility (CSR) has become increasingly important worldwide in recent years due to growing awareness of environmental, social, governance, ethics, and sustainability issues.¹ The heightened awareness of CSR is highlighted recently by a growing demand from both investors and regulators for greater voluntary disclosure of CSR activities in firms' financial reports (Financial Times, 2010).² There is also a growing movement of socially responsible investing (SRI), which accounts for about 12.2 per cent of assets under professional management in the U.S. in 2010.³ SRI assets under management in the U.S. grew exponentially from \$639 billion in 1995 to \$3.07 trillion in 2010 (Social Investment Forum Foundation, 2010). In Europe, the total SRI assets under management is approximately €5.0 trillion and globally, the SRI market is estimated at about €7.6 trillion as at year-end 2009 (Eurosif, 2010).⁴ In response to public demand, a growing number of firms are voluntarily providing additional disclosures about their CSR activities (Dhaliwal et al., 2011). Corporations worldwide are also increasingly adopting and integrating CSR into their businesses. A recent worldwide survey, for example, finds that an overwhelming majority of corporate CEOs believe that sustainability issues are critical to the future success of their companies and should be fully integrated into the strategy and operations of a company (Accenture, 2010).

¹ Corporate Social Responsibility (CSR) is defined by the European Commission (2001) as “a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis. Being socially responsible means not only fulfilling legal expectations, but also going beyond compliance ... to contribute to a better society and a cleaner environment.”

² Financial Times, “Corporate reports: Investors push to know more about non-financial risks,” October 1, 2010.

³ Socially responsible investing (SRI), which is also known as responsible investing, ethical investing, sustainable investing, or green investing, is a broad-based approach to investing that incorporates environmental, social, and governance (ESG) criteria in investment decisions. The SRI strategy is to maximize both financial and social returns.

⁴ In Europe, SRI assets account for about 43% of all European assets under management as at year-end 2009 (Social Investment Forum Foundation, 2010).

Given the increasing importance of CSR, a pertinent question to ask is that: Does it matter? In this paper, we study the relevance of CSR from the perspective of new equity issues. Specifically, we examine the effects of CSR on the demand and valuation of equity in both IPO and SEO markets. Theoretically, Heinkel et al. (2001) develop a model which shows that exclusionary ethical investing will result in lower demand for stocks of socially irresponsible (polluting) firms. The neglect of socially irresponsible firms by green investors, in turn, leads to lower stock prices (higher expected returns) for such firms because of the lack of risk-sharing opportunities among non-green investors. Under Fama and French's (2007) framework, CSR affects demand for stocks because investors derive utility not only from the assets' financial payoffs, but also from the taste for assets as consumption goods. Empirically, the growing trend of socially responsible investing worldwide suggests that CSR can have a potentially sizeable effect on the demand for stocks. Anecdotal evidence on the effect of CSR on demand for stocks is illustrated in the case of Toys "R" Us' proposed IPO recently. Five years after being taken private in an LBO, Toys "R" Us filed an S-1 registration on May 28, 2010 to raise up to \$800 million in an IPO. However, Toys "R" Us' proposed IPO was not well received. It was delayed many times by CSR concerns about the firm. Details of the Toys "R" Us case study is provided in subsequent section.

We examine the effect of CSR on equity demand under four different settings. First, previous studies have shown that the terms of stock offerings in IPO and SEO markets are often revised during the registration period to reflect market demand for the issue (Benveniste and Spindt, 1989; Galloway et al., 1998; Ang and Brau, 2003). The revisions in the terms of stock offerings thus provide a novel setting to study the effect of CSR on equity demand. Using the CSR data from KLD Research & Analytics, we test the hypothesis that equity demand is

negatively (positively) affected by CSR concerns (strengths) associated with the issuer. In support of the above hypothesis, we find that issuers with greater CSR concerns are more likely to be associated with downward revisions in the offer price, number of shares offered for sale, and total amount of proceeds raised.⁵

Second, another setting where we can examine the effect of CSR on demand for equity is the exercise of over-allotment option. Over-allotment option gives underwriters the right to sell additional shares at the offering price if demand for the securities exceeds the original amount offered. The over-allotment option can vary in size, but usually represents about 15% of the original number of shares offered for sale. Hence, if the demand for stock is positively (negatively) related to the CSR strengths (concerns) of the issuer, based on cost-benefit tradeoff analyses, then we would expect the likelihood that the over-allotment option is exercised to depend on the CSR strengths (concerns) of the issuer. Again, in support of our hypothesis, we find that the probability of the over-allotment option being exercised is negatively related to CSR concerns in SEO issues, but is positively related to CSR strengths in IPO issues.

Third, the choice of SEO offering methods can also shed additional light on the effect of CSR on equity demand. In a SEO, the issuer will typically choose between two offering methods to market the stock offering. The fully-marketed offer provides greater marketing effort, but the cost (gross spread) is higher; while the accelerated offer entails less marketing effort, but the cost (gross spread) is lower. If the demand for stock is positively (negatively) related to the CSR strengths (concerns) of the issuer, then we expect firms with greater CSR strengths (concerns) to

⁵ Further investigation shows that for the high CSR concerns firms, the downward revisions in shares offered for sale applies mostly to primary shares. Also, consistent with Ang and Brau's (2003) finding on the opportunistic wealth-maximizing behavior of insiders, we find that the revisions in the sale of secondary shares are negatively related to CSR strengths in IPO issues, but are positively related to CSR concerns in SEO issues. In other words, insiders strategically sell relatively more (less) of their own shares and less (more) primary shares when the demand is poor (good) due to CSR concerns (strengths) over the issue.

choose fully-marketed offers (accelerated offers). Gao and Ritter (2010) posit that the greater marketing effort associated with a fully-marketed offer could create demand by shifting the demand curve positively. Marketing effort also results in more homogenous opinions and flattens the demand curve of the issuer's stock. Firms with greater CSR strengths have "good news" to disseminate and, hence, could create more demand by shifting the demand curve positively. Such firms stand to reap greater benefits (increase demand) from the marketing effort of a fully-marketed offer. In contrast, firms with greater CSR concerns are more inclined to remain silent about their weaknesses, rather than disseminate the "bad news" through fully-marketed offerings. These firms will face considerable obstacles in generating investor interests because of CSR concerns. Thus, the benefits generated by a fully-marketed offer may not be sufficiently large to compensate these firms for the additional costs incurred. Also, in certain cases, the dissemination of "bad news" through a fully-marketed offer may actually have a negative impact on demand, instead of creating demand. Consistent with our expectation, we find that firms with greater CSR strengths (concerns) are more likely to adopt fully-marketed offers (accelerated offers).

Fourth, the change in institutional holdings around the issue date also provides further evidence on the effect of CSR on equity demand. Empirically, we find that for both IPO and SEO issues, the change in the percentage of institutional holdings is positively (negatively) correlated with the CSR strengths (concerns) of the issuer. There are two possible reasons for this empirical finding. One possibility is that the increase (decrease) in the percentage of institutional holdings is due to higher (lower) allocation of shares of firms with high CSR strengths (concerns) to institutional investors by investment banks. Another possibility is that the increase (decrease) in the percentage of institutional holdings is a result of institutional investors' accumulation (selling down) of shares of firms with high CSR strengths (concerns) in the post-

issue market. We are unable to determine whether the change in the percentage of institutional holdings is a result of the first and/or second possibility without detailed share allocation data.

Having established the above linkages between CSR and demand for equity, we then examine the effect of CSR on equity valuation. Heinkel et al. (2001) posit that lower demand for socially irresponsible firms will lead to lower stock prices and, hence, higher expected returns for such firms.⁶ Similar to models on litigation risks, Heinkel et al.'s (2001) model predicts that the CSR strengths (concerns) of the issuer should be ex-ante priced into the final offer price to provide investors with lower (higher) first-day returns or underpricing, *ceteris paribus*. Empirically, however, we find that IPOs with greater CSR concerns have lower underpricing and are more likely to be overvalued; while SEOs with greater CSR strengths are associated with significantly higher underpricing.

Our findings are contrary to Heinkel et al.'s (2001) model predictions, which assume that information about the CSR strengths and concerns of the issuer is fully-incorporated into the final offer price. Instead, our findings are consistent with the partial adjustment phenomenon (Benveniste and Spindt, 1989; Hanley, 1993; Loughran and Ritter, 2002; Edelen and Kadlec, 2005). As argued previously, firms with greater CSR strengths (concerns) are more likely to revise the offer price and/or total number of shares offered upwards (downwards) because of strong (weak) demand for their stocks. The upward (downward) revisions in offer price, in turn, are associated with higher (lower) first-day returns because underwriters and issuers would only partially adjust the offer price to reflect the information gathered during the registration period. Ince (2008) finds that offer prices adjust fully to negative information, but only partially to

⁶ Heinkel et al.'s (2001) model is similar to Merton's (1987) model, which posits that lower demand for neglected firms will lead to lower stock prices and higher expected returns for such firms. In Merton's (1987) model, the demand for neglected stocks is lower because of incomplete information.

positive information. In contrast, our findings suggest that offer prices adjust only partially to both negative and positive information about the CSR of the issuer.

Another setting where we can examine the effect of CSR on equity valuation is the SEO announcement returns. Prior studies (Asquith and Mullins, 1986; Masulis and Korwar, 1986; Lucas and McDonald, 1990) find that share prices, on average, react negatively to the announcements of seasoned equity offerings. Studies on market-timings (Myers and Majluf, 1984; Baker and Wurgler, 2000) attribute the negative share price reaction to managers' exploitation of the windows of opportunity to sell overvalued stocks. Empirically, we find that firms with greater CSR concerns are associated with significantly more negative cumulative abnormal returns around the SEO announcement date. This finding suggests that firms with greater CSR concerns (strengths) have less (more) loyal and smaller (larger) investor base.

Finally, we examine the effect of CSR on the long-run return performance of new equity issues (Ritter, 1991; Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995). We investigate whether the effect of CSR on equity demand and, hence, valuation continues to persist over the long-run. Using the four-factor calendar-time portfolio regression approach, we find that for SEO issues, firms with high CSR concerns underperform firms with low CSR concerns by as much as 80 basis points per month. We also obtained similar results using the Fama-MacBeth cross-sectional regression approach. An explanation for this finding is that, in comparison to normal firms, high CSR concerns firms have higher project financing costs (cost of capital) because of poor equity demand and depressed stock prices. Such firms also do not have favorable access to capital markets and are thus more likely to be financially constrained. As a consequence, firms with high CSR concerns will be at a competitive disadvantage. Relative to normal firms, high CSR concerns firms will not have as much financial flexibility in funding

and undertaking future projects. Also, for any given future project, high CSR concerns firms will not be able to generate as much value from it, *ceteris paribus*.

Our study contributes to the literature in several ways. First, we provide new evidence which shows that CSR matters. More specifically, we find that CSR affects demand for equity; which, in turn, affects equity valuation. Second, we also add to the literature on new equity issues. Our findings on the revisions in stock offerings provide a unique insight on how CSR concerns and strengths about the issuer are incorporated into the terms (offer price and shares offered for sale) of the stock offering. Our findings also indicate that CSR is an important factor that influences equity valuation in both IPO and SEO markets. We find that CSR affects the underpricing of new equity issues, SEO announcement returns, and long-run return performances. Overall, our findings suggest that the primary channel whereby CSR affects equity valuation and corporate financial performances is via the demand for equity.

The rest of the paper is organized as follows. Section 2 discusses our sample selection and the regression variables. In Section 3, we examine the linkages between CSR and revisions in the terms of stock offerings, exercise of over-allotment option, choice of SEO offering methods; and institutional shareholdings. In Section 4, we analyze the effect of CSR on equity valuations (underpricing, SEO announcement returns, and long-run return performance). Finally, Section 5 concludes the paper.

2. Data and Variables

2.1 Sample Selection

To examine the effect of CSR on the demand and valuation of new equity issues, we construct our sample by merging together several key databases. The KLD Research & Analytics SOCRATES database provides CSR data; Securities Data Company's (SDC) Global New Issues database provides data on U.S. common stock offerings; and CRSP provides the data on stock returns. Our overall sample period is from January 1, 1991 to December 31, 2009. The starting period for our sample is limited to the first year that the KLD database begins the reporting of CSR ratings. Only common stock offerings are included in our sample. Consistent with prior literature, we exclude American Depositary Receipts, private placements, rights offerings, unit offerings, closed-end funds, Real Estate Investment Trusts (REITs), and penny stocks with offer price below five dollars from our sample. Firms that are not covered by the KLD database and, hence, do not have any CSR ratings are also excluded. We further exclude firms with incomplete stock returns and missing SDC new issues data. Our final sample consists of 378 initial public offerings (IPOs) and 2,734 seasoned equity offerings (SEOs). The relatively small IPO sub-sample is due to limited coverage of IPO firms by the KLD database.

[Insert Table I here]

Table I reports the number of IPOs and SEOs in our sample by year. Our sample observations are largely dependent on the availability of KLD's data on CSR. The number of observations for both IPOs and SEOs, which is rather small during the early period, has increased steadily over the sample period. This pattern reflects KLD's increasing coverage of

firms over time. Initially, over the period of 1991-2000, KLD only covers firms on the S&P 500 and Domini 400 Social Index. KLD then expanded its coverage subsequently to include the Russell 100 Index (in 2001), Large Cap Social Index (in 2002), Russell 2000 Index (in 2003), and Broad Market Social Index (in 2003).

2.2 *Dependent Variables*

There are two sets of dependent variables that are of relevance to this study. First, to study the linkages between CSR and demand for equity, we examine the effects of CSR on revisions in the terms of the stock offerings, exercise of over-allotment option, choice of SEO offering methods, and institutional shareholdings. Information on the terms of the stock offerings, over-allotment option, and SEO offering methods are all extracted from the SDC Global New Issues database. Data on institutional holdings are extracted from the Thomson-Reuters Institutional Holdings (13F) database.

The terms of the stock offerings are often revised to reflect the market demand for the new issues (Ang and Brau, 2003; Galloway et al., 1998; Chan et al., 2011; Gokkaya et al., 2011). To study the revisions in the terms of the stock offerings over the registration period (from the initial filing date to the final offering date), we construct the *Price Revision*, *Total Share Revision*, *Proceeds Revision*, *Primary Share Revision*, and *Secondary Share Revision* variables to measure the percentage revisions in the offer price, total shares offered, total proceeds raised, primary shares offered, and secondary shares offered, respectively.

The effect of CSR on demand for equity is also reflected through the exercise of over-allotment option in stock offerings. The over-allotment (or greenshoe) option in the underwriting

agreements allows the underwriter to sell additional shares at the offering price if the demand for shares is greater than anticipated. We examine this effect with the *Over-allotment Exercised* dummy variable, which is equal to 1 if the over-allotment option is exercised; and 0 otherwise. The choice of SEO offering methods also provides insights on the anticipated effects of CSR on demand. We examine the choice of SEO offering methods with the *Fully-marketed Offering* dummy variable, which is equal to 1 if the SEO offering is on a fully-marketed basis; and 0 otherwise. Lastly, we examine the effect of CSR on institutional demand with the Δ *Institutional Holdings* variable, which is equal to the change in percentage institutional holdings from pre- to post-issue date.

Subsequently, to study the linkages between CSR and equity valuations, we examine the effects of CSR on underpricing, SEO announcement returns, and long-run return performance. The *Underpricing* variable is a measure of the first-day return (calculated from offer price to first-day closing market price) in new equity issues. Following Lee and Masulis (2009), our measure of the SEO announcement returns is based on the *CAR* [0, 1] variable, which is equal to the two-day cumulative abnormal return over the [0, +1] event window. Abnormal return is calculated using the market model, where the firm beta is estimated over the [-160, -11] event window period. Finally, our analysis of long-run return performance is over both three-year and five-year post-issue periods.

2.3 Corporate Social Responsibility

Following previous studies (Dhaliwal et al., 2011; Hillman and Keim, 2001; Bae et al., 2011; Galema et al., 2008; Ghoul et al., 2011), we extract our measure of a firm's corporate social responsibility from the KLD database. KLD evaluates a firm's CSR based on seven

qualitative areas, namely: community, corporate governance, diversity, employee relations, environment, human rights, and product. The community qualitative area captures the firm's strengths and weaknesses in community-related issues, such as charitable giving, support for housing and education, indigenous people relation, volunteer programs, investment controversies, negative economic impact, and tax disputes. Corporate governance relates to issues pertaining to the firm's compensation, ownership, transparency, political accountability, and accounting controversies. Diversity relates to workforce composition issues, such as women and minority representation, affirmative action, gay and lesbian policies, and employment of disabled. The employee relations area is concerned about issues relating to employee compensation, union relations, health and safety program, layoff policy, and workforce reductions. Environment focuses on issues pertaining to pollution, recycling, clean energy, ozone depleting chemicals, hazardous waste, agricultural chemicals, regulatory compliance, and climate change. The human rights area examines the firm's social record in South Africa, Burma operations and investments, labor rights, and indigenous people relations. The product area is concerned about antitrust issues and the quality, safety, and marketing of the firm's product.⁷

For each of the above qualitative areas, positive and negative screens are used to capture the strengths and weaknesses of the firm's CSR, respectively. KLD assigns a binary (0/1) rating for each of the (positive and negative) screens to indicate whether the firm meets the particular screen's criterion. In this paper, we use three different measures of the firm's CSR. First, the *CSR Strengths* variable, which is obtained by summing the binary values for all positive screens across the seven qualitative areas, is a measure of the total CSR strengths of the firm. Second, the *CSR Concerns* variable, which is obtained by summing the binary values for all the negative

⁷ Please refer to KLD Research & Analytics (2008) for more detailed information on KLD's CSR ratings methodology.

screens, is a measure of the total CSR concerns of the firm. Third, the *CSR* variable, which is equal to the total CSR strengths score minus the total CSR concerns score, is a measure of the aggregate CSR score for the firm.

Previous studies' measurement of a firm's CSR is mostly based on the aggregate CSR score (Dhaliwal et al., 2011; Hillman and Keim, 2001; Ghoul et al., 2011). Using the aggregate CSR score alone, however, can be misleading. One unit of *CSR Strengths* is not necessary equivalent to one unit of *CSR Concerns* because of potential asymmetric effects. We therefore examine the effects of the CSR strengths and CSR concerns of the firm separately, in addition to the aggregate CSR measure.

2.4 Control Variables

Following previous studies in IPO and SEO (Lee and Masulis, 2009; Gao and Ritter 2010; Corwin, 2003; Loughran and Ritter, 2004; Benveniste et al., 2003; Lowry and Shu, 2002), our control variables typically consist of the following: *Total Asset*, *Offer Size*, *Total Shares Offered*, *Primary Shares*, *Underwriter Rank*, *High-tech Dummy*, and *NASDAQ Dummy*. The *Total Asset* variable (Compustat item *at*) is a measure of firm size; while *Offer Size* is equal to the total proceeds raised in the offering. *Total Shares Offered* is equal to the total shares offered as a percentage of shares outstanding after the offering. *Primary Shares* is equal to the percent of offering that is primary (or newly issued) shares. The *Underwriter Rank* variable is equivalent to the Carter-Manaster ranking of underwriter's reputation. *High-tech Dummy* is dummy variable

for high technology firms; while the *NASDAQ Dummy* is a dummy variable for NASDAQ-listed firms.

We further include the *VC-backed Dummy* variable in all IPO regressions and the *Shelf-registration Dummy* variable in all SEO regressions. The *Market Return* variable is included in all regressions to capture the general stock market conditions prior to issue date. *Market Return* is equivalent to the cumulative value-weighted market returns over a 15-trading day period prior to the issue date. Calendar year dummies are also included in our regressions to control for potential year fixed effect. Finally, we control for the Fama-French three factors and the momentum factor in the long-run return performance analysis.

2.5 Summary Statistics

Table II reports the summary descriptive statistics for our sample. On average, we find that the total CSR Concerns score is higher than the total CSR Strengths score for both our IPO and SEO sub-samples. The net result is that the aggregate CSR scores for both sub-samples are slightly negative, on average. The median CSR score, however, is zero in both sub-samples. The standard deviation of the CSR scores shows that there is substantial variation in the CSR scores across firms. Also, in comparison to IPO firms, both the CSR Strengths and CSR Concerns scores are generally higher for SEO firms. This result may be attributed to SEO firms' relatively longer period of operating history.

[Insert Table II here]

Comparing the IPO and SEO sub-samples, we further find that the SEO firms are generally larger in asset size (*Total Assets*). Both sub-samples have similar mean and median *Offer Size*

(total proceeds raised), but both the total shares offered (% of shares outstanding) and primary shares offered (% total shares offered) are generally higher in IPO issues. The two sub-samples have similar mean and median *Underwriter Rank* for underwriter reputation. About 50% of IPOs and 31% of SEOs are from the high-technology industry. The IPO sub-sample has a higher percentage of NASDAQ-listed firms (64%) than the SEO sub-sample (40%). About 42% percent of IPO issues are VC-backed, while 69% of SEO offerings are from shelf-registration (SEC Rule 415). About 69% of SEO offerings are on a fully-marketed basis. In comparison to IPOs, SEOs are generally offered under better market conditions. The median cumulative value-weighted market returns over a 15-trading day period prior to the issue date (*Market Return*) for SEO issues (1.4%) is higher than that for IPO issues (0.9%).

The mean (median) *Price Revision* (from initial filing date to final offering date) for IPO and SEO issues are 0.3% (1.2%) and -4.2% (-3.0%), respectively; while the mean (median) *Total Share Revision* for IPO and SEO issues are 2.4% (0.0%) and -1.0% (0.0%), respectively. On average, the total proceeds raised in an offering is revised upwards in IPOs, but is revised downwards in SEOs. The mean (median) *Proceeds Revision* for IPO and SEO issues are 3.1% (5.1%) and -4.8% (-1.3%), respectively. The over-allotment option is finally exercised in 71.5% of IPO issues, but only in 64.9% of SEO issues.

Table II also shows that the change in percentage institutional holdings from pre- to post-issue date is substantially greater for IPO issues than that for SEO issues. The mean (median) Δ *Institutional Holdings* for IPO and SEO issues are 35.2% (30.2%) and 3.3% (2.8%), respectively. This result is attributable to the relatively low participation of institutional investors in pre-IPO shareholdings. In our sample, only six IPOs have institutional holdings data prior to

issue date. The percentage of institutional holdings is assigned a value of zero for IPOs that do not have institutional holdings data prior to issue date.

The first-day return (underpricing) for our sample is comparable to that in previous literature (Loughran and Ritter, 2002; Loughran and Ritter, 2004; Corwin, 2003). The mean (median) *Underpricing* for the IPO and SEO sub-samples are 14.6% (10.7%) and 2.6% (1.1%), respectively. Also, consistent with previous studies, the SEO announcements cumulative abnormal returns are negative, on average. The mean (median) *CAR* [0, 1] for the SEO sub-sample is equal to -3.2% (-2.5%).

3. CSR and Demand for Equity

In this section, we test the hypothesis that demand for equity is negatively (positively) affected by CSR concerns (strengths) associated with the equity issues. Heinkel et al.'s (2001) model posits that exclusionary ethical investing will result in lower demand for stocks of socially irresponsible firms. In the context of Fama and French's (2007) framework, CSR affects demand for stocks because investors derive utility not only from the financial payoffs of assets, but also from the taste for assets as consumption goods. In socially responsible investing (SRI), the investment objective is to maximize both financial and social returns. SRI investors and institutional funds use both negative and positive screening criteria to construct their portfolios. Negative (positive) screens are used to exclude (include) stocks with undesirable (desirable) environmental, social, and governance (ESG) characteristics. A natural consequence of the SRI screening criteria is that demand for stocks will be negatively (positively) affected by CSR

concerns (strengths) of the firm. Furthermore, the growing trend of socially responsible investing worldwide suggests that CSR can have a potentially sizeable effect on the demand for stocks.

Anecdotal evidence on the effect of CSR on demand for stocks can be illustrated in a case study of the proposed initial public offering by Toys "R" Us recently. Toys "R" Us is a global retailer of toys and juvenile products. Founded in 1948, Toys "R" Us operated as a public-listed company from 1978 until 2005. On July 2005, Toys "R" Us was taken private in a \$6.6 billion leveraged buyout by an investment group consisting of Kohlberg Kravis Roberts, Bain Capital, and Vornado Realty Trust. After a period of about five years as a private firm, Toys "R" Us filed an S-1 registration statement with the SEC on May 28, 2010 to raise up to \$800 million in an initial public offering. The S-1 filing did not provide any information on the number of shares offered and the estimated price range. Nor did it specify the timing for the stock flotation. It was reported by Reuters (May 28, 2010) that the filing is a "trial balloon" for the underwriters to gauge investors' appetite for the IPO.⁸

Toys "R" Us' proposed IPO was not well received. It was delayed many times by CSR concerns about the firm. On July 22, 2010, a coalition of organizations held a demonstration outside Toys "R" Us' flagship store in Times Square to protest against the firm's sale of toxic toy story and PVC toys. Then on September 17, 2010, members of the Interfaith Center on Corporate Responsibility (ICCR) and the Investor Environmental Health Network (IEHN) released an open letter to the investing community to discourage investors from participating in Toys "R" Us' IPO because of concerns over the firm's sale of toxic PVC toys. The ICCR represents a coalition of about 300 institutional investors with more than \$150 billion in combined assets; while the IEHN

⁸ Reuters, "Toys R Us eyes \$800 million IPO," May 28, 2010.

is a coalition of 20 institutional investors with more than \$30 billion in combined assets. A copy of the open letter is included in the Appendix.

Subsequently, the New York Post reported on September 26, 2010 that Toys "R" Us' IPO may be delayed until 2011, although there was a 20% chance that the IPO could be done in the next few weeks.⁹ On October 1, 2010, Toys "R" Us filed a third amendment to its S-1 with the SEC. But prior to the Christmas holiday shopping season, the Center for Health, Environment & Justice (CHEJ) and the Teamsters Office of Consumer Affairs released a report about Toys "R" Us' toxic toys to the National Commission of Inquiry into Toxic Toys. The report, which includes recommendations for Toys "R" Us to reform its practices, calls for Congressional action. The group also launched a website (www.toxictoysrus.org) and uploaded a video on YouTube to disseminate information about Toys "R" Us allegedly selling toys that are poisoning the nation's children.

On March 2, 2011, the Washington Business Journal reported that Toys "R" Us was once again considering an IPO after twice scrapping IPO plans in 2010.¹⁰ On March 28, 2011, Toys "R" Us filed a fourth amendment to its S-1 with the SEC. However, Reuters reported on April 7, 2011 that Toys "R" Us had delayed the IPO contemplated for the first half of the year because of lackluster holiday sales.¹¹ Then on April 13, 2011, Reuters reported that the IPO is likely to be in July.¹² On June 20, 2011, Toys "R" Us filed a fifth amendment to its S-1 with the SEC. But on July 8, 2011, Reuters reported that Toys "R" Us is expected to delay the IPO until 2012.¹³

⁹ New York Post, "Revamped Toys 'R' Us may delay IPO," September 26, 2010.

¹⁰ Washington Business Journal, "Toys 'R' Us Mulls IPO Again," March 2, 2011.

¹¹ Reuters, "Toys R Us IPO could be delayed," April 7, 2011.

¹² Reuters, "Toys R Us IPO likely in July," April 13, 2011.

¹³ Reuters, "Toys R Us IPO now expected in 2012," July 8, 2011.

Finally, Asbury Park Press Online reported on March 27, 2012 that the company is leaving the IPO on the shelf, after trying to go public for almost two years.¹⁴

In this section, we seek to provide further empirical evidence on the effect of CSR on equity demand, beyond the anecdotal evidence associated with Toys "R" Us' IPO. Empirically, we study the link between CSR and equity demand under four different settings. First, we examine the effects of CSR on the revisions in the terms of the stock offerings. Second, we analyze the effect of CSR on the likelihood associated with the exercise of over-allotment option. Third, the choice of SEO offering methods provides additional insights on the potential effect of CSR on demand. Finally, we examine the relation between CSR and institutional shareholdings.

3.1 CSR and Revisions in the Terms of Stock Offerings

A problem associated with setting the (sale price and quantity of shares offered) terms of a new equity issue is that neither the issuer nor its underwriter know precisely the demand for its stock. Under a book-building procedure, the issuer and its underwriter will initially set the terms of the stock offering based on a preliminary estimate of the demand for the issue. The issuer will initially distribute a preliminary prospectus that lists an indicative pricing range and the quantity of shares offered for sale. The underwriter will then conduct a marketing campaign (road shows) and solicit indications of interest from potential investors. Based on the observed demand schedule, the issuer and its underwriter will then finalize the terms of the stock offering. Typically, the offer price and quantity of shares offered will be revised upwards (downwards) when the demand for the issue is stronger (weaker) than expected.

¹⁴ Asbury Park Press Online, "Toys 'R' Us leaves IPO on shelf as debt looms," March 27, 2012.

The revisions in the terms of stock offerings thus provide a novel setting to study the effect of CSR on demand for equity. If the demand for stock is positively (negatively) related to the CSR strengths (concerns) of the issuer, then we would expect both the direction and magnitude of the revisions in the (offer price, number of shares offered, total proceeds) terms of stock offerings to depend on the CSR strengths (concerns) of the issuer. To examine the effects of CSR on the revisions in the terms of stock offerings, we estimate the following regression equation:

$$\text{Revisions in Terms} = \alpha + \gamma * \text{CSR measures} + \beta * \text{Control Variables} + \varepsilon \quad (1)$$

Under *Revisions in Terms*, we consider several dependent variables that measure the revisions in the (offer price, number of shares offered, total proceeds) terms of stock offerings. The three different *CSR measures* included in our regression model are: *CSR*, *CSR Strengths*, and *CSR Concerns*, which measures the aggregate CSR score, CSR strengths, and CSR concerns of the firm, respectively. Following previous studies on new equity issues, we include the following control variables: *Total Asset*, *Offer Size*, *Total Shares Offered*, *Primary Shares*, *Underwriter Rank*, *High-tech Dummy*, *NASDAQ Dummy*, *Market Return*, and calendar year dummies. We further include the *VC-backed Dummy* variable in all IPO regressions and the *Shelf-registration Dummy* variable in all SEO regressions.

[Insert Table III here]

Table III reports the results on the effects of CSR on revisions in offer price over the registration period. The first four columns present the regression results for the IPO sub-sample; while the last four columns present the regression results for the SEO sub-sample. For each sub-sample, we estimate four different regression models. The dependent variable for models (3) and

(4) is *Price Revision*, which is equal to the percentage revision in offer price. The dependent variable for models (1) and (2) is a dummy variable for negative *Price Revision*, which is equal to 1 if there is a downward revision in offer price and 0 otherwise.¹⁵ Models (3) and (4) are estimated based on OLS regression, while models (1) and (2) are estimated based on logit regression. Overall, we find that both the magnitude and direction of the offer price revision is related to the CSR concerns of the firm.

First, the results in Table III show that the *CSR Concerns* variable is significant and negatively related to *Price Revision* in both IPO and SEO sub-samples. As reported under model (4), the coefficient estimate for *CSR Concerns* is significantly more negative for the IPO sub-sample (-0.015) than for the SEO sub-sample (-0.002). The coefficient estimates suggest that one unit increase in *CSR Concerns* is associated with 1.5% reduction in *Price Revision* in the IPO sub-sample, but only 0.2% reduction in *Price Revision* in the SEO sub-sample.

Second, we find that for the IPO sub-sample, the likelihood of downward revisions in offer price is higher for firms with greater CSR concerns. As reported under model (2), the coefficient estimate for *CSR Concerns* is significant for the IPO sub-sample, but insignificant for the SEO sub-sample. The reason for the insignificant SEO sub-sample result may be attributable to the relatively high frequency of downward revisions in offer price for the SEO sub-sample (65%), which suggests a lack of variation in the dummy variable for negative *Price Revision*.

Third, the revision in offer price is significantly affected by CSR concerns only. Neither the CSR strengths nor the aggregate CSR score of the issuer has any significant effect on the

¹⁵ The offer price revision is, on average, negative for the SEO sub-sample, but positive for the IPO sub-sample. As reported previously in Table II, the mean (median) *Price Revision* for the SEO and IPO sub-samples are -4.2% (-3.0%) and 0.3% (1.2%), respectively. The frequency of downward revisions in offer price is also much higher for the SEO sub-sample (65%) than for the IPO sub-sample (37%).

revision in offer price. This finding reinforces the conjecture that the effects of CSR strengths and CSR concerns of the issuer are potentially asymmetric. Also, by aggregating the CSR strengths and concerns of the issuer together, the aggregate CSR score can yield misleading and/or inconclusive results.

Finally, the results for the control variables are generally consistent with that of prior literature. We find the likelihood of downward revisions in offer price is higher for firms with smaller offer size, larger total asset size, and greater percentage of total shares offered. Downward revisions in offer price are also more likely during poor market conditions and for high technology firms, non-VC-backed IPOs, and shelf-registered SEOs. The magnitude of the offer price revisions (*Price Revision*) is also significantly related to aforementioned control variables.

[Insert Table IV here]

Table IV reports the results on the effects of CSR on the revisions in total number of shares offered. Again, we estimate four different regression models for each sub-sample. The dependent variable for models (3) and (4) is *Total Share Revision*, which is equal to the percentage revision in total number of shares offered. The dependent variable for models (1) and (2) is a dummy variable for negative *Total Share Revision*, which is equal to 1 if there is a downward revision in number of shares offered and 0 otherwise.¹⁶ Models (3) and (4) are estimated based on OLS regression, while models (1) and (2) are estimated based on logit regression.

¹⁶ As reported previously in Table II, the mean (median) *Total Share Revision* for IPO and SEO issues are 2.4% (0.0%) and -1.0% (0.0%), respectively. The frequency of downward revisions in number of shares offered is 13.5% for the IPO sub-sample and 15.6% for the SEO sub-sample.

For the SEO sub-sample, we find that both the direction and magnitude of the revision in number of shares offered is significantly related to CSR concerns. As reported under model (2), the coefficient estimate for *CSR Concerns* is significant and positive, which indicates that the likelihood of a downward revision in number of shares offered is higher for firms with greater CSR concerns. Also, the revision in number of shares offered (*Total Share Revision*) is positively related to the aggregate *CSR* variable under model (3), but this result is primarily driven by the CSR concerns of the issuer. As reported under model (4), the coefficient estimate is significantly negative for *CSR Concerns*, but insignificant for *CSR Strengths*. Economically, the -0.008 coefficient estimate for *CSR Concerns* indicates that *ceteris paribus*, one unit increase in *CSR Concerns* is associated with 0.8% reduction in *Total Share Revision*.

For the IPO sub-sample, we find that the coefficient estimates for all the CSR measures are insignificant. One possible explanation for this finding is that the issuers are more likely to respond to unexpected demand in IPOs by revising the offer price, instead of revising the number of shares offered.

[Insert Table V here]

Table V reports the results on the effects of CSR on the revisions in the total proceeds. We similarly estimate four different regression models for each sub-sample. The dependent variable for models (3) and (4) is *Proceeds Revision*, which is equal to the percentage revision in total proceeds raised.¹⁷ The dependent variable for models (1) and (2) is a dummy variable for

¹⁷ The revision in total proceeds is equal to the percentage change in total proceeds from initial filing date to issue date; where total proceeds at initial filing date is equal to the mid-file price times the initial number of shares filed and the total proceeds at issue date is equal to the final offer price times the final number of shares offered. Our measure of total proceeds does not include the proceeds from the exercise of the over-allotment option, which is subjected to investigation in subsequent sub-section. Our results are nevertheless similar if we include the proceeds from the exercise of the over-allotment option.

negative *Proceeds Revision*, which is equal to 1 if there is a downward revision in total proceeds raised and 0 otherwise.¹⁸

The results reported in Table V are similar to those reported in the previous two tables. First, the coefficient estimates for all the CSR measures are insignificant for the IPO sub-sample. Second, for the SEO sub-sample, we find that the coefficient estimates for the aggregate *CSR* variable under models (1) and (3) are significant, but again this result is primarily driven by the CSR concerns of the issuer. As reported under models (2) and (4), the coefficient estimates are significant for *CSR Concerns*, but insignificant for *CSR Strengths*. The positive coefficient estimate for *CSR Concerns* under model (2) indicates that the likelihood of downward revisions in total proceeds is higher for firms with greater CSR concerns. Also, the -0.009 coefficient estimate for *CSR Concerns* under model (4) indicates that *ceteris paribus*, one unit increase in *CSR Concerns* is associated with 0.9% reduction in *Proceeds Revision*.

Overall, the results in Tables III, IV, and V are consistent with the hypothesis that the demand for equity is affected by the CSR measures of the issuer. We find that both the direction and magnitude of the revisions in the (offer price, number of shares offered, total proceeds) terms of stock offerings are significantly related to the CSR concerns of the issuer. In general, we find that firms with greater CSR concerns have a higher likelihood of downward revisions in the terms of stock offerings. The magnitude of the revisions in the terms of stock offerings is furthermore negatively related to the CSR concerns of the issuer. We do not find any significant effect for the CSR strengths of the issuer, which suggest that the CSR (strengths and concerns) effects are potentially asymmetric.

¹⁸ As reported previously in Table II, the mean (median) *Proceeds Revision* for IPO and SEO issues are 3.1% (5.1%) and -4.8% (-1.3%), respectively. The frequency of downward revisions in total proceeds is 38.5% for the IPO sub-sample and 54.4% for the SEO sub-sample.

Further to the above analysis, we also examine the effects of CSR on the revisions in both primary and secondary shares offered. A breakdown of the revisions in total share offered into primary and secondary share revisions can provide insights on the opportunistic wealth-maximizing behavior of insiders. To hide the negative signal associated with the sale of secondary shares, Ang and Brau (2003) finds that insiders often underreport the number of secondary shares that they intend to sell in the initial filing (relative to what they actually sell in subsequent amendments). Another concealment strategy is switching, which involves the substitution of secondary for primary shares, while keeping the overall number of shares offered fairly constant. Similarly, our objective is to examine whether insiders also behave strategically in their revisions of primary and secondary shares, condition on the CSR strengths and concerns of the issuers.

[Insert Table VI here]

Table VI reports the results on the effects of CSR on both primary and secondary share revisions. We estimate four different regression models for each sub-sample. The dependent variable for model (2) is *Primary Share Revision*, which is equal to the revision in number of primary shares offered (scaled by total shares offered). For model (4), the dependent variable is *Secondary Share Revision*, which is equal to the revision in number of secondary shares offered (scaled by total shares offered). The dependent variable for models (1) and (3) is a dummy variable for negative *Primary Share Revision* and negative *Secondary Share Revision*, respectively.¹⁹

¹⁹ The mean (median) *Primary Share Revision* for IPO and SEO sub-samples are 1.4% (0.0%) and -2.1% (0.0%), respectively. The frequency of downward revisions in number of primary shares offered is 9.3% for the IPO sub-sample and 14.1% for the SEO sub-sample. The mean (median) *Secondary Share Revision* for IPO and SEO sub-

Overall, we find evidence of insiders strategically switching primary and secondary shares, condition on the CSR strengths and concerns of the issuers. For the SEO sub-sample, we find that *Secondary Share Revision* is significant and positively related to *CSR Concerns*; but *Primary Share Revision* is significant and negatively related to *CSR Concerns*. As reported under model (1), the likelihood of downward revisions in primary shares offered is also significantly higher for firms with greater CSR concerns. The above results are consistent with the earlier findings that issuers with greater CSR concerns are more likely to face weaker than expected demand for their stocks and, hence, revise the offer price and/or total number of shares offered downwards. Under such a scenario, our results indicate that insiders will also engage in opportunistic switching practices by strategically increasing the number of secondary offered, while decreasing the number of primary shares offered.

Insiders have incentive to sell more secondary shares on the perception that the share issue is likely to be overvalued when demand is weaker than expected. Previous literature on conditional underpricing (Ritter, 2011) has shown that, on average, underpricing is minimal (severe) when offer prices are revised downwards (upwards). Also, as we will show later on, issues with greater CSR concerns are more likely to be overvalued; while issue with greater CSR strengths are significantly more underpriced. Insiders may also sell more secondary shares to reduce their exposure to issues with high CSR concerns. As documented in Ang and Brau (2003), to avoid the negative signal associated with the sale of secondary shares, insiders initially underreport the number of secondary shares in initial filing, but increase the number of secondary shares in subsequent amendments.

samples are 1.1% (0.0%) and 1.4% (0.0%), respectively. The frequency of downward revisions in number of secondary shares offered is 11.9% for the IPO sub-sample and 7.0% for the SEO sub-sample.

We also find similar opportunistic switching practices for the IPO sub-sample. As reported in Table VI, we find that *Secondary Share Revision* is significant and negatively related to *CSR Strengths*. Also, issuers with greater CSR strengths are more likely to revise downward the number of secondary shares offered. In contrast, although not significant, the positive coefficient estimate for *CSR Strengths* under model (2) suggests that *Primary Share Revision* is positively related to *CSR Strengths*. The opportunistic switching practices of insiders probably explain why we previously fail to detect any significant relation between CSR and the revisions in total number of shares offered in the IPO sub-sample.

3.2 *CSR and the Exercise of Over-allotment Option*

Another setting where we can study the link between CSR and demand for equity is the exercise of over-allotment option. Over-allotment option gives underwriters the right to sell additional shares at the offering price if demand for the securities exceeds the original amount offered. Hence, if the demand for stock is positively (negatively) related to the CSR strengths (concerns) of the issuer, then we would expect the likelihood that the over-allotment option is exercised to depend on the CSR strengths (concerns) of the issuer.

[Insert Table VII here]

Table VII reports the logit regression results on the effects of CSR on the exercise of over-allotment option. The dependent variable is the *Over-allotment Exercised* dummy variable, which is equal to 1 if the over-allotment option is exercised; and zero otherwise. As previously reported in Table II, 72% and 65% of the over-allotment options are finally exercised in the IPO

and SEO sub-samples, respectively. The control variables are the same as those in previous regressions.

The results reported in Table VII are in support of our hypothesis. Overall, we find that the probability of the over-allotment option being exercised is positively (negatively) related to the CSR strengths (concerns) of the issuer. For the IPO sub-sample, the over-allotment options are significantly more likely to be exercised for issuers with higher aggregate CSR scores. But this result is driven mostly by the CSR strengths of the issuer. As reported under model (2), the coefficient estimate for *CSR Strengths* is positive and significant. The negative coefficient estimate for *CSR Concerns* is consistent with our hypothesis, albeit not significant. For the SEO sub-sample, we find that issuers with greater *CSR Concerns* are significantly less likely to exercise the over-allotment option. Also, consistent with our hypothesis, the coefficient estimate for *CSR Strengths* is positive, but insignificant.

3.3 *CSR and Choice of SEO Offering Methods*

In this sub-section, we examine the choice of SEO offering methods for additional insights on the potential effect of CSR on demand. When choosing between a fully-marketed offer and an accelerated offer, the issuer will typically consider the cost-benefit tradeoffs associated with the two SEO offering methods (Gao and Ritter, 2010). A fully-marketed SEO stock offering is conducted in much the same way as bookbuilt IPO. Following a book-building process, the underwriters will typically conduct a road show to market the issue and generate investor interests. The fully-marketed offering (from filing date to issue date) normally lasts about 2-3 weeks (Gao and Ritter, 2010). The accelerated offers, which include both bought deals and accelerated bookbuilt offers, are typically shelf-registered in the U.S. An accelerated offer is

usually completed within 1-2 days (Gao and Ritter, 2010) and the gross spread is relatively lower. Also, unlike the extensive marketing effort provided by underwriters in fully-marketed offers, the accelerated offers generally entail very little or no marketing effort at all.

Gao and Ritter (2010) posit that the greater marketing effort associated with a fully-marketed offer could create demand by shifting the demand curve positively. Marketing effort also results in more homogenous opinions and flattens the demand curve of the issuer's stock. The additional marketing effort does not come for free, however. The issuer has to balance the potential benefits (in terms of higher demand) with the higher underwriting costs associated with a fully-marketed offer. Building on Gao and Ritter's (2010) argument, our hypothesis is that firms with greater CSR strengths are more likely to use fully-marketed offers, while firms with greater CSR concerns are more likely to use accelerated offers, condition on potential effect of CSR on demand.

If the demand for stock is positively (negatively) related to the CSR strengths (concerns) of the issuer, then we would expect firms with greater CSR strengths to reap greater benefits (increase demand) from the marketing effort of a fully-marketed offer. Our argument is based on cost-benefit tradeoff analyses: firms with greater CSR strengths have "good news" to disseminate and, hence, could create more demand by shifting the demand curve positively. In contrast, firms with greater CSR concerns are more inclined to remain silent about their weaknesses, rather than disseminate the "bad news" through a fully-marketed offer. As a result of serious CSR concerns, these firms will face considerable obstacles in generating investor interests. For such firms, the benefits generated by a fully-marketed offer may not be sufficiently large to compensate the firm for the additional costs incurred. In certain cases, the dissemination of "bad news" through a fully-marketed offer may actually have a negative impact on demand,

instead of creating demand. Our hypothesis differs slightly from that of Gao and Ritter (2010) in that the additional marketing effort associated with a fully-marketed offer is a two-edge sword, which can impact demand positively or negatively, depending on the CSR strengths and concerns of the issuer.

[Insert Table VIII here]

Table VIII reports the logistic regression results on the effect of CSR on the choice of SEO offering methods. The dependent variable is the *Fully-marketed Offering* dummy variable, which is equal to 1 if the SEO offering is on a fully-marketed basis and zero otherwise. Consistent with our expectation, we find that firms with greater CSR strengths are more likely to utilize fully-marketed offers; while firms with greater CSR concerns are more likely to adopt accelerated offers. As reported under model (2), the coefficient estimate for *CSR Strengths* is significantly positive; while the coefficient estimate for *CSR Concerns* is significantly negative. In aggregate, the significant and positive coefficient estimate for *CSR* under model (1) suggests that firms with higher aggregate CSR scores are more likely to choose fully-marketed offers, instead of accelerated offers²⁰. Our overall finding also supports the hypothesis that in SEO stock offerings, the issuers will choose between the two offering methods based on the relative costs and benefits of each method to the issuers (Gao and Ritter, 2010).

²⁰ Under a competing hypothesis, firms with greater CSR concerns would have lower market demand revealed during the offering process. As a consequence, firms with greater CSR concerns would be more likely to choose fully-marketed offers in the hope of generating higher investor interest and create more demand. On the other hand, firms with greater CSR strengths have higher market demand during the registration period. They would be more likely to choose accelerated offers as they do not need to rely on fully-marketed offers to generate investor interest. The prediction under this alternative hypothesis is that CSR strengths (concerns) are negatively (positively) related to the probability of choosing fully-marketed offering methods. Our empirical evidence does not support this competing hypothesis.

3.4 CSR and Changes in Institutional Holdings

A more direct test of the effect of CSR on demand is to examine the change in institutional holdings around the issue date. If the demand for stock is positively (negatively) related to the CSR strengths (concerns) of the issuer, then we expect the change in the percentage of institutional holdings around the issue date to be positively (negatively) correlated with CSR strengths (concerns) of the issuer.

[Insert Table IX here]

Table IX reports the regression results on the effects of CSR on the change in institutional holdings. The dependent variable is the $\Delta Institutional Holdings$ variable, which is equal to the change in percentage institutional holdings from pre- to post-issue date. Consistent with our expectation, we find that the change in percentage institutional holdings is positively (negatively) related to the CSR strengths (concerns) of the issuer. This finding applies to both the IPO and SEO sub-samples. As reported under model (2), the coefficient estimate for *CSR Strengths* is significantly positive; while the coefficient estimate for *CSR Concerns* is significantly negative. Economically, the magnitude of the effect of CSR strengths (concerns) on institutional demand is much larger for IPOs than for SEOs. The coefficient estimates indicate that for every one unit increase in *CSR Strengths*, $\Delta Institutional Holdings$ increase by 5% in the IPO sub-sample and by only 0.3% in the SEO sub-sample. Similarly, for every one unit increase in *CSR Concerns*, $\Delta Institutional Holdings$ decrease by 2.5% and 0.2%, respectively, in the IPO and SEO sub-samples. Also, as reported under model (1), the change in percentage institutional holdings is positively related to the aggregate CSR scores.

There are two possible reasons for the above empirical finding. One possibility is that the increase (decrease) in the percentage of institutional holdings is due to higher (lower) allocation of shares of firms with high CSR strengths (concerns) to institutional investors by investment banks. Another possibility is that the increase (decrease) in the percentage of institutional holdings is a result of institutional investors' accumulation (selling down) of shares of firms with high CSR strengths (concerns) in the post-issue market. We are unable to determine whether the change in the percentage of institutional holdings is a result of the first and/or second possibility without detailed share allocation data.

4. Effect of CSR on Equity Valuations

In the previous section, we provide evidence in support of the hypothesis that demand for equity is negatively (positively) affected by CSR concerns (strengths) of the firm. Having established the link between CSR and demand for equity, we now examine the effect of CSR on equity valuations. Heinkel et al. (2001) posit that lower demand for socially irresponsible firms will lead to lower stock prices and, hence, higher expected returns for such firms. Conversely, higher demand for socially responsible firms will result in higher stock prices and lower expected returns.

In this section, we examine the effects of CSR on equity valuations under three different settings. First, we examine the effects of CSR on the underpricing of new equity issues. Second, we study the relation between CSR and SEO announcement returns. Third, we analyze the long-run return performance of socially responsible (high CSR strengths) firms as well as socially irresponsible (high CSR concerns) firms.

4.1 CSR and Underpricing of New Equity Issues

Similar to models on litigation risks, Heinkel et al.'s (2001) theoretical model predicts that the CSR strengths (concerns) of the issuer should be ex-ante priced into the final offer price to provide investors with lower (higher) first-day returns or underpricing, *ceteris paribus*. Table X reports the regression results on the effects of CSR on the underpricing of new equity issues. The dependent variable for models (3) and (4) is *Underpricing*, which is a measure of the first-day return (calculated from offer price to first-day closing market price) in new equity issues. The dependent variable for models (1) and (2) is the *Overvaluation* dummy, which is equal to 1 if the first-day return is negative and 0 otherwise.²¹

[Insert Table X here]

For the IPO sub-sample, we find that issues with higher aggregate CSR scores are less likely to be overvalued and tend to have higher underpricing. This result is mostly driven by the CSR concerns of the issuer, however. As reported under model (2), IPO issues with greater CSR concerns are more likely to be overvalued. The result under model (4) further shows that the underpricing is significantly lower for issues with greater CSR concerns. Economically, the negative coefficient estimate for *CSR Concerns* under model (4) indicates that one unit increase in *CSR Concerns* is associated with 2.4% reduction in underpricing, *ceteris paribus*. The coefficient estimates for *CSR Strengths* are not statistically very significant.

For the SEO sub-sample, we find that issuers with higher aggregate CSR scores are significantly more underpriced. However, this result is mostly driven by the CSR strengths of the

²¹ The mean (median) *Underpricing* for the IPO and SEO sub-samples are 14.6% (10.7%) and 2.6% (1.1%), respectively. The percentage of over-valued issues for the IPO and SEO sub-samples are 24% and 33%, respectively.

issuer. As reported under model (4), underpricing is significantly higher for issues with greater CSR strengths. Economically, we find that one unit increase in *CSR Strengths* is associated with 0.2% increase in underpricing, *ceteris paribus*. Underpricing is negatively related to *CSR Concerns*, but the coefficient estimate is not statistically significant. Also, the result under model (2) indicates that issues with greater CSR strengths (concerns) are less (more) likely to be overvalued, but the coefficient estimates are not statistically very significant.

Overall, our findings are consistent with the earlier argument that firms with greater CSR strengths (concerns) are more likely to revise the offer price and/or total number of shares offered upwards (downwards) because of strong (weak) demand for their stocks. And previous literature on conditional underpricing (Ritter, 2011) has shown that the upward (downward) revisions in offer price are associated with higher (lower) first-day returns. The revision in offer price is a good predictor of the first-day return because underwriters and issuers would only partially adjust the offer price to reflect the information gathered during the registration period.

Thus, our findings are contrary to those predicted by Heinkel et al.'s (2001) theoretical model, which assume that information about the CSR strengths and concerns of the issuer is fully-incorporated into the final offer price. Instead, our findings are consistent with the partial adjustment phenomenon (Benveniste and Spindt, 1989; Hanley, 1993; Loughran and Ritter, 2002; Edelen and Kadlec, 2005; Ince, 2010). Benveniste and Spindt's (1989) model predicts that offer prices adjust fully to positive public information, but only partially to favorable private information. In contrast, the models by Loughran and Ritter (2002) and Edelen and Kadlec (2005) predict that offer prices will only adjust partially to both public and private information. Empirically, Ince (2008) finds that offer prices adjust fully to negative public and private information, but only partially to positive public and private information. In contrast, our

findings suggest that offer prices adjust only partially to both negative and positive information about the CSR of the issuer.

4.2 *CSR and SEO Announcement Returns*

In this section, we examine the effect of CSR on SEO announcement returns. Prior studies (Asquith and Mullins, 1986; Masulis and Korwar, 1986; Lucas and McDonald, 1990) find that share prices, on average, react negatively to the announcements of seasoned equity offerings. Studies on market-timings (Myers and Majluf, 1984; Baker and Wurgler, 2000) attribute the negative share price reaction to managers' exploitation of the windows of opportunity to sell overvalued stocks.

If the demand for stock is positively (negatively) related to the CSR strengths (concerns) of the issuer, then we would expect the SEO announcement effect to be less (more) negative for firms with greater CSR strengths (concerns). Assuming a downward sloping demand curve, the demand curve for firms with greater CSR strengths (concerns) are expected to be flatter (steeper) because of their relatively larger (smaller) and more (less) loyal investor base.²² The expected increase in supply of shares associated with the SEO announcement will thus trigger a less (more) negative share price reaction for firms with greater CSR strengths (concerns).

[Insert Table XI here]

Table XI reports the regression results on the effect of CSR on SEO announcement returns. The dependent variable is *CAR* [0, 1], which is equal to the two-day cumulative abnormal return

²² In support of the hypothesis that SRI investors are more loyal than conventional investors, Bollen (2006) finds that SRI funds have lower funds flow volatility than conventional funds. Also, in comparison to conventional funds, the cash flows into SRI funds are more sensitive to lagged positive returns, but cash outflows from SRI funds are less sensitive to lagged negative returns.

over the $[0, +1]$ event window. Abnormal return is calculated using the market model, where the firm beta is estimated over the $[-160, -11]$ event window. As previously reported in Table II, the mean (median) *CAR* $[0, 1]$ for the SEO sub-sample is equal to -3.2% (-2.5%).

The empirical results tabulated in Table XI are generally consistent with our expectation. We find that the SEO announcement returns are significantly more negative for firms with greater CSR concerns. Economically, the -0.002 coefficient estimate for *CSR Concerns* indicate that the *CAR* $[0, 1]$ declines by an additional 0.2% for every one unit increase in *CSR Concerns*, *ceteris paribus*. The effect of CSR on SEO announcement returns appears to be asymmetric, however. The coefficient estimates for the aggregate *CSR* and *CSR Strengths* variables are not statistically significant.

4.3 *CSR and Long-run Return Performance*

A third setting where we can examine the effect of CSR on equity valuation is the long-run return performance of new equity issues. In this section, we investigate whether the effect of CSR on equity demand and, hence, valuation continues to persist over the long-run. First, we study the long-run return performance using the four-factor calendar-time portfolio regression approach. Then we check the robustness of the long-run return performance results using the Fama-MacBeth cross-sectional regression approach.

The calendar-time portfolio regression approach adopted in this paper is similar to that of Loughran and Ritter (1995), Ikenberry et al. (2000), and Mitchell and Stafford (2000). For each sub-sample, we first calculate the monthly returns in calendar time for a value-weighted portfolio of firms that have completed a new equity issue within the last three years. The portfolio is re-

balanced at the beginning of each calendar month to drop all firms that have reached the end of the 3-year holding period and to add all firms that have just completed a new equity issue. Under this portfolio re-balancing strategy, the number of stocks in the portfolio can vary over time due to the entry of new firms and exit of old firms. In some months, the number of stocks in the portfolio can be quite small, especially for the IPO sub-sample. Following Ikenberry et al. (2000), we drop those months where the portfolio has less than six stocks to minimize the effect of idiosyncratic noise.²³ The above portfolio construction assumes a three-year investment holding period. Alternatively, we also construct the monthly portfolio returns for a five-year investment holding period using the above procedure.

Next, we estimate the abnormal portfolio return by regressing the portfolio's excess returns against the Fama and French's (1993) three factors and Carhart's (1997) momentum factor, as in Equation (2) below:

$$R_{pt} - R_{ft} = \alpha + \beta_{mkt}(R_{mt} - R_{ft}) + \beta_{smb}SMB_t + \beta_{hml}HML_t + \beta_{umd}UMD_t + \epsilon_t \quad (2)$$

where the dependent variable is the monthly excess returns on the portfolio; $R_{mt} - R_{ft}$, SMB_t , and HML_t are the Fama and French's (1993) three factors; UMD_t is the Carhart's (1997) momentum factor; and α is a measure of the average monthly abnormal return on the portfolio. The monthly time series data for all four factors are downloaded from Professor Kenneth R. French's website.

[Insert Table XII here]

²³ We obtain similar results when we increase the minimum requirement for each monthly portfolio to 10 stocks.

Table XII reports the four-factor calendar-time portfolio regression results for both the IPO and SEO sub-samples. For each sub-sample, we report the estimated α for portfolio constructed under a 3-year as well as a 5-year investment horizon. We also report the results after dividing each sub-sample according (a) *High CSR* and *Low CSR* firms; (b) *High CSR Strengths* and *Low CSR Strengths* firms; and (c) *High CSR Concerns* and *Low CSR Concerns* firms. In addition, we report the results for the following hedge portfolios: (a) long *High CSR* and short *Low CSR* firms; (b) long *High CSR Strengths* and short *Low CSR Strengths* firms; and (c) long *High CSR Concerns* and short *Low CSR Concerns* firms. Firms are classified as *High (Low) CSR* firms if the aggregate *CSR* score is greater (less) than the median *CSR* score.²⁴ The *High (Low) CSR Strengths* firms and *High (Low) CSR Concerns* firms are similarly classified in the same way. The number of observations differs slightly across sub-samples because of the earlier requirement that each monthly portfolio must have a minimum of six stocks.

For the SEO sub-sample, we find that the α coefficient estimate is significantly negative for the *High CSR Concerns* portfolio, but is positive for the *Low CSR Concerns* portfolio. We also find that the *High CSR Concerns* portfolio statistically underperforms the *Low CSR Concerns* portfolio over both a 3-year and 5-year investment horizon. The α coefficient estimates for the long-short *CSR Concerns* hedge portfolio for the 3-year and 5-year investment horizons are -0.008 and -0.007, respectively. Economically, the coefficient estimates suggest that high *CSR* concerns firms underperform the low *CSR* concerns firms by as much as 0.8% per month over a 3-year investment horizon and by 0.7% per month over a 5-year investment horizon. In summary, a reverse long-short hedging strategy that invests in SEOs with low *CSR* concerns and shorts SEOs with high *CSR* concerns would produce economically and statistically

²⁴ We also obtain similar results when the *High CSR* and *Low CSR* portfolios are classified based on the Top 25% and Bottom 25%, respectively, of the issues by *CSR* ranking.

significant total abnormal returns of about 29% and 42%, respectively, over a 3-year and 5-year investment horizons.

Also, for the SEO sub-sample, the α coefficient estimates for all the *CSR Strengths* portfolios are not statistically significant. This finding again indicates that the effects of CSR strengths and CSR concerns are potentially asymmetric. For the IPO sub-sample, the α coefficient estimates for all the long-short hedge portfolios are not statistically significant. In other words, CSR does not appear to have any significant effects on the long-run return performance of IPO firms.

In the above calendar-time portfolio regression analysis, we assume an investment horizon of either three years or five years. Although not reported, we obtain similar results using one year, two years, and four years investment holding period. We also obtain similar results when the portfolio is constructed on an equally-weighted basis, instead of on a value-weighted basis. Another robustness check that we conducted to deal with the problem of uneven number of stocks in the portfolio over time is to estimate Equation (2) using the weighted least squares regression approach (Ikenberry et al., 2000). The weighted least squares regression approach yields similar results as well.

Finally, we also check the robustness of the long-run return performance results using the Fama-MacBeth cross-sectional regression approach. Following Hong and Kacperczyk (2009), Loughran and Ritter (1995), and Teoh et al. (1998), we estimate the following cross-sectional regression equation for each calendar month from January 1991 to December 2009:

$$R_{it} = \alpha + \gamma \text{CSR Measures}_{it} + \beta \ln(MV_{it}) + \theta \ln(BV/MV)_{it} + \varepsilon_{it} \quad (3)$$

The dependent variable is the monthly return on individual stocks of firms that have completed a new equity issues within the last three years. The three different CSR measures included in our regressions are: *CSR*, *CSR Strengths*, and *CSR Concerns*. The other two independent variables are the typical controls used in the Fama-MacBeth cross-sectional regression approach, namely the market value of equity (*MV*) and book-to-market ratio (*BV/MV*). Although not reported, our results are robust to the inclusion of the other control variables used in previous regression models. In addition to the above, we also repeat the analysis for a 5-year investment horizon, instead of a 3-year horizon. The results for both the 3-year and 5-year long-run performance are reported in Table XIII.

[Insert Table XIII here]

Table XIII reports the average coefficient estimates from the cross-sectional regressions. The t-statistics (in parenthesis) are calculated based on the standard deviation of the coefficient estimates across the cross-sectional regressions. The number of observations varies across different sub-samples because of the previous requirement that each month must have a minimum of six stocks. Although not reported, we obtain similar results when we increase the minimum requirement for each month to 10 stocks.

Overall, the results reported in Table XIII are consistent with previous findings using the calendar-time portfolio regression approach. For the SEO sub-sample, we find that the aggregate *CSR* score is positively related to the long-run return performance. But this result is driven mostly by the *CSR concerns* of the firm. The average coefficient estimate for *CSR Concerns* is significantly negative, while average coefficient estimate for *CSR Strength* is not significantly different from zero. Economically, the -0.002 coefficient estimate for *CSR Concerns* indicates

that the long-run return declines by 0.2% per month for every one unit increase in *CSR Concerns*, *ceteris paribus*. This finding applies for both 3-year and 5-year long-run return performance. For the IPO sub-sample, none of the CSR measures are significantly related to the long-run return performance.

In summary, we show that for the SEO sub-sample, firms with high CSR concerns underperform firms with low CSR concerns over both a 3-year and 5-year horizon. Our finding is robust to both the calendar-time portfolio regression approach and the Fama-MacBeth cross-sectional regression approach. An explanation for this finding is that, in comparison to normal firms, high CSR concerns firms have higher project financing costs (cost of capital) because of poor equity demand and depressed stock prices. Such firms also do not have favorable access to capital markets and are thus more likely to be financially constrained. As a consequence, firms with high CSR concerns will be at a competitive disadvantage. Relative to normal firms, high CSR concerns firms will not have as much financial flexibility in funding and undertaking future projects. Also, for any given future project, high CSR concerns firms will not be able to generate as much value from it, *ceteris paribus*.

In support of this explanation, Ghoul et al. (2011) find that firms with better CSR rankings have lower cost of equity. Bauer and Hann (2010) find that firms with more severe environmental concerns are associated with higher cost of debt. Chava (2011) finds that firms with larger environmental concerns have higher cost of equity and cost of debt. Cheng et al. (2011), moreover, find that firms with better CSR performance have better access to financing and face significantly lower capital constraints. Another related study by Lamont et al. (2001) find that firms that are financially constrained, which is defined as the inability to fund all desired investments, earn lower returns than unconstrained firms. Our results are in contrast to

Hong and Kacperczyk's (2007) finding that sin stocks outperformed comparable stocks over the period of 1965-2006.

5. Conclusion

In this paper, we study the relevance of CSR from the perspective of new equity issues. Empirically, we find new evidence which supports the theory that CSR affects equity demand; which, in turn, affects equity valuation. First, consistent with the hypothesis that equity demand is positively (negatively) affected by the CSR strengths (concerns) of the issuer, we find that firms with greater CSR concerns are more likely to revise downwards the terms (offer price, number of shares offered for sale, and total amount of proceeds) of their offerings. And when subjected to weaker than expected demand for their stocks, firms with greater CSR concerns will opportunistically increase the number of secondary offered, while decrease the number of primary shares offered. Also, in support of the above hypothesis, we find that the probability of the over-allotment option being exercised is negatively related to CSR concerns in SEO issues, but is positively related to CSR strengths in IPO issues. We also find evidence that issuers would strategically choose between two different SEO offering methods, condition on the anticipated effects of CSR on equity demand. More specifically, firms with greater CSR strengths are more likely to adopt fully-marketed offers, while firms with greater concerns are more likely to use accelerated offers. Another supporting evidence is that we find that the change in the percentage of institutional holdings is positively (negatively) correlated with the CSR strengths (concerns) of the issuer.

Second, we also provide evidence on the effects of CSR on equity valuation. We find IPOs with greater CSR concerns have lower underpricing and are more likely to be overvalued; while

SEOs with greater CSR strengths are associated with significantly higher underpricing. This finding is contrary to Heinkel et al.'s (2001) model predictions, but is consistent with the predictions of models on partial adjustment phenomenon. Also, consistent with the argument that firms with greater CSR concerns (strengths) have less (more) loyal and smaller (larger) investor base, we find that firms with greater CSR concerns experience significantly more negative SEO announcement returns. Another piece of evidence which relates to long-run return performance is the finding that SEO firms with high CSR concerns consistently underperform SEO firms with low CSR concerns over both three-year and five-year post-issue periods.

Collectively, our findings are consistent with the theory that CSR affects equity demand; which, in turn, affects equity valuation. Our findings also suggest that the effects of CSR strengths and CSR concerns of the issuer on equity demand and valuation are potentially asymmetric and tend to be driven mostly by CSR concerns. Also, in support of the growing influence of SRI, we find that the effects of CSR on equity demand and valuation are sizable and economically significant. Finally, our overall findings indicate that the CSR effects, which extend to the long-run performance of the firm, are not transient in nature.

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Table I. Sample Distribution by Year

Table I lists the sample distribution by year. The sample period is from January 1, 1991 to December 31, 2009. Only common stock offerings are included in our sample. We exclude American Depositary Receipts, private placements, rights offerings, unit offerings, closed-end funds, Real Estate Investment Trusts (REITs), and penny stocks with offer price below five dollars from our sample. Firms that are not covered by the KLD database are also excluded. We further exclude firms with incomplete stock returns and missing SDC new issues data. Our final sample consists of 378 initial public offerings (IPOs) and 2,734 seasoned equity offerings (SEOs).

Issue Year	Initial Public Offerings		Seasoned Equity Offerings	
	Observations	Percent	Observations	Percent
1991	-	-	25	0.91
1992	-	-	29	1.06
1993	-	-	25	0.91
1994	-	-	11	0.40
1995	-	-	20	0.73
1996	1	0.26	19	0.69
1997	1	0.26	31	1.13
1998	-	-	27	0.99
1999	1	0.26	28	1.02
2000	-	-	22	0.80
2001	5	1.32	80	2.93
2002	4	1.06	86	3.15
2003	3	0.79	342	12.51
2004	95	25.13	388	14.19
2005	92	24.34	308	11.27
2006	81	21.43	326	11.92
2007	95	25.13	266	9.73
2008	-	-	198	7.24
2009	-	-	503	18.40
Total	378	100.0	2,734	100.0

Table II. Summary Statistics

Table II provides the summary descriptive statistics for our sample. *CSR Strengths* and *CSR Concerns* measure the total CSR strengths and concerns of the firm, respectively. The aggregate *CSR* variable is equal to the total CSR strengths score minus the total CSR concerns score. *Total Asset* (Compustat item *at*) is a measure of firm size; while *Offer Size* is equal to the total proceeds raised in the offering. *Total Shares Offered* is equal to the total shares offered as a percentage of shares outstanding after the offering. *Primary Shares* is equal to the percent of offering that is newly issued shares. *Underwriter Rank* is equivalent on the Carter-Manaster ranking of underwriter's reputation. *High-tech Dummy*, *NASDAQ Dummy*, *VC-backed Dummy*, and *Shelf-registration Dummy* are dummy variables for high-technology firms and NASDAQ-listed firms, VC-backed IPOs, and shelf-registered SEO offerings, respectively. *Market Return* is equivalent to the cumulative value-weighted market returns over a 15-trading day period prior to the issue date. *Price Revision* = (final offer price - initial mid-file price)/ initial mid-file price. *Total Share Revision* = (final number of shares offered - initial number of shares filed)/ initial number of shares filed. *Proceeds Revision* = (amount of proceeds raised in final offering - initial amount filed)/ initial amount filed. *Over-allotment Exercised Dummy* is equal to 1 if the over-allotment option is exercised and zero otherwise. *Fully-marketed Offering* is a dummy variable for fully-marketed SEO offerings. Δ *Institutional Holdings* is equal to the change in percentage institutional holdings from pre- to post-issue date. *Underpricing* is equal to the first-day return (calculated from offer price to first-day closing market price). *CAR* [0, 1] is equal to the 2-day cumulative abnormal return over the [0, +1] SEO announcement window. To mitigate the influence of outliers, all the variables are winsorized at the 1st and 99th percentiles.

Variables	Initial Public Offerings				Seasoned Equity Offerings			
	N	Mean	Median	Std Dev	N	Mean	Median	Std Dev
<i>CSR</i>	378	-0.593	0.000	1.267	2734	-0.480	0.000	1.919
<i>CSR Strengths</i>	378	0.368	0.000	0.974	2734	1.056	1.000	1.704
<i>CSR Concerns</i>	378	0.960	1.000	1.161	2734	1.536	1.000	1.759
<i>Total Asset</i> (\$ billion)	378	1.023	0.287	2.428	2734	8.056	1.658	22.769
<i>Offer Size</i> (\$ billion)	378	0.234	0.121	0.334	2734	0.226	0.118	0.318
<i>Total Shares Offered</i>	378	0.309	0.263	0.176	2734	0.130	0.113	0.097
<i>Primary Shares</i>	378	0.806	1.000	0.282	2734	0.755	1.000	0.407
<i>Underwriter Rank</i>	378	8.437	9.001	1.047	2734	7.899	9.001	2.118
<i>High-tech Dummy</i>	378	0.503	1.000	0.501	2734	0.305	0.000	0.461
<i>NASDAQ Dummy</i>	378	0.635	1.000	0.482	2734	0.398	0.000	0.490
<i>VC-backed Dummy</i>	378	0.421	0.000	0.494	-	-	-	-
<i>Shelf-registration Dummy</i>	-	-	-	-	2734	0.689	1.000	0.463
<i>Market Return</i>	378	0.004	0.009	0.027	2734	0.013	0.014	0.037
<i>Price Revision</i>	378	0.003	0.012	0.177	2734	-0.042	-0.030	0.111
<i>Total Share Revision</i>	377	0.024	0.000	0.135	2518	-0.010	0.000	0.233
<i>Proceeds Revision</i>	377	0.031	0.051	0.243	2518	-0.048	-0.013	0.255
<i>Over-allotment Exercised Dummy</i>	372	0.715	1.000	0.452	2232	0.649	1.000	0.477
<i>Fully-marketed Offering dummy</i>	-	-	-	-	2734	0.685	1.000	0.465
Δ <i>Institutional Holdings</i>	364	0.352	0.302	0.221	2636	0.033	0.028	0.096
<i>Underpricing</i>	378	0.146	0.107	0.188	2734	0.026	0.011	0.052
<i>CAR</i> [0, 1]	-	-	-	-	2717	-0.032	-0.025	0.054

Table III. Effects of CSR on Revisions in Offer Price

Table III reports the regression results on the effects of CSR on revisions in offer price. The dependent variable for models (3) and (4) is *Price Revision*, which is equal to the percentage revision in offer price. The dependent variable for models (1) and (2) is a dummy variable for negative *Price Revision*, which is equal to 1 if there is a downward revision in offer price and 0 otherwise. Models (3) and (4) are estimated based on OLS regression, while models (1) and (2) are estimated based on logit regression. The independent variables are as defined in Table II. The t-statistics and z-statistics (in parentheses) for the OLS regressions and logit regressions, respectively, are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	Initial Public Offerings				Seasoned Equity Offerings			
	(1) Dummy for negative <i>Price Revision</i>	(2) <i>Price Revision</i>	(3) <i>Price Revision</i>	(4) <i>Price Revision</i>	(1) Dummy for negative <i>Price Revision</i>	(2) <i>Price Revision</i>	(3) <i>Price Revision</i>	(4) <i>Price Revision</i>
<i>CSR</i>	-0.009 (-0.09)		0.007 (0.97)		0.015 (0.66)		0.000 (0.26)	
<i>CSR Strengths</i>		0.211 (1.22)		-0.007 (-0.66)		0.040 (1.33)		-0.002 (-1.22)
<i>CSR Concerns</i>		0.125* (1.68)		-0.015** (-2.02)		0.006 (0.23)		-0.002* (-1.79)
<i>Log (Offer Size)</i>	-1.111*** (-3.62)	-1.241*** (-3.96)	0.120*** (5.53)	0.127*** (5.87)	0.029 (0.42)	0.015 (0.22)	0.012*** (3.93)	0.013*** (4.32)
<i>Log (Total Asset)</i>	0.663*** (3.10)	0.675*** (3.13)	-0.066*** (-4.97)	-0.066*** (-5.00)	-0.073 (-1.61)	-0.086* (-1.85)	-0.005** (-2.27)	-0.004 (-1.64)
<i>Total Shares Offered</i>	0.720 (0.87)	0.842 (0.99)	-0.140** (-2.49)	-0.147*** (-2.62)	1.618** (2.53)	1.677*** (2.61)	-0.174*** (-6.39)	-0.179*** (-6.53)
<i>Primary Shares</i>	0.413 (0.85)	0.433 (0.88)	-0.009 (-0.28)	-0.009 (-0.27)	0.329*** (2.95)	0.329*** (2.95)	-0.008 (-1.50)	-0.008 (-1.49)
<i>Underwriter Rank</i>	-0.012 (-0.09)	0.010 (0.08)	-0.000 (-0.05)	-0.002 (-0.23)	0.113*** (4.04)	0.115*** (4.09)	-0.004*** (-2.68)	-0.004*** (-2.83)
<i>High-tech Dummy</i>	0.872*** (2.83)	0.888*** (2.82)	-0.093*** (-4.39)	-0.094*** (-4.38)	-0.022 (-0.20)	-0.040 (-0.35)	-0.017*** (-3.06)	-0.016*** (-2.77)
<i>NASDAQ Dummy</i>	-0.355 (-1.07)	-0.372 (-1.10)	0.030 (1.18)	0.030 (1.20)	0.124 (1.11)	0.122 (1.09)	-0.008 (-1.51)	-0.008 (-1.48)
<i>Market Return</i>	-9.825** (-2.17)	-8.136* (-1.77)	1.052*** (2.96)	0.933*** (2.75)	-4.397*** (-3.19)	-4.357*** (-3.16)	0.229*** (3.39)	0.226*** (3.34)
<i>VC-backed Dummy</i>	-0.379 (-1.13)	-0.419 (-1.24)	0.037 (1.53)	0.040 (1.63)				
<i>Shelf-registration Dummy</i>					-0.219** (-2.11)	-0.216** (-2.08)	0.001 (0.18)	0.001 (0.15)
Constant	0.264 (0.16)	0.487 (0.29)	-0.057 (-0.41)	0.016 (0.11)	1.348*** (3.92)	1.418*** (4.06)	0.094*** (2.58)	0.086** (2.33)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	375	375	378	378	2,734	2,734	2,734	2,734
Adjusted/Pseudo R ²	0.0910	0.101	0.161	0.169	0.0854	0.0858	0.109	0.110

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table IV. Effects of CSR on Revisions in Total Number of Shares Offered

Table IV reports the regression results on the effects of CSR on revisions in total number of shares offered. The dependent variable for models (3) and (4) is *Total Share Revision*, which is equal to the percentage revision in total number of shares offered. The dependent variable for models (1) and (2) is a dummy variable for negative *Total Share Revision*, which is equal to 1 if there is a downward revision in number of shares offered and 0 otherwise. Models (3) and (4) are estimated based on OLS regression, while models (1) and (2) are estimated based on logit regression. The independent variables are as defined in Table II. The t-statistics and z-statistics (in parentheses) for the OLS regressions and logit regressions, respectively, are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	Initial Public Offerings				Seasoned Equity Offerings			
	(1) Dummy for negative	(2) <i>Total Share Revision</i>	(3) <i>Total Share Revision</i>	(4) <i>Total Share Revision</i>	(1) Dummy for negative	(2) <i>Total Share Revision</i>	(3) <i>Total Share Revision</i>	(4) <i>Total Share Revision</i>
<i>CSR</i>	0.198 (1.41)		-0.005 (-0.81)		-0.026 (-0.73)		0.005** (2.03)	
<i>CSR Strengths</i>		0.343 (1.23)		-0.000 (-0.01)		0.031 (0.69)		0.001 (0.24)
<i>CSR Concerns</i>		-0.135 (-1.10)		0.008 (1.24)		0.076** (2.06)		-0.008*** (-3.06)
<i>Log (Offer Size)</i>	-1.401*** (-4.18)	-1.455*** (-4.35)	0.032 (1.24)	0.028 (1.13)	-0.361*** (-3.52)	-0.388*** (-3.82)	0.057*** (7.84)	0.058*** (8.05)
<i>Log (Total Asset)</i>	0.522** (2.15)	0.514** (2.12)	0.001 (0.05)	0.002 (0.11)	0.203*** (3.02)	0.170** (2.40)	-0.025*** (-5.67)	-0.022*** (-5.02)
<i>Total Shares Offered</i>	-0.822 (-0.97)	-0.758 (-0.89)	0.124 (1.30)	0.131 (1.40)	0.733 (0.95)	0.853 (1.12)	0.132** (2.39)	0.125** (2.27)
<i>Primary Shares</i>	0.399 (0.83)	0.381 (0.80)	-0.043 (-1.40)	-0.043 (-1.40)	-0.551*** (-3.26)	-0.567*** (-3.36)	0.050*** (4.89)	0.050*** (4.89)
<i>Underwriter Rank</i>	0.368*** (2.92)	0.383*** (3.01)	-0.012 (-1.56)	-0.012 (-1.49)	-0.054 (-1.10)	-0.051 (-1.05)	0.000 (0.09)	-0.000 (-0.03)
<i>High-tech Dummy</i>	0.273 (0.89)	0.279 (0.92)	0.024 (1.54)	0.025 (1.55)	0.302* (1.67)	0.272 (1.49)	-0.007 (-0.69)	-0.005 (-0.46)
<i>NASDAQ Dummy</i>	-0.564 (-1.51)	-0.564 (-1.51)	0.011 (0.53)	0.011 (0.53)	0.186 (1.01)	0.187 (1.00)	-0.020** (-1.97)	-0.019* (-1.90)
<i>Market Return</i>	-4.683 (-0.85)	-3.716 (-0.67)	0.180 (0.65)	0.218 (0.83)	0.579 (0.29)	0.650 (0.32)	-0.149 (-1.04)	-0.154 (-1.08)
<i>VC-backed Dummy</i>	-0.044 (-0.12)	-0.066 (-0.18)	0.023 (1.16)	0.022 (1.12)				
<i>Shelf-registration Dummy</i>					0.526*** (2.81)	0.542*** (2.88)	-0.043*** (-4.35)	-0.044*** (-4.41)
Constant	2.524 (1.59)	2.644* (1.69)	-0.195 (-0.50)	-0.205 (-0.53)	-2.913*** (-4.40)	-2.740*** (-4.14)	-0.347*** (-4.35)	-0.359*** (-4.50)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	374	374	377	377	2,518	2,518	2,518	2,518
Adjusted/Pseudo R ²	0.125	0.129	0.065	0.064	0.265	0.267	0.288	0.289

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table V. Effects of CSR on Revisions in Total Proceeds

Table V reports the regression results on the effects of CSR on the revisions in the total proceeds. The dependent variable for models (3) and (4) is *Proceeds Revision*, which is equal to the percentage revision in total proceeds raised. The dependent variable for models (1) and (2) is a dummy variable for negative *Proceeds Revision*, which is equal to 1 if there is a downward revision in total proceeds raised and 0 otherwise. Models (3) and (4) are estimated based on OLS regression, while models (1) and (2) are estimated based on logit regression. The independent variables are as defined in Table II. The t-statistics and z-statistics (in parentheses) for the OLS regressions and logit regressions, respectively, are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	Initial Public Offerings				Seasoned Equity Offerings			
	(1) Dummy for negative <i>Proceeds Revision</i>	(2) <i>Proceeds Revision</i>	(3) <i>Proceeds Revision</i>	(4) <i>Proceeds Revision</i>	(1) Dummy for negative <i>Proceeds Revision</i>	(2) <i>Proceeds Revision</i>	(3) <i>Proceeds Revision</i>	(4) <i>Proceeds Revision</i>
CSR	0.014 (0.15)		-0.002 (-0.21)		-0.038* (-1.75)		0.005* (1.88)	
CSR Strengths		0.234 (1.27)		-0.015 (-1.27)		-0.001 (-0.05)		-0.001 (-0.15)
CSR Concerns		0.099 (0.89)		-0.005 (-0.43)		0.069*** (2.67)		-0.009*** (-3.15)
Log (<i>Offer Size</i>)	-1.375*** (-4.23)	-1.487*** (-4.52)	0.166*** (5.38)	0.171*** (5.58)	-0.095 (-1.50)	-0.117* (-1.82)	0.067*** (8.26)	0.069*** (8.55)
Log (<i>Total Asset</i>)	0.661*** (2.98)	0.664*** (2.99)	-0.086*** (-4.21)	-0.086*** (-4.21)	-0.036 (-0.88)	-0.056 (-1.31)	-0.028*** (-5.54)	-0.025*** (-4.76)
Total Shares Offered	0.842 (0.96)	0.944 (1.05)	-0.023 (-0.26)	-0.030 (-0.34)	0.204 (0.43)	0.290 (0.62)	-0.029 (-0.48)	-0.039 (-0.64)
Primary Shares	0.189 (0.40)	0.193 (0.40)	-0.027 (-0.51)	-0.027 (-0.51)	-0.137 (-1.25)	-0.135 (-1.23)	0.038*** (3.24)	0.038*** (3.25)
Underwriter Rank	0.046 (0.37)	0.068 (0.54)	-0.010 (-0.69)	-0.011 (-0.78)	0.113*** (4.62)	0.117*** (4.75)	-0.002 (-0.73)	-0.003 (-0.88)
High-tech Dummy	0.920*** (3.02)	0.936*** (3.01)	-0.089*** (-3.02)	-0.089*** (-3.01)	-0.122 (-1.13)	-0.149 (-1.37)	-0.022* (-1.77)	-0.019 (-1.48)
NASDAQ Dummy	-0.638* (-1.90)	-0.654* (-1.91)	0.040 (1.09)	0.040 (1.10)	0.062 (0.60)	0.059 (0.56)	-0.027** (-2.19)	-0.026** (-2.11)
Market Return	-10.558** (-2.33)	-9.053* (-1.95)	1.180** (2.58)	1.076** (2.35)	-4.506*** (-3.79)	-4.458*** (-3.76)	0.091 (0.57)	0.084 (0.53)
VC-backed Dummy	-0.461 (-1.35)	-0.504 (-1.47)	0.041 (1.22)	0.043 (1.28)				
Shelf-registration Dummy					-0.171* (-1.74)	-0.168* (-1.71)	-0.045*** (-3.88)	-0.046*** (-3.95)
Constant	1.975 (1.21)	2.183 (1.33)	-0.144 (-0.71)	-0.177 (-0.86)	-0.010 (-0.03)	0.096 (0.31)	-0.295*** (-3.75)	-0.313*** (-3.95)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	370	370	377	377	2,518	2,518	2,518	2,518
Adjusted/Pseudo R ²	0.105	0.114	0.150	0.152	0.0634	0.0646	0.204	0.206

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table VI. Effects of CSR on Revisions in Primary and Secondary Shares

Table VI reports the results on the effects of CSR on both primary and secondary share revisions. The dependent variable for model (2) is *Primary Share Revision*, which is equal to the revision in number of primary shares offered (scaled by total shares offered). For model (4), the dependent variable is *Secondary Share Revision*, which is equal to the revision in number of secondary shares offered (scaled by total shares offered). The dependent variable for models (1) and (3) is a dummy variable for negative *Primary Share Revision* and negative *Secondary Share Revision*, respectively. Models (2) and (4) are estimated based on OLS regression, while models (1) and (3) are estimated based on logit regression. The independent variables are as defined in Table II. The t-statistics and z-statistics (in parentheses) for the OLS regressions and logit regressions, respectively, are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	Initial Public Offerings				Seasoned Equity Offerings			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Dummy for negative <i>Primary Share Revision</i>	<i>Primary Share Revision</i>	Dummy for negative <i>Secondary Share Revision</i>	<i>Secondary Share Revision</i>	Dummy for negative <i>Primary Share Revision</i>	<i>Primary Share Revision</i>	Dummy for negative <i>Secondary Share Revision</i>	<i>Secondary Share Revision</i>
<i>CSR Strengths</i>	-0.350 (-1.19)	0.012 (1.26)	0.025** (2.17)	-0.013** (-2.16)	0.035 (0.85)	-0.001 (-0.17)	-0.088 (-1.17)	0.002 (0.86)
<i>CSR Concerns</i>	-0.251 (-1.12)	0.004 (0.65)	-0.079 (-0.48)	0.008 (1.28)	0.108*** (2.97)	-0.014*** (-4.11)	-0.023 (-0.37)	0.005** (2.32)
<i>Log (Offer Size)</i>	-0.327 (-0.69)	0.028* (1.93)	-0.417 (-1.09)	0.014 (0.68)	-0.281*** (-2.76)	0.049*** (5.52)	-0.039 (-0.33)	0.012 (1.65)
<i>Log (Total Asset)</i>	0.298 (1.29)	-0.014 (-1.39)	0.343 (1.61)	-0.006 (-0.43)	0.030 (0.41)	-0.013** (-2.28)	0.106 (1.17)	-0.009** (-2.03)
<i>Total Shares Offered</i>	1.591 (1.19)	0.079 (1.41)	-2.131* (-1.80)	0.056 (1.22)	0.433 (0.47)	0.092 (1.19)	0.707 (0.76)	0.051 (0.86)
<i>Primary Shares</i>	-0.854 (-1.14)	0.142*** (3.72)	-1.200** (-2.08)	-0.161*** (-3.05)	-0.251 (-1.39)	0.163*** (10.25)	-1.440*** (-7.26)	-0.107*** (-6.83)
<i>Underwriter Rank</i>	-0.318* (-1.76)	-0.001 (-0.21)	0.091 (0.45)	-0.008 (-1.04)	-0.054 (-1.06)	0.003 (1.02)	0.011 (0.16)	-0.003* (-1.93)
<i>High-tech Dummy</i>	0.035 (0.08)	-0.013 (-0.98)	-0.969** (-1.97)	0.023* (1.67)	0.085 (0.46)	-0.009 (-0.65)	0.192 (0.91)	0.000 (0.04)
<i>NASDAQ Dummy</i>	0.324 (0.59)	0.003 (0.14)	-0.010 (-0.02)	-0.006 (-0.26)	-0.110 (-0.57)	0.010 (0.74)	0.506** (2.16)	-0.030** (-2.56)
<i>Market Return</i>	-0.205 (-0.03)	0.050 (0.21)	-7.941 (-1.19)	0.013 (0.05)	1.015 (0.53)	-0.128 (-0.78)	-3.170 (-1.21)	-0.044 (-0.40)
<i>VC-backed Dummy</i>	0.767 (1.64)	-0.027* (-1.70)	-0.127 (-0.24)	0.034* (1.73)				
<i>Shelf-registration Dummy</i>					0.794*** (4.06)	-0.067*** (-5.21)	-0.487*** (-2.62)	0.021** (2.03)
Constant	0.078 (0.03)	-0.815*** (-9.85)	-0.474 (-0.20)	1.006*** (11.12)	-2.442*** (-3.62)	-0.827*** (-7.20)	-3.214*** (-3.66)	0.512*** (4.05)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	374	377	367	377	2,517	2,517	2,432	2,517
Adjusted/Pseudo R ²	0.111	0.219	0.0993	0.251	0.245	0.231	0.139	0.119

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table VII. Effects of CSR on the Exercise of Over-allotment Option

Table VII reports the logit regression results on the effects of CSR on the exercise of over-allotment option. The dependent variable is the *Over-allotment Exercised* dummy variable, which is equal to 1 if the over-allotment option is exercised and zero otherwise. The independent variables are as defined in Table II. The z-statistics (in parentheses) are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	Initial Public Offerings		Seasoned Equity Offerings	
	(1) <i>Over-allotment Exercised Dummy</i>	(2)	(1)	(2) <i>Over-allotment Exercised Dummy</i>
CSR	0.169* (1.93)		0.039 (1.49)	
CSR Strengths		0.284* (1.88)		0.021 (0.60)
CSR Concerns		-0.134 (-1.20)		-0.053* (-1.91)
Log (Offer Size)	0.560** (2.09)	0.524* (1.93)	0.551*** (6.49)	0.563*** (6.50)
Log (Total Asset)	-0.401** (-2.06)	-0.391** (-2.02)	-0.180*** (-3.27)	-0.172*** (-3.11)
Total Shares Offered	-0.755 (-0.80)	-0.715 (-0.75)	0.658 (1.05)	0.619 (0.98)
Primary Shares	-1.040* (-1.84)	-1.061* (-1.87)	0.176 (1.26)	0.176 (1.25)
Underwriter Rank	0.320** (2.51)	0.329** (2.54)	0.237*** (5.75)	0.236*** (5.72)
High-tech Dummy	-0.239 (-0.69)	-0.239 (-0.70)	-0.082 (-0.62)	-0.072 (-0.54)
NASDAQ Dummy	0.008 (0.02)	0.013 (0.04)	-0.224* (-1.83)	-0.222* (-1.80)
Market Return	4.650 (1.02)	5.233 (1.11)	-0.220 (-0.15)	-0.251 (-0.18)
VC-backed Dummy	0.182 (0.51)	0.180 (0.51)		
Shelf-registration Dummy			-0.236** (-2.05)	-0.236** (-2.05)
Constant	-1.261 (-0.80)	-1.253 (-0.79)	-2.139*** (-4.41)	-2.192*** (-4.50)
Year Fixed Effect	Yes	Yes	Yes	Yes
Observations	362	362	2,232	2,232
Pseudo R ²	0.0721	0.0732	0.0752	0.0754

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table VIII. Effects of CSR on the Choice of SEO Offering Methods

Table VIII reports the logistic regression results on the effect of CSR on the choice of SEO offering methods. The dependent variable is the *Fully-marketed Offering* dummy variable, which is equal to 1 if the SEO offering is on a fully-marketed basis and zero otherwise. The independent variables are as defined in Table II. The z-statistics (in parentheses) are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	(1) <i>Fully-marketed Offering Dummy</i>	(2)
<i>CSR</i>	0.079*** (2.86)	
<i>CSR Strengths</i>		0.110*** (2.79)
<i>CSR Concerns</i>		-0.057* (-1.69)
<i>Log (Offer Size)</i>	0.626*** (7.90)	0.615*** (7.65)
<i>Log (Total Asset)</i>	-0.399*** (-7.63)	-0.419*** (-7.72)
<i>Total Shares Offered</i>	-0.037 (-0.80)	-0.041 (-0.89)
<i>Primary Shares</i>	0.629*** (4.54)	0.632*** (4.56)
<i>Underwriter Rank</i>	-0.109*** (-2.69)	-0.106*** (-2.61)
<i>High-tech Dummy</i>	-0.128 (-0.97)	-0.156 (-1.16)
<i>NASDAQ Dummy</i>	0.452*** (3.57)	0.450*** (3.55)
<i>Market Return</i>	-1.665 (-1.05)	-1.608 (-1.02)
<i>Shelf-registration Dummy</i>	-2.426*** (-14.99)	-2.428*** (-14.99)
Constant	5.401*** (12.22)	5.509*** (12.20)
Year Fixed Effect	Yes	Yes
Observations	2,635	2,635
Pseudo R ²	0.300	0.301

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table IX. CSR and Changes in Institutional Holdings

Table IX reports the regression results on the effects of CSR on the change in institutional holdings. The dependent variable is the Δ Institutional Holdings variable, which is equal to the change in percentage institutional holdings from pre- to post-issue date. The independent variables are as defined in Table II. The t-statistics (in parentheses) are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	Initial Public Offerings		Seasoned Equity Offerings	
	(1) Δ Institutional Holdings	(2) Δ Institutional Holdings	(1) Δ Institutional Holdings	(2) Δ Institutional Holdings
<i>CSR</i>	0.034*** (2.93)		0.002*** (3.06)	
<i>CSR Strengths</i>		0.050*** (4.19)		0.003*** (2.88)
<i>CSR Concerns</i>		-0.025** (-1.99)		-0.002* (-1.78)
<i>Log (Offer Size)</i>	0.029 (0.88)	0.024 (0.73)	0.006*** (2.73)	0.006** (2.51)
<i>Log (Total Asset)</i>	0.041* (1.86)	0.041* (1.89)	-0.008*** (-4.58)	-0.008*** (-4.72)
<i>Total Shares Offered</i>	0.906*** (5.98)	0.915*** (6.03)	0.104*** (4.74)	0.106*** (4.82)
<i>Primary Shares</i>	0.036 (0.60)	0.037 (0.61)	-0.045*** (-9.83)	-0.045*** (-9.83)
<i>Underwriter Rank</i>	0.044** (2.43)	0.045** (2.49)	0.001 (1.27)	0.001 (1.37)
<i>High-tech Dummy</i>	0.009 (0.30)	0.010 (0.33)	0.004 (0.80)	0.003 (0.66)
<i>NASDAQ Dummy</i>	0.067* (1.81)	0.070* (1.88)	0.008** (1.96)	0.008* (1.95)
<i>Market Return</i>	0.094 (0.19)	0.233 (0.48)	0.065 (1.60)	0.066 (1.63)
<i>VC-backed Dummy</i>	-0.041 (-1.18)	-0.042 (-1.19)		
<i>Shelf-registration Dummy</i>			-0.011*** (-2.89)	-0.011*** (-2.88)
Constant	-1.420*** (-5.80)	-1.453*** (-6.03)	0.059*** (3.10)	0.062*** (3.25)
Year Fixed Effect	Yes	Yes	Yes	Yes
Observations	364	364	2,636	2,636
Adjusted R ²	0.259	0.263	0.145	0.146

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table X. CSR and Underpricing of New Equity Issues

Table X reports the regression results on the effects of CSR on the underpricing of new equity issues. The dependent variable for models (3) and (4) is *Underpricing*, which is a measure of the first-day return (calculated from offer price to first-day closing market price) in new equity issues. The dependent variable for models (1) and (2) is the *Overvaluation* dummy, which is equal to 1 if the first-day return is negative and 0 otherwise. The independent variables are as defined in Table II. Models (3) and (4) are estimated based on OLS regression, while models (1) and (2) are estimated based on logit regression. The t-statistics and z-statistics (in parentheses) for the OLS regressions and logit regressions, respectively, are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	Initial Public Offerings				Seasoned Equity Offerings			
	(1) <i>Overvaluation Dummy</i>	(2) <i>Overvaluation Dummy</i>	(3) <i>Underpricing</i>	(4) <i>Underpricing</i>	(1) <i>Overvaluation Dummy</i>	(2) <i>Overvaluation Dummy</i>	(3) <i>Underpricing</i>	(4) <i>Underpricing</i>
CSR	-0.190*		0.017***		-0.033		0.001**	
	(-1.95)		(2.77)		(-1.47)		(2.16)	
CSR Strengths		-0.132		0.005		-0.036		0.002**
		(-0.87)		(0.86)		(-1.25)		(2.10)
CSR Concerns		0.216**		-0.024***		0.030		-0.001
		(2.05)		(-3.11)		(1.11)		(-1.14)
Log (Offer Size)	-0.467*	-0.497*	0.070***	0.076***	-0.112*	-0.110	-0.000	-0.000
	(-1.78)	(-1.86)	(3.91)	(4.05)	(-1.67)	(-1.61)	(-0.00)	(-0.17)
Log (Total Asset)	0.510***	0.510**	-0.058***	-0.058***	0.013	0.014	0.001	0.001
	(2.58)	(2.57)	(-4.55)	(-4.57)	(0.29)	(0.32)	(1.04)	(0.79)
Total Shares Offered	0.538	0.572	-0.260***	-0.266***	-0.764	-0.771	0.085***	0.086***
	(0.61)	(0.64)	(-4.09)	(-4.18)	(-1.39)	(-1.39)	(5.14)	(5.21)
Primary Shares	0.339	0.345	-0.026	-0.025	-0.047	-0.047	0.006***	0.006***
	(0.67)	(0.68)	(-0.87)	(-0.86)	(-0.42)	(-0.42)	(2.89)	(2.88)
Underwriter Rank	0.094	0.098	0.006	0.005	0.039	0.039	-0.004***	-0.004***
	(0.67)	(0.70)	(0.75)	(0.60)	(1.58)	(1.56)	(-4.45)	(-4.42)
High-tech Dummy	0.766**	0.773**	-0.076***	-0.076***	-0.007	-0.005	0.007***	0.007**
	(2.20)	(2.20)	(-3.39)	(-3.41)	(-0.06)	(-0.05)	(2.70)	(2.55)
NASDAQ Dummy	-0.314	-0.324	0.019	0.020	-0.166	-0.166	0.008***	0.008***
	(-0.95)	(-0.97)	(0.82)	(0.83)	(-1.49)	(-1.49)	(2.95)	(2.93)
Market Return	-7.678	-7.449	0.987**	0.889**	-1.449	-1.452	0.068**	0.069**
	(-1.52)	(-1.46)	(2.33)	(2.08)	(-1.18)	(-1.18)	(2.03)	(2.06)
VC-backed Dummy	-0.457	-0.467	0.068***	0.070***				
	(-1.25)	(-1.27)	(2.60)	(2.68)				
Shelf-registration Dummy					0.061	0.061	-0.004*	-0.004*
					(0.60)	(0.60)	(-1.82)	(-1.80)
Constant	-3.080*	-3.002*	0.165	0.060	-0.411	-0.420	0.028	0.030*
	(-1.78)	(-1.73)	(1.27)	(0.43)	(-1.22)	(-1.23)	(1.61)	(1.70)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	366	366	378	378	2,734	2,734	2,734	2,734
Adjusted/Pseudo R ²	0.0706	0.0713	0.132	0.136	0.0200	0.0200	0.096	0.097

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table XI. CSR and SEO Announcement Returns

Table XI reports the regression results on the effect of CSR on SEO announcement returns. The dependent variable is *CAR* [0, 1], which is equal to the two-day cumulative abnormal return over the [0, +1] event window. Abnormal return is calculated using the market model, where the firm beta is estimated over the [-160, -11] event window. The independent variables are as defined in Table II. The t-statistics (in parentheses) are calculated based on heteroskedasticity-consistent standard errors that allow for clustering at the firm level.

VARIABLES	(1) SEO Announcement	(2) CAR [0, 1]
<i>CSR</i>	0.001 (1.18)	
<i>CSR Strengths</i>		-0.000 (-0.44)
<i>CSR Concerns</i>		-0.002** (-2.03)
<i>Log (Offer Size)</i>	-0.001 (-0.37)	-0.000 (-0.10)
<i>Log (Total Asset)</i>	0.003** (2.37)	0.004*** (2.68)
<i>Total Shares Offered</i>	-0.001 (-1.35)	-0.001 (-1.16)
<i>Primary Shares</i>	-0.004 (-1.54)	-0.004 (-1.54)
<i>Underwriter Rank</i>	-0.003*** (-2.69)	-0.003*** (-2.83)
<i>High-tech Dummy</i>	0.002 (0.64)	0.003 (0.97)
<i>NASDAQ Dummy</i>	-0.009*** (-3.03)	-0.009*** (-3.01)
<i>Shelf-registration Dummy</i>	0.001 (0.32)	0.001 (0.30)
Constant	-0.002 (-0.15)	-0.004 (-0.27)
Year Fixed Effect	Yes	Yes
Observations	2,717	2,717
Adjusted R ²	0.073	0.074

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table XII. CSR and Long-run Return Performance

Table XII reports the four-factor calendar-time portfolio regression results for both the IPO and SEO sub-samples. We report the results after dividing each sub-sample according (a) *High CSR* and *Low CSR* firms; (b) *High CSR Strengths* and *Low CSR Strengths* firms; and (c) *High CSR Concerns* and *Low CSR Concerns* firms. We also report the results for the following hedge portfolios: (a) long *High CSR* and short *Low CSR* firms; (b) long *High CSR Strengths* and short *Low CSR Strengths* firms; and (c) long *High CSR Concerns* and short *Low CSR Concerns* firms. Under the calendar-time portfolio regression, we first calculate for each sub-sample the calendar monthly returns for a value-weighted portfolio of firms that have completed a new equity issues within the last three (or five years). The portfolio is re-balanced at the beginning of each calendar month to drop all firms that have reached the end of the 3-year (or 5-year) holding period and to add all firms that have just completed a new equity issue. The excess returns of the portfolios are regressed on the Fama and French (1993) three factors and the Carhart (1997) momentum factor using the following models: $R_{pt} - R_{ft} = \alpha + \beta_{mkt}(R_{mt} - R_{ft}) + \beta_{smb}SMB_t + \beta_{hml}HML_t + \beta_{umd}UMD_t + \epsilon_t$. To conserve space, we only report the α coefficient estimate for each regression. The number of observations varies across different sub-samples because of the requirement that each month must have a minimum of six stocks. The t-statistics are in parentheses.

Model	Initial Public Offerings (IPOs)						Seasoned Equity Offerings (SEOs)					
	Three Years			Five Years			Three Years			Five Years		
	α	Obs	Adj R ²	α	Obs	Adj R ²	α	Obs	Adj R ²	α	Obs	Adj R ²
(1) High CSR	0.002 (0.56)	127	0.803	0.003 (1.04)	174	0.848	-0.001 (-0.58)	228	0.865	0.000 (0.29)	228	0.888
(2) Low CSR	0.003 (0.97)	127	0.746	0.004 (1.09)	174	0.783	-0.002 (-1.20)	228	0.842	-0.001 (-0.83)	228	0.863
(3) High - Low CSR (1) - (2)	-0.001 (-0.28)	127	0.227	-0.001 (-0.17)	174	0.174	0.001 (0.48)	228	0.043	0.002 (0.91)	228	0.050
(4) High CSR Strengths	0.002 (0.54)	124	0.750	0.005 (1.55)	150	0.800	-0.003 (-1.31)	228	0.854	-0.001 (-0.60)	228	0.881
(4) Low CSR Strengths	0.004 (1.49)	124	0.864	0.002 (0.98)	150	0.819	0.001 (0.22)	228	0.789	0.001 (0.36)	228	0.824
(6) High - Low CSR Strengths (4) - (5)	-0.002 (-0.50)	124	0.107	0.002 (0.68)	150	0.074	-0.003 (-1.05)	228	0.004	-0.002 (-0.71)	228	0.002
(7) High CSR Concerns	0.004 (1.24)	127	0.833	0.002 (0.67)	180	0.772	-0.005** (-2.52)	228	0.857	-0.003* (-1.95)	228	0.881
(8) Low CSR Concerns	-0.001 (-0.18)	127	0.843	0.006* (1.70)	180	0.686	0.003 (1.62)	228	0.819	0.004*** (2.14)	228	0.840
(9) High - Low CSR Concerns (7) - (8)	0.004 (1.17)	127	0.120	-0.004 (-1.06)	180	0.001	-0.008*** (-3.27)	228	0.078	-0.007*** (-3.27)	228	0.064

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table XIII. Cross Sectional Analysis of Long-run Return Performance

Table XIII reports the average coefficient estimates from the Fama-MacBeth cross-sectional regressions. The dependent variable is the monthly return on individual stocks of firms that have completed a new equity issues within the last three years. The three different CSR measures included in our regressions are: *CSR*, *CSR Strengths*, and *CSR Concerns*. The other two independent variables are the typical controls used in the Fama-MacBeth cross-sectional regression approach, namely the market value of equity (*MV*) and book-to-market ratio (*BV/MV*). We require that each month must have at least six stocks to minimize the effect of idiosyncratic noise. The t-statistics are in parentheses.

	Average Parameter Values							
Model	Constant	CSR	CSR Strengths	CSR Concerns	ln (Market Value)	ln (BV/MV)	Adj R ²	Observations
Three-year Long-run Return Performance								
Initial Public Offerings	-0.037*	-0.000			0.005**	-0.020***	0.175	153
	(-1.86)	(-0.08)			(2.09)	(-4.32)		
	-0.031		-0.001	-0.001	0.004*	-0.019***	0.219	153
	(-1.23)		(-0.61)	(-0.38)	(1.70)	(-2.84)		
Seasoned Equity Offerings	-0.030***	0.001*			0.003***	-0.015***	0.071	228
	(-2.85)	(1.67)			(2.96)	(-7.52)		
	-0.035***		-0.001	-0.002***	0.004***	-0.014***	0.085	228
	(-3.17)		(-0.73)	(-3.85)	(3.70)	(-7.35)		
Five-year Long-run Return Performance								
Initial Public Offerings	-0.036**	-0.001			0.003*	-0.022***	0.174	198
	(-2.37)	(-1.24)			(1.96)	(-6.69)		
	-0.038**		-0.003	0.002	0.004**	-0.022***	0.213	198
	(-2.43)		(-0.93)	(0.92)	(2.28)	(-6.37)		
Seasoned Equity Offerings	-0.026***	0.001**			0.003***	-0.015***	0.064	228
	(-2.87)	(1.98)			(3.12)	(-7.55)		
	-0.031***		-0.001	-0.002***	0.004***	-0.014***	0.077	228
	(-3.15)		(-0.75)	(-3.81)	(3.82)	(-7.32)		

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Appendix: The Open Letter to Investing Community from ICCR and IEHN

September 17, 2010

An open letter to the investing community:

As members of the Interfaith Center on Corporate Responsibility and the Investor Environmental Health Network, we are writing in advance of the Toys R Us initial public offering to alert you to Toys R Us' sale of toys made with polyvinyl chloride (PVC) plastic, a toxic plastic that poses dangerous risks to children's health. With a public campaign against Toys R Us' toxic toys intensifying, and with consumer rights advocates commissioning a report to Congress on Toys R Us' failure to phase out PVC, this alarming business practice threatens to put the world's leading dedicated toy retailer at the center of controversy during the critical Christmas season.

The Interfaith Center on Corporate Responsibility is a coalition of nearly 300 institutional investors with more than \$150 billion in assets, and the Investor Environmental Health Network, is a coalition of over 20 institutional investors with over \$30 billion in combined assets. As members of these organizations, we want investors to know the full story behind Toys R Us' sale of toxic toys and the related protests against the company so that potential shareholders can make an informed, responsible investment decision.

We urge investors not to participate in Toys R Us' IPO without a firm commitment from the company to label toxic chemicals in toys it sells and phase-out the sale of toys made with PVC. We are concerned that absent such commitment, providing fresh capital to Toys R Us and its current private equity owners, Kohlberg Kravis Roberts & Company (KKR), will further entrench Toys R Us' irresponsible business practices that put children's health at risk and threaten to destroy shareholder value over the long-term.

PVC is the most toxic plastic for human health and the environment and there is no safe way to manufacture, use, or dispose of PVC products, according to scientific experts. Chemicals released in PVC's lifecycle have been linked to chronic diseases on the rise in children, impaired child development and birth defects, cancer, disruption of the endocrine system, reproductive impairment, and immune system suppression.

Under pressure from concerned parents and product safety advocates, in 2008 Toys R Us announced a new policy to reduce PVC plastic in children and infants' toys and set a goal of offering PVC-free products, but recent testing has found the company has failed to fully implement this commitment. Recent independent testing by the Ecology Center in Ann Arbor, Michigan, found that Toys R Us is selling Toy Story 3 merchandise made with PVC. Toys R Us sells thousands of toys and the company generally does not disclose PVC presence on its products.

The Center for Health, Environment & Justice and the Teamsters Office of Consumer Affairs has commissioned a report to Congress on Toys R Us' Toy Safety Policy and Practices.

Toys R Us' failure to phase out PVC products and label toxic chemicals in toys could potentially lead to a consumer backlash during the critical Christmas season, which accounts for roughly 40% of Toys R Us' annual revenues. This risk raises serious questions about Toys R Us' ability to meet sales expectations and build trust among its consumer base.

We list below further financial, legal, health, environmental, and reputational risks tied to the use of PVC.

RISKS TIED TO PVC AND TOYS R US' TOYS

PVC Facing Increasing Regulations: The use of PVC is facing increasing governmental regulations around the world, which may pose financial and regulatory risks to Toys R Us. On July 20, 2006, the U.S. Food and Drug Administration notified retailers to stop marketing PVC lunchboxes containing lead. Cities around the United States such as New York City, Boston, Seattle, San Francisco, and Buffalo have enacted procurement policies to avoid the purchase of materials such as PVC that lead to persistent toxic pollution. PVC has been banned or restricted in a number of countries including Canada, the Czech Republic, Germany, South Korea, Spain, and Sweden. Restrictions or bans have been placed on phthalates in PVC toys in the entire European Union - Austria, Denmark, Finland, France, Germany, Greece, Italy, Japan, Iceland Mexico, Norway, and Sweden. In 1998, the U.S. Consumer Product Safety Commission (CPSC) reached a voluntary agreement with manufacturers to remove two phthalates from PVC rattles, teethingers, pacifiers and baby bottle nipples. San Francisco became the first city in the U.S. to ban phthalates used in soft PVC children's toys in June 2006. The States of California, Washington and Vermont have enacted legislation banning phthalates in children's toys, and similar legislation is pending at the federal level. Congress enacted federal legislation banning phthalates in children's toys in 2008. Legislation to ban PVC packaging passed the CA State Assembly in 2009, and will likely be re-introduced in 2010. 19 states across the country have laws restricting heavy metals in packaging. A July 2009 study by the Toxics In Packaging Clearinghouse found over 50% of PVC packaging tested violated these laws.

Companies and Competitors Phasing out PVC: Major retailers all around the world are enacting restrictions on PVC packaging and products, potentially putting Toys R Us at a competitive disadvantage. Over the past few years, Target, Sears Holdings, Wal-Mart Stores, Bed Bath and Beyond, Best Buy, and JCPenney have all announced major initiatives to significantly reduce and/or phase out PVC in products and packaging.

JCPenney announced in their Corporate Social Responsibility report the company has formed a Product Stewardship Committee and that the company is, "currently evaluating our products to determine where PVC is being used and examining alternatives. Our overall approach will be to work toward replacing PVC where we can identify safer, more sustainable and cost-effective alternatives. For example, our vinyl shower curtains are being switched to ethylene vinyl acetate (EVA). The Product Stewardship Committee is currently developing a policy on PVC." As reported in the November 6, 2007, Wall Street Journal, Target announced that the company was reducing its use of PVC in products and packaging, and noted that Target's brands of children's lunch boxes and utensils were now PVC-free. On December 12, 2007 Sears Holdings (Sears and Kmart) announced the company is phasing out PVC in products and packaging and would label such products as PVC-free. On July 28, 2006, Wal-Mart announced, "the company will no longer sell soft sided lunchboxes with PVC linings". In October 2005, Wal-Mart committed to phasing out their private label PVC packaging over the next 2 years.

Many supermarkets and/or retail chains in Austria, Denmark, Germany, and Japan are restricting or eliminating PVC use. Many other companies such as Ikea, H&M, Marks & Spencer, Microsoft, Johnson & Johnson, Gerber, Nike, SC Johnson, Limited Brands, Dell, Toyota, Honda, Hewlett Packard, and Sony have made commitments to phase out PVC in products and/or packaging.

Dangerous Additives May Pose Legal and Financial Risks: PVC is useless without the addition of toxic chemical stabilizers - such as lead, cadmium and organotins - and phthalate plasticizers. These leach, flake or outgas from PVC over time, raising risks that include asthma, lead poisoning and cancer. Companies have been sued for selling PVC products including lunchboxes and bouncy houses laden with elevated levels of lead. Between 80-90% of all phthalates are used to soften PVC products such as school supplies.

Phthalates in PVC toys have now been banned by Congress and a number of states. Some products, such as PVC toys, may expose customers to toxic chemicals released from the product. A June 2008 study by the Center for Health, Environment and Justice found one new vinyl shower curtain can release over 100 chemicals into the air – chemicals that can damage the lungs, brain and even cause cancer. The levels of chemicals violated the U.S. Green Building Council's recommended guidelines for indoor air quality for no less than seven days. This new study received substantial media coverage across the country including a prominent article in the LA Times.

Until adequately addressed, concerns about toxicity, safety and human rights of Toys R US supply chain will continue to resurface, exposing the company to legal and reputational risks.

PVC Health Risks: PVC is produced with extremely toxic chemicals, including chlorine and vinyl chloride, known to cause cancer. Dioxin, ethylene dichloride and vinyl chloride are unavoidably created in the production or disposal of PVC and can cause severe health problems including cancer, neurological damage, reproductive and immune system damage, and impaired child development. PVC poses significant risks to both workers and fenceline environmental justice communities, which was recently featured in June 2010 by CNN's Dr. Sanjay Gupta in an hour-long investigative special, Toxic Towns, USA.

PVC Cannot be Readily Recycled: The multitudes of additives required to make PVC useful make large-scale post consumer recycling nearly impossible for most products and interfere with the recycling of other plastics. Of an estimated 7 billion pounds of PVC thrown away in the US, only 14 million - less than 1/2 of 1 percent - is recycled. The Association of Post Consumer Plastics Recyclers declared efforts to recycle PVC a failure and labeled it a contaminant in 1998.

Safer Alternatives are Available: Safer, cost-effective, alternatives to PVC are readily available. From safer, recyclable plastics, to bio-based materials, there is a growing market replacing PVC in products and packaging.

Conclusion

For the reasons listed above, we believe Toys R Us' sale of toxic toys creates serious financial, legal, safety, environmental, and reputational risks that could negatively impact shareholder value over the long term.

We believe that phasing out PVC not only has significant environmental and health benefits, but also helps to build public trust, protect brand reputation, and safeguard and grow market share by anticipating further regulation and recall/legal liabilities. Such actions can significantly and positively raise Toys R Us environmental profile, enhance its reputation and competitive position.

We therefore urge investors not to participate in Toys R Us' IPO absent a firm commitment from the company to label toxic chemicals in toys it sells and phase-out the sale of toys made with PVC.

Thank you.

Sincerely,

Pat Zerega, Director
Corporate Social Responsibility
Evangelical Lutheran Church in America

Margaret Weber
Corporate Responsibility Director
Congregation of St. Basil

Ed Gerardo, Director
Community and Social Investments
Bon Secours Health System, Inc.

Cathy Rowan
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Barbara Jennings, CSJ
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Michael Passoff
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Corporate Social Responsibility
As You Sow

Sister Patricia Marshall
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Gwen Farry, BVM
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Valerie Heinonen, o.s.u.
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Susan Vickers, RSM
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Ruth Kuhn, SC
Chair – Corporate Responsibility Committee
Sisters of Charity of Cincinnati

Judy Byron, OP
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Essay Two: The Directed Share Program (DSP) in Initial Public Offerings

Abstract

This paper examines the role of directed share program (DSP) in initial public offerings. In support of the reward hypothesis, we find that both the size of DSP and the likelihood of DSP adoption are greater when expected IPO underpricing is high. Through amended filings, the issuers also behave opportunistically to maximize the reward to DSP recipients by increasing the allocation of reserved shares to related persons in DSP when expected IPO underpricing is high during the registration period. Issuers are also more likely to introduce (withdraw) the DSP when expected IPO underpricing is high (low) during the registration period. We also find that issuers with DSP strategically underprice the IPO to maximize the reward to DSP recipients. Conditioned on strong market demand during the registration period, issuers with DSP do not adjust the offer price upwards as much as issuers without DSP. This paper also examines the role of lockup in DSP. Consistent with the price support hypothesis, we find that the reserved shares in DSP are more likely to be locked up and the lockup length is significantly longer when the size of DSP is larger and when the general stock market condition is poor.

JEL Classification: G14; G32

Keywords: Directed Share Program; DSP; Family and Friends Program; Initial Public Offerings; Price Revisions; Market Demand; Underpricing; Partial Adjustment; Lockup Provision

1. Introduction

Directed share program (hereafter, DSP), also known as “friends and family program”, is a plan designed to allow company employees, their relatives, and other parties with a relationship to the company (including directors, managers, customers, suppliers, and their relatives, etc.) to purchase stock as part of a public offering. Qualified parties may purchase the reserved shares at the public offering price. In recent years, DSP has become a fairly common feature of initial public offerings (IPOs), particularly in the bubble period. Ljungqvist and Wilhelm (2003) report that the percentage of IPOs that includes a DSP rose from 24.7 percent in 1996 to 79.2 percent in 1999 and 92.6 percent in 2000. Issuers need to get prior approval from the SEC for having a DSP but the program size is not regulated. The number of reserved shares normally accounts for 5 percent of the total shares offered, but this number varies substantially across IPOs and achieves the peak in the bubble period²⁵. Despite the great importance of DSP, surprisingly, there is not much related literature on the role of DSP. Ray (2007) studies a smaller sample of IPOs with directed shares program. Her evidence rejects the conjecture that DSP create an agency problem between some beneficiaries of the problem and non-beneficiary shareholders. Instead, Ray (2007) concludes that DSPs are used as an upstream and downstream supply assurance mechanism in a multilateral purchasing relationship. Ljungqvist and Wilhelm (2003) conjecture “*that a directed share program creates an incentive to underprice an offering in order to benefit the targeted clienteles*”, but they do not formally test their conjecture. In this paper, we are trying to fill this gap by examining the role of DSP in IPO.

25 The Internet Capital Group, Inc. (“ICG”) reserved almost 30 percent of the shares being offered so that ICG could directly offer its shares to business associates.

An IPO represents both an important milestone as well as a critical transition point in the evolution of an entrepreneurial firm. During firms' critical listing time, the employees who worked so hard in the difficult early years, those customers whose loyalty has been a key factor in the company's success and those suppliers who were so generous with their credit terms in the days when cash was tight should be assured that they will be able to buy shares in the IPO. DSP provides those related persons with the opportunity to purchase shares of common stock at the IPO offer price. The issuers' incentive to involve related persons and provide them with the opportunity to purchase part of the offered shares are often stated in the reason why they adopt DSP: *"Through this directed share program, we intend to ensure that those individuals and companies that have supported us, or who are in a position to support us in the future, have the opportunity to purchase our common stock at the same price that we are offering our shares to the general public."*²⁶

DSP is of great value to both the issuers and the related persons for several reasons. First, issuers could use DSP to provide extra benefits to related persons who have contributed to the firm (directors, officers, employees, their relatives etc.). Secondly, issuers could use DSP to involve people who are essential to the firm's past and future success (supplier, customers and other related persons). Thirdly, by allocating reserved shares, issuers could offer the DSP recipients a stake in the issuers' future success. To sum up, the primary reason the issuers adopt DSP is to provide additional benefits to related persons of the companies. Therefore, the issuers are rewarding the related persons through the adoption of DSP when the firms get listed for the first time. Under the reward hypothesis, issuers could better achieve the goal of rewarding the

²⁶ Excerpt from Amendment no. 4 of QUINTUS CORP, which filed a S-1 to SEC in 10 September, 1999 and finally get listed on stock exchange on 16 November, 1999.

DSP recipients through at least two ways. First, issuers would increase the allocation of reserved shares when expected profit (underpricing) is high. Secondly, issuers would have the incentive to underprice an offering to benefit DSP recipients.

We empirically examine the role of DSP under three different settings. Firstly, we examine the effects of expected underpricing on DSP. Previous studies show that IPO offer price are often revised to reflect the market demand during the registration period (Ang and Brau, 2003; Galloway et al., 1998; Chan et al., 2011; Gokkaya et al., 2011). Typically, the offer price is revised upwards (downwards) when the demand for the issue is stronger (weaker) than expected. Price revisions are highly correlated with first-day underpricing and the revision in offer price is a good predictor of the first-day return (Benveniste and Spindt, 1989; Hanley, 1993; Loughran and Ritter, 2002; Edelen and Kadlec, 2005). We thus use price revision as a proxy for expected underpricing. In support of our reward hypothesis, we find both the size of DSP and the likelihood of DSP adoption is greater when price revision (expected IPO underpricing) is higher. Our further analyses also show that issuers increase the allocation of reserved shares in DSP when market demand and expected IPO underpricing is high during the registration period. Issuers are also more likely to introduce (withdraw) the DSP when market demand and expected IPO underpricing is high (low) during the registration period.

Secondly, we study issuers' incentive to underprice the offerings to benefit the DSP recipients. The partial adjustment phenomenon literature in IPO (Benveniste and Spindt, 1989; Hanley, 1993; Loughran and Ritter, 2002; Edelen and Kadlec, 2005) show that when revealed market demand is higher than expected during the registration period, offer prices are only partially revised upwards. When revealed market demand is higher, the underpricing level is

higher and more money is left on the table. If issuers with DSP have the incentive to underprice offerings to benefit DSP recipients, they would adjust the offer price upwards less compared with issuers without DSP when revealed market demand is strong during the registration period. Again, in support of our reward hypothesis, conditioned on strong market demand during the registration period, our empirical analyses show that issuers with DSP do not adjust the offer price upwards as much as issuers without DSP. Our empirical evidence indicates that issuers indeed strategically underprice the IPO to maximize the rewards to DSP recipients. Our findings also have implication in the partial adjustment phenomenon in IPO. Loughran and Ritter (2002) use prospect theory to explain the partial adjustment phenomenon in IPO: the partial adjustment is due to agency problem between underwriters and issuers (Baron, 1982; Biais, Bossaerts, and Rochet, 2002). Underwriters have incentives to underprice the IPO because of the practice of allocating undervalued issues to favorite clients in exchange for “soft dollars” and future investment banking business. Our strategic underpricing results show that the partial adjustment is also related to issuers’ incentive to reward the recipients of DSP. Thus, both issuers and underwriters have incentives to underprice the IPO.

Further, we examine the cost associated with strategic underpricing for the issuers to reward DSP recipients. Strategic underpricing is not costless for the issuers. Because of strategic underpricing, the issuers are selling the offered shares at a lower price and left more money on the table. We expect issuers would strategically underprice the offerings to reward DSP recipients only when the total shares offered is less. Habib and Ljungqvist (2001) argue that owners are more tolerant of underpricing when they sell fewer shares at the time of the IPO, because the benefit of costly monitoring is smaller. Loughran and Ritter (2002) show that, in case of strong market demand, the wealth gain for pre-issue shareholders from the revaluation

(because of the increase of the offer price and the first day closing price) would be more likely to higher than their shares of the money left on the table (because of more underpricing) when the total shares offered accounts for a small part of shares outstanding, and thus pre-issue shareholders would care less about the underpricing. Habib and Ljungqvist (2001) and Loughran and Ritter (2002) indicate that the cost of the strategic underpricing for the issuers is a function of the total shares offered. Specifically, when more (less) shares are offered, the cost would be higher (lower). Consistent with our expectation, we find issuers would only strategically underprice the IPO to benefit DSP recipients when the total shares they offered account a smaller part of the shares outstanding.

Thirdly, we investigate the relationship between DSP and actual IPO underpricing. Empirically, DSP and IPO underpricing co-vary consistently across time in our sample period and there is a strong positive correlation between DSP and IPO underpricing, the correlation between size of DSP (DSP Dummy) and IPO underpricing is about 26.3% (18.9%). Our previous empirical evidence have already shown that DSP is determined by expected underpricing and since issuers strategically underprice IPO to maximize the reward to DSP recipients, underpricing level is also affected by DSP. All of the above results suggest that the relationship between DSP and IPO underpricing may be endogenous. Following common approach in prior literature, we try to address the endogeneity concern by estimating simultaneous equations using a set of instrument variables. We find that the relationship between DSP and underpricing is indeed in two ways: bigger DSP lead to higher underpricing and higher underpricing also lead to bigger DSP.

Our above evidence all supports the reward hypothesis: issuers tend to allocate more reserved shares when the expected underpricing is higher and they would behave opportunistically to increase the reward to DSP recipients. Finally, we also test other alternative explanations of the role of DSP: (1) the signaling hypothesis (Leland and Pyle, 1977): high quality issuers could signal their quality by reserving more shares under the DSP and thus distinguish themselves from low quality issuers; (2) the commitment hypothesis (Brav and Gompers, 2003): DSPs are used to align the interest of insiders (beneficiaries of the DSP) together with outsiders; and (3) the supplement demand hypothesis: when expected/revealed market demand is high (low), underwriters allocate (less) more reserved shares to related persons. Our empirical evidence supports none of those alternative hypotheses.

In the last part of this paper, we examine the role of lockup in DSP. In our sample, 16.3% of DSPs are subject to lockup provision. The lockup provision prohibits the recipients from selling all or part of reserved shares during a specific period. Compared with the normal lockup on pre-IPO shareholders' shares, the incidence of lockup restriction on DSP are much less frequent and the lockup days are shorter. We find that underwriters are more likely to impose lockup restrictions and lockup length is significantly longer when the size of DSP is bigger or when general market condition is poorer. Also, reserved shares in DSP are more likely to be locked up when underwriter is more reputable. Our evidence is more supportive of price support explanation of lockup in that lockup constraint the selling pressure (flipping) right after listing.

Our study contributes to the literature in several ways. First, this paper adds to the literature on new equity issues. We examine the role of DSP in IPO, which is largely unexplored by prior literature. We test various hypotheses to explain the role of DSP. Our empirical evidence does

not support the signaling hypothesis, the commitment hypothesis and the backup demand hypothesis. Our empirical evidence strongly supports the reward hypothesis: issuers adopt DSP is to reward related persons who have contributed to the firm in the past and who are important to the firm's past and future success. Second, our findings on strategic underpricing supplement Loughran and Ritter's (2002) prospect theory explanation of partial adjustment phenomenon in IPO. We show that the partial adjustment is also related to issuers' incentive to reward the recipients of DSP. Thus, both issuers and underwriters have incentive to underprice the IPO. Third, different from prior literature on normal lockup provision on pre-IPO shareholders' shares, our findings suggest lockup on DSP serve as a price support mechanism by constraining the selling pressure right after listing.

The rest of the paper is organized as follows. Section 2 discusses our sample. In Section 3, we formally test the reward hypothesis and discuss its implications. In Section 4, we examine the role of lockup on DSP. Finally, Section 5 concludes the paper.

2. Data and Sample Description

2.1 Sample Selection

To examine the role of DSP in IPO, we construct our sample by merging together several key databases. Securities Data Company's (SDC) Global New Issues database provides data on U.S. common stock offerings; CRSP provides data on stock returns; and Compustat provides accounting data. DSP related data are hand collected from registration statements and

prospectuses filed through SEC Edgar System. Our overall sample period is from January 1, 1997 to December 31, 2010. The starting period for our sample is limited to the first year that Edgar starts to cover comprehensive firms. Only common stock offerings are included in our sample. Consistent with prior literature, we exclude American Depositary Receipts, private placements, rights offerings, unit offerings, closed-end funds, Real Estate Investment Trusts (REITs), and penny stocks with offer price below five dollars from our sample. Firms that are not covered by the Edgar and, hence, we cannot collect DSP related data are also excluded. We further exclude firms with incomplete accounting data and missing SDC new issues data. Our final sample consists of 1,843 initial public offerings (IPOs).

[Insert Table I Here]

Table I reports the number of IPOs in our sample by year. The number of observation is large from year 1997 to 2000 and from year 2004 to 2007. The sample is relative small from year 2008 to 2010.

2.2 DSP Related Data

DSP related data are the key variables in this paper. As SDC does not report data on DSP, we manually collected the DSP related data from the issuers' registration statement and prospectuses filed through the Edgar system. To track the revision of DSP, we search through all the registration filings during the registration period (from initial filing date to final offer date). Specifically, we manually collect the DSP data from all the prominent initial filings, subsequent

amendments and final 424B filings²⁷. For each filing, the following information is collected: *DSP Dummy* variable, which takes value of 1 if the filing specifies a directed share program (or friends and family program sometimes) is adopted; *Reserved Shares* variable, the number of reserved shares if issuers adopt DSP, if available; *%Reserved Shares* variable, the percentage of reserved shares relative over total number of shares offered, if available; *DSP Amount* variable, the total amount under the DSP, which equal to number of reserved shares times the offer price, if available; *DSP Lockup Dummy* variable, which takes value of 1 if reserved shares under DSP are subject to lockup restrictions; *DSP Lockup Days* variable, the number of lockup days on reserved shares. The *Reserved Shares* variable and *DSP Amount* variable are then converted to corresponding *%Reserved Shares* variable using the total number of shares offered and offer price from SDC.

2.3 Control Variables

Following previous studies in IPO (Loughran and Ritter, 2004; Benveniste et al., 2003; Lowry and Shu, 2002; Hanley and Hoberg 2010), our control variables typically consist of the following: *Price Revision*, *Underpricing*, *Total Asset*, *Offer Size*, *Total Shares Offered*, *Primary Shares*, *Underwriter Rank*, *High-tech Dummy*, and *NASDAQ Dummy*. The *Price Revision* variable, which measures the percentage revision in offer price, is equal to (final offer price - initial mid-file price)/ initial mid-file price. *Underpricing* variable is equal to the first-day return (calculated from offer price to first-day closing market price). The *Total Asset* variable (Compustat item *at*) is a measure of firm size; while *Offer Size* is equal to the total proceeds raised in the offering. *Total Shares Offered* is equal to the total shares offered as a percentage of

²⁷ Mainly the S-1, S-11, 424B filings and their amendments.

shares outstanding after the offering. *Primary Shares* is equal to the percent of offering that is primary (or newly issued) shares. The *Underwriter Rank* variable is equivalent to the Carter-Manaster ranking of underwriter's reputation. *High-tech Dummy* is dummy variable for high technology firms; *VC-backed Dummy* variable is a dummy variable for Venture-Capital backed new equity issues; while the *NASDAQ Dummy* is a dummy variable for NASDAQ-listed firms. The *Market Return* variable is also included in all regressions to capture the general stock market conditions prior to issue date. *Market Return* is equivalent to the cumulative value-weighted market returns over the period from initial filing date to final issue date. Calendar year dummies and Fama-French 48 industry dummies are also included in our regressions to control for potential year fixed effect and industry fixed effect.

2.4 Summary Statistics

Table I reports the number of IPOs without and with DSP in our sample by year. Among our total sample of 1,843 IPOs, 1,103 IPOs (59.85%) finally include a DSP and 740 IPOs (40.15%) do not. Figure I shows the time trend of DSP across our sample period from January 1, 1997 to December 31, 2010. We find the percentage of IPO that adopt DSP and the percentage of reserved shares for IPO adopting DSP vary substantially across years. 33.6% of IPO include a DSP in 1997 and the number increase sharply in the bubble period (77% in 1999 and 92.1% in 2000). The %IPO with DSP here is close to Ljungqvist and Wilhelm (2003). The percentage of IPO that have DSP decrease to around 60% to 70% from 2001 to 2006, and this number further decrease to around 40% to 50% from 2007 to 2010. The percentage of reserved shares are a little bit more stable and it shows similar time trend with the percentage of IPO include a DSP. The %Reserved Shares increase from 1997 (5.5%) to the bubble period and also top in bubble

period (6.92% in 1999 and 6.87% in 2000), after which it fluctuate around 5%. The *%Reserved Shares* is relatively smaller in 2003 (4.17%) and 2009 (3.55%); while it is relatively larger in 2006 (5.94%) and 2010 (6.91%).

[Insert Figure I Here]

Table II reports the summary descriptive statistics for our IPO without DSP and IPO with DSP sub-samples, respectively. Last two columns show the difference of mean and median between the IPO without DSP and IPO with DSP sub-samples. On average, we find the mean of *%Reserved Shares* for IPO with DSP sub-sample is about 5.89%. The median of *%Reserved Shares* is 5%, which is the most common percentage of reserved shares under DSP. 19% of DSP are subject to lockup restrictions (as shown in *DSP Lockup Dummy*). For DSP without lockup restrictions, we assign a lockup days of zero. The mean *DSP Lockup Days* is about 27.21 days.

[Insert Table II Here]

We find the offer prices are generally revised downwards (upwards) for IPO without (with) DSP. The mean (median) *Price Revision* (from initial filing date to final offering date) for IPO without DSP and with DSP sub-samples are -5.0% (-2.4%) and 3.3% (0.0%), respectively.

Comparing the IPO without and IPO with DSP sub-samples, we further find that the IPO with DSP are generally have larger *Offer Size* (total proceeds raised) and larger in asset size (*Total Assets*), while they have less total shares offered (% of shares outstanding). The two sub-samples have similar mean and median primary shares offered (% total shares offered). *Underwriter Rank* for underwriter reputation is generally higher in IPO with DSP. About 37.6% of IPO without DSP and 44.6% of IPO with DSP are VC-backed. The IPO without DSP sub-

sample has a similar percentage of NASDAQ-listed firms (72.3%) compared with the IPO with DSP sub-sample (69.6%). In comparison to IPO with DSP, IPO without DSP are generally offered under better market conditions. The mean cumulative value-weighted market returns over the period from initial filing date to final offer date (*Market Return*) for IPO without DSP (5.2%) is higher than that for IPO with DSP (3.5%).

3. The reward hypothesis

Under the reward hypothesis, the primary incentive for issuers to adopt DSP is to reward DSP recipients. We expect the issuers would try to increase the profits to DSP recipients, thus issuers could better achieve the goal of rewarding the DSP recipients through the DSP. Since the reserved shares are purchased at the offer price and could be sold after the listing date²⁸, a good proxy for the profit for subscribing one reserved share would be the level of underpricing. The total profits for the DSP recipients would thus become the total number of reserved shares times the underpricing level. As a consequence, they are at least two ways that issuers could better reward the DSP recipients: First, issuers would subjectively allocate more (less) reserved shares when the expected underpricing is high (low); Second, issuers would have the incentive to underprice the offerings to benefit DSP recipients. When revealed market demand is high, issuers with DSP could strategically underprice the IPO by not adjusting the offer price upwards as much as issuers without DSP. As a consequence, the underpricing level would be higher and thus the profits of the DSP recipients also be increased.

²⁸ In our sample, 16.3% of IPO with DSP are subject to lockup restriction on reserved shares. For reserved shares with lockup restrictions, they could only be sold certain days after the listing date.

In this paper, we seek to provide empirically evidence on the reward hypothesis and later we also test some other alternative hypotheses that are also trying to explain the role of DSP. Specifically, we examine the role of DSP under three different settings. First, we examine the effects of expected underpricing on DSP. Second, we study the strategic underpricing and issuers' incentive to reward the DSP recipients. Third, we investigate the relationship between DSP and actual underpricing. Finally, we also test some other alternative explanations to explain the role of DSP.

3.1 Expected Underpricing and DSP

We first examine the effect of expected underpricing on DSP. We use the *price revisions* of offer price from initial file price to final offer price as a proxy for expected underpricing. Our arguments are based on prior literature in IPO. First, offer price are often revised to reflect the market demand during the registration period (Ang and Brau, 2003; Galloway et al., 1998; Chan et al., 2011; Gokkaya et al., 2011). A problem associated with setting sale price of a new equity issue is that neither the issuer nor its underwriter knows precisely the demand for its stock. Under a book-building procedure, the issuer and its underwriter will initially set the sale price based on a preliminary estimate of the demand for the issue. The issuer will initially distribute a preliminary prospectus that lists an indicative pricing range. The underwriter will then conduct a marketing campaign (road shows) and solicit indications of interest from potential investors. Based on the observed demand schedule, the issuer and its underwriter will then finalize offer price. Typically, the offer price will be revised upwards (downwards) when the demand for the issue is stronger (weaker) than expected.

Second, price revisions are highly correlated with first-day underpricing (Benveniste and Spindt, 1989; Hanley, 1993; Loughran and Ritter, 2002; Edelen and Kadlec, 2005). Previous literature on conditional underpricing (Ritter, 2011) has shown that the upward (downward) revisions in offer price are associated with higher (lower) first-day returns. The revision in offer price is thus a good predictor of the first-day return because underwriters and issuers would only partially adjust the offer price to reflect the information gathered during the registration period.

The first way that that issuers could better reward the DSP recipients is that issuers could subjectively allocate more (less) reserved shares when the expected underpricing is high (low). In our empirical analyses, we first study the effect of expected underpricing on the size of DSP, as well as the likelihood of DSP adoption. We then examine the effect of expected underpricing on the revision of DSP terms.

We begin our analysis by examine the difference of expected underpricing between issuers with DSP and issuers without DSP. Table I shows the univariate comparison of the *Price Revision* variable and *Underpricing* variable between our IPO without DSP and IPO with DSP sub-samples. Consistent with our reward hypothesis, we find IPO with DSP are associated with more positive price revision and greater underpricing. The mean (median) *Price Revision* for IPO without DSP sub-samples are -5.0% (-2.4%), while mean (median) *Price Revision* for IPO with DSP sub-samples are 3.3% (0.0%). The comparison shows IPO with DSP sub-sample are facing stronger market demand and have higher expected underpricing. We now turn to the true ex-post first-day return. Table I also shows the first-day return (underpricing) for our IPO without DSP sub-sample are substantial lower than our IPO with DSP sub-sample. The mean (median)

Underpricing for the IPO without and with DSP sub-samples are 13.2% (5.0%) and 30.2% (12.0%), respectively. In sum, univariate comparison supports the reward hypothesis. IPO with DSP are associated with higher expected underpricing (market demand) and also the true ex-post underpricing.

We further estimate the following regression equation:

$$DSP\ Terms = \alpha + \gamma * Expected\ Underpricing + \beta * Control\ Variables + \varepsilon \quad (1)$$

Under *DSP Terms*, we consider both the likelihood of DSP adoption, captured by *DSP Dummy*, and the size of DSP, measured by *%Reserved Shares*. Our interested independent variable is the *Expected Underpricing*, which is measured by *Price Revision*. Following previous studies on new equity issues, we include the following control variables: *Offer Size*, *Total Asset*, *Total Shares Offered*, *Primary Shares*, *Underwriter Rank*, *VC-backed Dummy*, *NASDAQ Dummy*, and *Market Return*. Calendar year dummies and Fama-French 48 industry dummies are also included in our regressions to control for potential year fixed effect and industry fixed effect.

[Insert Table III Here]

Table III reports the results on the effects of *Expected Underpricing* on *DSP Terms*. We estimate two different regression models. The dependent variable for models (1) is *%Reserved Shares*, which is the percentage of reserved shares under DSP. The dependent variable for models (2) is the *DSP Dummy* variable, which is equal to 1 if issuers adopt a DSP as indicated in final prospectuses and 0 otherwise. Models (2) are estimated based on OLS regression, while models (1) are estimated based on logit regression. Overall, we find that both the size of DSP

and the likelihood of DSP adoption are positively related to the price revision (market demand and expected underpricing).

Model (1)²⁹ in table III shows that the *Price Revision* variable is significant positively related to *%Reserved Shares* variable. The coefficient estimate for *Price Revision* is 2.356 and the t-statistics is 5.6. Economically, the coefficient estimates suggest that one percent increase in *Price Revision* is associated with 0.022 percent increase in *Reserved Shares* in our sample. Model (2) in table III shows *Price Revision* variable is also positive related to the likelihood of DSP adoption. The coefficient estimate for *Price Revision* in model (2) is 1.244 and the t-statistics is 3.9. Turning to other control variables, we find the likelihood of DSP adoption is higher for firms with more reputable underwriters and during poor market conditions³⁰.

Overall, consistent with our univariate comparison results, our multivariate regression results support the reward hypothesis. Our empirical evidence shows expected underpricing level determines the size of DSP and the likelihood of DSP adoption. We find both the size of DSP and the likelihood of DSP adoption is greater when expected underpricing is high.

We now examine the effect of expected underpricing on the revision of DSP terms. Previous literatures have shown that the offer prices are often revised to reflect the revealed

²⁹ Our results are similar if we include $\log(1 + \text{DSP Lockup Days})$ as a control. The coefficient on $\log(1 + \text{DSP Lockup Days})$ is positive and significant.

³⁰ We argue that the negative coefficient on *Market Return* is because when market condition is good, it does not necessarily mean that the expected underpricing level would be high. Under our reward hypothesis, when expected underpricing is higher, the size of DSP and likelihood of DSP adoption would be higher. We thus argue only when the market condition is good together with the expected underpricing level is high, the size of DSP and likelihood of DSP adoption would be high. In addition to the regression results shown in table III, we add an interaction term of the *Price Revision* variable and the *Market Return* variable. Untabulated regression results show that the coefficient of the interaction term of *Price Revision* and *Market Return* is significant positively at 22.011. The coefficient is quite large. The coefficient on the *Price Revision* remains significant positive at 2.01. These results indicate the issuers tend to allocate more reserved shares when expected underpricing is higher and they tend to allocate even more reserved shares when market condition is good. The negative coefficient on the *Market Return* (-5.33) maybe just pick up issues with low expected underpricing when market condition is good.

market demand during the registration period. In IPO, other terms of offering are also subject to revision. Terms of DSP are among one of them³¹. Typically issuers could revise the terms of DSP in two ways. First, they could increase or decrease the number of reserved shares under DSP. In other words, issuers would change the size of DSP. Second, they could include DSP in later amendments if they have not yet adopted DSP in early registration statements; or they could drop DSP in later amendments if they have already adopted DSP in early filings. In other words, issuers could choose to introduce or withdrawn DSP during the registration period.

Under the reward hypothesis, the issuers would have the incentive to increase the reward to DSP recipients. Since they have the power to revise the terms of DSP, we expect issuers would revise DSP in a way that benefits the DSP recipients. Given the two ways that they could change the terms of DSP, we conjecture (1) Issuers would be more likely to increase (decrease) the allocation of reserved shares to related persons in DSP when market demand and, hence, expected IPO underpricing is higher (lower) during the registration period; (2) Issuers are also more likely to introduce (withdraw) the DSP when market demand and, hence, expected IPO underpricing is higher (lower) during the registration period. We test our conjectures by estimating following regression equation:

DSP Terms Revision

$$= \alpha + \gamma * \text{Expected Underpricing} + \beta * \text{Control Variables} + \varepsilon \quad (2)$$

Our dependent variable *DSP Terms Revision* consists two variables that measures the revision of DSP terms: (1) $\Delta \text{Reserved Shares}$, which measures the changes of percentage of reserved shares during the registration period, is equal to $\% \text{reserved shares}$ in final prospectus - $\% \text{reserved}$

³¹ Appendix A shows how terms of DSP are subject to revision.

shares in initial filings. (2) ΔDSP *Dummy*, which measures the introduction and withdrawn of DSP, is equal to *DSP Dummy* in final prospectus - ΔDSP *Dummy* in initial filings. ΔDSP *Dummy* takes value of 1 if issuers introduce the DSP in amendments, -1 if issuers withdraw the DSP in amendments and 0 otherwise. Same with the regression equation in model (1), our interested variable is the *Expected Underpricing*. We also include the same control variables.

[Insert Table IV Here]

Panel A of table IV reports the summary descriptive statistics for the DSP terms revision. We find generally issuers increase the percentage of reserved shares during the registration period³². The mean (median) of $\Delta Reserved$ *Shares* is 1.17% (0%) for our sample³³. The summary statistics for the ΔDSP *Dummy* shows 5% of issuers introduce DSP in later amendments and more of the issuers withdraw DSP in later filings (12.15%). The majority of issuers (82.85%) does not introduce or withdraw DSP during the registration period. They either keep including DSP throughout the registration period or do not include DSP in any of their registration statements and prospectuses.

Panel B of table IV reports the results on the effects of market demand on DSP terms revision. We estimate two different regression models for our sample. The dependent variable for model (1) is $\Delta Reserved$ *Shares* and the dependent variable for model (2) is ΔDSP *Dummy*. Models (1) is estimated based on OLS regression, while models (2) is estimated based on

³² This could also due to we assign a value of zero if the %Reserved Shares is missing in prominent initial filing.

³³ Some of the reserved shares percentage is missing, especially in the prominent filings. We exclude samples with missing data reserved shares percentage data and thus the same size for *Reserved Shares* is much smaller.

multinomial logit regression³⁴. Overall, we find that DSP terms revision are positively related to the price revision (market demand and expected underpricing).

Model (1) in panel B³⁵ of table IV shows that the *Price Revision* variable has a positive and significant coefficient. The coefficient estimate for *Price Revision* is significant positive at 0.984 and the t-statistics is 2.06, which indicates *%Reserved Shares* are revised upwards when *Price Revision* is higher. Economically, the *%Reserved Shares* would be 0.01 percent higher with one percent increase in *Price Revision*. Regression results in model (2) shows the coefficient estimate for *Price Revision* is 0.673 (t-statistics 2.07) and -1.758 (t-statistics -3.07) for introduce of DSP ($\Delta DSP \text{ Dummy}=1$) and withdrawn of DSP ($\Delta DSP \text{ Dummy} = -1$), respectively. The results suggest that the introduction of DSP (withdrawn of DSP) is more likely when offer price are revised upwards (downwards).

Overall, the revision on terms of DSP reconfirms the reward hypothesis. Our empirical evidence shows expected underpricing level determines the revision of DSP terms. We find the issuers behave opportunistically to maximize the reward to DSP recipients by increasing the allocation of reserved shares to related persons in DSP when market demand and, hence, expected IPO underpricing is high during the registration period. Issuers are also more likely to introduce (withdraw) the DSP when market demand and, hence, expected IPO underpricing is high (low) during the registration period.

³⁴ We do not control year fixed effect and industry fixed in the multinomial logit regression, because the estimation is not concave once we include year dummies and industry dummies. Alternatively, we could estimate model (2) based on OLS regression (ordered logit regression as well) and includes the year dummies and industry dummies, our results are qualitative the same.

³⁵ Our results are robust if we include $\log(1+DSP \text{ Lockup Days})$ as a control.

3.2 DSP and Strategic Underpricing

As discussed earlier, the second way that issuers with DSP could better reward the DSP recipients is through strategic underpricing by not adjust the offer prices upwards as much as issuers without DSP. In our empirical analyses, we first study the strategic underpricing. We then examine the cost associated with issuers' incentive to reward the DSP recipients through strategic underpricing.

Our empirical testing of the strategic underpricing here again lies in the partial adjustment phenomenon in IPO. During the book-building procedure, the issuer and its underwriter would adjust the offer price according to the revealed market demand. Benveniste and Spindt (1989), Hanley (1993), Loughran and Ritter (2002), and Edelen and Kadlec (2005) shows, when revealed market demand is higher than expected, offer price is only partially adjusted upwards and thus more money is left on the table. Under our reward hypothesis, if an issuer has the incentives to increase the reward to DSP recipients, we expect the offer price would be adjusted upwards to a relative lower level when market demand is high. The strategic underpricing could be better illustrated in Figure II.

[Insert Figure II Here]

Under strong market demand, dashed line in figure II shows the general partial adjustment phenomenon in IPO. There are two types of issuers in this paper: issuers that have DSP program and issuers that do not have DSP program. For an issuer without DSP, the offer price is adjusted upwards partially to reflect the strong market demand. The final offer price (P_0') would be higher than the initial offer price (P_0), the price revision would be positive. Since the offer price

is only partially adjusted, the first day closing price (P_1) would be much higher than the final offer price (P_0'), thus more money is left on table and the underpricing would be larger. The dotted line in figure II shows the partial adjustment phenomenon for an issuer with DSP. Similar to the dashed line, offer price is adjusted upwards in facing strong market demand, but because of the issuer's incentives to reward the DSP recipients, the offer price would be adjusted upwards not as much as an issuer without DSP. The final offer price (P_0') would be lower for an issuer with DSP compared with an issuer without DSP. If the first-day closing price (the intrinsic value) is the same, an issuer with DSP would have higher underpricing. The testable prediction under the strategic underpricing is thus that issuers with DSP do not adjust the offer price upwards as much as issuers without DSP.

Corwin and Schultz (2005) use the total return from the midpoint of the filing price range to the closing price on the first day of trading as a proxy for information revealed during the registration period. In light of Corwin and Schultz (2005), we also use total return from midpoint of the filing price to first day closing price as a measure of the magnitude of full adjustment. If the offer price is fully adjusted to reflect the information revealed during the registration period, the final offer price would be the same with the first-day closing price and the total return would be the same with the price revision and the underpricing would be zero. The partial adjustment is measured by price revision over the total return. Specifically *%Partial Adjustment* is equal to $(\text{final offer price} - \text{initial mid-file price}) / (\text{first-day closing price} - \text{initial mid-file price})$ and it measures the magnitude of the price revision over the total information revealed during the registration period. Under our reward hypothesis, we expect *%Partial Adjustment* to be lower for issuers with DSP if they have the incentive to strategic underprice to reward DSP recipients.

[Insert Table V Here]

Panel A of table V shows the univariate comparison of the *%Partial Adjustment* variable between our IPO without DSP and IPO with DSP sub-samples. Consistent with our reward hypothesis, we find IPO with DSP are associated with lower *%Partial Adjustment*. The mean (median) *%Partial Adjustment* for IPO without DSP sub-samples are 0.56 (0.5), while mean (median) *%Partial Adjustment* for IPO with DSP sub-samples are 0.46 (0.31). The difference of *%Partial Adjustment* between two sub-samples is economically and statistically significant. Univariate comparison supports our conjecture that issuers strategic underpricing to increase the reward to DSP recipients. We further do some multivariate analyses.

Panel B of table V reports the regression results on the effects of DSP on partial adjustment. The dependent variable is the *%Partial Adjustment* variable. The interested variables are the *DSP Dummy* variable in model (1) to (3) and *%Reserved Shares* variable in model (4) to (6). Model (1) and model (4) reports the regression results for our entire IPO sample. Ince (2008) finds offer price adjust asymmetrically to positive and negative information. To capture the potential asymmetric effect of price adjustment in facing strong and weak market demand, we further divide the full sample into two subsamples: One sub-sample consists of issuers with high demand (*Price Revision* > 0) and regression results are shown in model (3) and (6); the other sub-sample consists of issues with low demand (*Price Revision* ≤ 0) and regression results are shown in model (2) and (5). Overall, consistent with our expectation, we find that the *%Partial Adjustment* negatively related to the *DSP Dummy* and *%Reserved Shares*.

As reported in Model (1), we find the coefficient estimate for *DSP Dummy* is -0.091 and significantly negative (t-statistics -2.72). This finding suggests that issuers with DSP adjust the

offer price upwards less, compared with issuers without DSP. Economically, the *%Partial Adjustment* would be 9.1% lower for issuers with DSP than that for issuers without DSP. When we divide the overall sample into high market demand and low market demand, we find the effects mostly come from high demand. Model (3) reports, for high market demand sub-sample, the coefficient estimate for *DSP Dummy* is significantly negative. We find in model (2), for low market demand sub-sample, the coefficient estimate for *DSP Dummy* is also negative, but insignificant. Model (4) to (6) do the same analyses as in model (1) to (3), except we substitute the *DSP Dummy* variable with the *%Reserved Shares* variable. The regression results in model (4) to (6) are generally the same. The coefficient estimate for *%Reserved Shares* is significant negative as reported under model (4) and the effects mostly come from high market demand sub-sample as reported under model (6).

Our empirical evidence suggests that conditioned on strong market demand during the registration period, issuers with DSP do not adjust the offer price upwards as much as issuers without DSP. Since the offer price is adjusted upwards less, more money is left on the table for issues with DSP and reflected in the first-day return, the underpricing. Overall, consistent with the reward hypothesis, issuers with DSP strategically underprice the IPO to maximize the reward to DSP recipients. Our findings here have implication on the partial adjustment phenomenon in IPO. Loughran and Ritter (2002) use Khaneman and Tversky's (1979) prospect theory to explain the partial adjustment phenomenon in IPO. Issuers anchor the expected value of the shares sold on the midpoint of the file price range and fail to update their expectations. Underwriters have incentive to underprice the IPO because of the practice of allocating undervalued issues to favorite clients in exchange for "soft dollars" and future investment banking business. As a consequence, underwriters would take advantage of issuers' psychological biases by not adjust

the offer price on a one-for-one basis when facing strong market demand. In Loughran and Ritter (2002), the partial adjustment is due to agency problem between underwriters and issuers (Baron, 1982; Biais, Bossaerts, and Rochet, 2002). Our results show that the partial adjustment is also related to issuers' incentive to reward the recipients of DSP. Thus, both issuers and underwriters have incentive to underprice the IPO³⁶.

We now examine the cost associated with strategic underpricing. In above analysis, we find issuers with DSP strategically underprice the IPO to maximize the reward to DSP recipients. Actually issuers' opportunistic behavior is not totally costless to them. Since the newly offered shares are sold at a relatively lower price because issuers with DSP do not boost the offer price as high as issuers without DSP in facing strong market demand, issuers with DSP incur some cost of strategic underpricing. Here we further test why and when the issuers adjust the offer price to a less extent. Our evidence shows issuers with DSP would only strategically underprice the IPO when the cost of doing so is low, in other words, the incentive for issuers with DSP to reward the DSP recipients is greater when the associated cost is low. We use the total shares offered as a percentage of the shares outstanding as a measure of the cost that goes to issuers with DSP.

³⁶ We also consider the potential endogeneity problem. The sample selection bias arises when the endogenous variable in the right hand side is the *DSP Dummy* variable. The best way to deal with the sample selection bias is to apply a Heckman sample selection model. As so far I cannot find any valid exogenous variables that can predict choice of DSP but not the % *partial adjustment* variable, I cannot apply the Heckman selection model analysis. When the endogenous variable in the right hand side is the % *Reserved Shares* variable, to address the potential endogeneity concerns, I could apply a two-stage least square analysis. In the first stage, I use *Customer Dummy* and *Supplier Dummy* to predict the size of DSP (please refer to section 3.3 for more detailed discussions of the *Customer Dummy* and *Supplier Dummy* as exogenous instrument variables). In the second stage, I put in the predicted size of DSP as the independent variable of the % *Partial Adjustment* model. Our two-stage analyses confirm our simple OLS regression results: issuers with more reserved shares adjust the offer price upwards less, compared with issuers with less reserved shares.

Habib and Ljungqvist (2001) model the effect of participation (as measured by secondary shares offered over pre-IPO shares outstanding) and dilution (as measured by primary shares offered over pre-IPO shares outstanding) on underpricing. They argue firms could reduce the level of underpricing through costly promoting. The benefits of reducing underpricing depend on the owners' participation in the offering (participation effect) and the magnitude of the dilution they suffer on retained shares (dilution effect). Because Issuers are trading off the cost and benefit of monitoring underpricing and as the benefit of costly monitoring is smaller when the fewer shares they sell at the time of the IPO, issuers are thus more tolerant of underpricing the fewer shares (total shares offered) they sell. Similarly, Loughran and Ritter (2002) also implies the wealth gain for preissue shareholders from the revaluation (because of the increase of the offer price and the first day closing price) would be more likely to higher than their share of the money left on the table (because of more underpricing) when the total shares offered accounts for a small part of shares outstanding, and thus preissue shareholders would care less of the underpricing. In light of Habib and Ljungqvist (2001) and Loughran and Ritter (2002), we argue when the total shares offered accounts for a smaller part of the shares outstanding, the issuers' personal loss from the increased underpricing, which is a result of strategic underpricing, would be lower. In other words, the cost of strategic underpricing that goes to issuers would be lower if total shares offered accounts a small part of the shares outstanding. We thus conjecture that the cost for issuers with DSP to reward the DSP recipients through strategic underpricing is lower when the total shares offered accounts a small part of the shares outstanding.

[Insert Table VI Here]

Table VI shows the empirical evidence that the incentive for issuers with DSP to reward the DSP recipients is higher when the cost is lower. We estimate the same regression equation as in table V: the dependent variable is the *%Partial Adjustment* variable and the interested independent variable is the *DSP Dummy* variable³⁷. To capture the incentive for issuers with DSP to reward the DSP recipients, we partition our full sample into different sub-samples according to *Total Shares Offered*³⁸. Specifically, for the first sub-sample, we keep issues with *Total Shares Offered* that are greater than 0.1. For the next sub-sample, we keep issues with *Total Shares Offered* that are greater than 0.2. Following the same procedure, our last sub-sample consists of issues with *Total Shares Offered* greater than 0.7³⁹. Finally we have seven sub-samples in total. Since we partition our sample based on *Total Shares Offered* variable, we do not include the *Total Shares Offered* as a control in all our regressions in table VI. Consistent with our expectation, our empirical evidence shows the incentive for issuers with DSP to reward the DSP recipients through strategic underpricing is higher when *Total Shares Offered* is lower.

In tale VII, we find the coefficient estimates for *DSP Dummy* are only significant negative for sub-samples with *Total Shares Offered* > 0.1 and *Total Shares Offered* > 0.2; while the coefficient estimates for *DSP Dummy* are negative but insignificant for the other sub-samples. This findings suggest when the *Total Shares Offered* is high enough (to be more precise, higher than 0.3), the issuers with DSP do not apparently strategically underprice the new equity issues to reward the DSP recipients. That is, the incentive for issuers with DSP to reward the DSP

³⁷ We get similar results when we use the *% Reserved Shares* as the interested independent variable.

³⁸ Slightly different from Habib and Ljungqvist (2001), we use total shares offered over the shares outstanding after offering but not total shares offered over the shares outstanding prior to offering. This is because a lot of the shares outstanding prior to offering is missing in our sample.

³⁹ We do not include the sub-sample with *Total Shares Offered* greater than 0.8 and *Total Shares Offered* greater than 0.9 as the sample size is too small.

recipients through strategic underpricing is higher when the *Total Shares Offered* is lower⁴⁰. Our empirical results here are consistent with Habib and Ljungqvist (2001) and Loughran and Ritter (2002). When total shares offered accounts a smaller part of shares outstanding, the cost of increased underpricing that goes to issuers would be less (Habib and Ljungqvist, 2001) or the issuers are more likely to become complacent because the wealth gain for issuers from the revaluation (because of the increase of the offer price and the first day closing price) would be more likely to higher than their share of the money left on the table because of the increased underpricing (Loughran and Ritter, 2002).

3.3 *DSP and Actual Underpricing*

In this sub-section, we test the relationship between DSP and actual IPO underpricing. To begin our analyses, we first compare the true IPO underpricing between IPO with DSP sub-sample and IPO without DSP sub-sample. Panel A of table VII shows the univariate comparison results. We find the first-day return (underpricing) for our IPO without DSP sub-sample are substantial lower than our IPO with DSP sub-sample. The mean (median) Underpricing for the IPO without and with DSP sub-samples are 13.2% (5.0%) and 30.2% (12.0%), respectively. The differences of the mean and median between those two sub-samples are significant at 1 percent level. The results indicate, compared with IPO without DSP, the true IPO underpricing is indeed much higher for IPO with DSP.

[Insert Table VII Here]

⁴⁰ We also run a full sample regression which include the *Total Shares Offered* variable and an interaction term of the *DSP Dummy* and *Total Shares Offered* variables. The interaction term has a significant positive coefficient, which indicates issuers with DSP tend to adjust the offer price upwards more when *Total Shares Offered* is larger. The implications are the same.

Next we study the correlation between the IPO underpricing and DSP. Figure III shows the time trend of DSP and underpricing across our sample period from year 1997 to year 2010. We find the percentage of IPO with DSP consistently co-varies with underpricing across time in our sample period. Both of the %IPO with DSP and underpricing increase sharply from 1997 and peak in the bubble period in year 1999 and 2000, after which both of them decline sharply and reach a relatively low point at year 2002 and 2003. After that, the %IPO with DSP and underpricing remains somewhat stable and both of them decrease a little bit from year 2008 to 2010. Panel B of table VII also shows the correlation matrix among the following variables: *Underpricing*, *%Reserved Shares* and *DSP Dummy*. We find the correlation coefficient between size of DSP (DSP Dummy) and IPO underpricing is about statistically significant at 26.3% (18.9%).

[Insert Figure III Here]

Our empirical evidence in table III has already shown expected underpricing level determines the size of DSP and the likelihood of DSP adoption. On the other hand, regression results in table V shows issuers with DSP have the incentive to strategic underpricing in order to increase the reward to DSP recipients. Conditional on strong market demand, issuers do not adjust the offer price upwards as much as issuers without DSP. As a result of the strategic underpricing, issuers with DSP have a relatively low final offer price. Since DSP could affect the level of final offer price and underpricing depends on the level of final offer price, our empirical findings also imply that the DSP determines the underpricing level. Specifically, issuers with DSP should have relatively high underpricing. In sum, our empirical evidence shows DSP is determined by underpricing and underpricing is also determined by DSP.

The strong correlation between DSP and true IPO underpricing, together with our previous empirical evidence, suggests that the relationship between DSP and IPO underpricing may be endogenous. More specifically, the relationship between DSP and IPO underpricing may be two ways: larger size of DSP and higher likelihood of DSP adoption may lead to higher IPO underpricing⁴¹, while higher IPO underpricing also lead to larger size of DSP and higher likelihood of DSP adoption. One ensuing questions would be the common endogeneity problem in corporate finance. Following the common approach in prior literature, we also try to address the endogeneity concern by estimating simultaneous equations using a set of instrument variables. Specifically, we estimate following simultaneous equations system:

$$\begin{aligned} \text{Underpricing} = & \%Reserved\ Shares + \text{Log}(\text{No of Underwriting Managers}) \\ & + \text{Contorls} + \epsilon \quad \dots \quad (3) \end{aligned}$$

%Reserved Shares

$$\begin{aligned} = & \text{Underpricing} + \text{Customer Dummy} + \text{Supplier Dummy} + \text{Contorls} \\ & + \epsilon \quad \dots \quad (4) \end{aligned}$$

We use log of *No of Underwriting Managers* to identify equation (4) of DSP and we use *Customer Dummy* and *Supplier Dummy* to identify equation (3) of underpricing. Corwin and Schultz (2005) find large syndicates and particularly by syndicates with a lot of co-managers are more likely to revise the offer price in response to information gathered during the registration

⁴¹ Empirically we indeed find the level of underpricing depends on DSP. When we run regressions of underpricing on DSP (*%Reserved Shares* variable and *DSP Dummy* variable), consistent with the implication of strategic underpricing, we find *%Reserved Shares* and *DSP Dummy* are positive and significantly related to *Underpricing*. The coefficient estimates on *%Reserved Shares* is 0.009 (t-statistics 3.29). Economically, 1 percent increase of *Reserved Shares* would lead to 0.9 percent increase of *Underpricing*. Regression results also show issuers with DSP have underpricing 4.8% higher than issuers without DSP. In sum, our results show the size of DSP and likelihood of DSP adoption determines the first day underpricing.

period in IPO. Huang and Zhang (2010) show the number of managing underwriters for an SEO is negatively related to the underpricing because of more underwriters' marketing efforts. This strand of literature shows *No of Underwriting Managers* should be related to underpricing. It seems there is no particular reason to believe *No of Underwriting Managers* would determines *%Reserved Shares*. Hence, we use the variable *No of Underwriting Mangers* to identify size of DSP equation. We use *Customer Dummy (Supplier Dummy)*, which takes value of 1 if customer (supplier) is included as one of the DSP recipients, for the identification of the underpricing equation for the following two reasons: 1) Ray (2007) argues the size of DSP may be influenced by whether vendors and customers are the potential beneficiaries the DSP, because they may argue for more reserved shares and thus increase the size of DSP. 2) The vendors and customers are unlikely to affect the offer price and thus the underpricing. Issuers (officers, directors) are less likely to deliberately set the offer price lower to benefits the customers or suppliers (although they will do so for the benefits of the officers, directors and some of the other related persons). If they want, they could simply decrease (increase) the prices that they offered to the customers (suppliers). In other words, if they want to offer cash incentives to customers or suppliers, they do not need to do it through sub-optimal offer price⁴². Overall, the simultaneous equation estimation shows the relationship between DSP and underpricing is indeed two ways.

[Insert Table VIII Here]

Table VIII reports the regression results for the simultaneous equations. Equation (1) and (3) reports the first-stage regression results. Model (1) of the size of DSP equation shows the

⁴² Because insiders like directors and managers may deliberate set the offer price lower, other similar variables like the “*Directors Dummy*”, “*Managers Dummy*” etc. would not be valid instrumental variables as they are likely to have effects on the *% Partial Adjustment* variable.

Customer Dummy is significant positive related to the size of DSP. Economically, if customers (suppliers) are included in the beneficiaries of the DSP, the issuers tend to reserve 1.5% (0.7%) more shares to related persons. Model (1) also shows the Log (*No of Underwriting Managers*) variable is not significantly related to size of DSP. Consistent with Corwin and Schultz (2005), Huang and Zhang (2010), model (3) of the underpricing equation shows the Log (*No of Underwriting Managers*) variable is significant negative correlated with underpricing. More managers are associated with lower underpricing. Model (3) also shows the *Customer Dummy* and *Supplier Dummy* are not significantly related to underpricing level.

Equation (2) and (4) reports the second-stage regression results. The interested variable are the *%Reserved Shares* variable in model (2) and the *Underpricing* variable in model (4). We find the coefficient on *%Reserved Shares* and *Underpricing* are both significant and positive. Model (2) shows the coefficient on *%Reserved Shares* is about 0.049 and significant at 10 percent level. This result indicates after control for the potential endogeneity problem, 1 percent increase of reserved shares would lead to 4.9 percent increase of the underpricing. Model (4) shows the coefficient on *Underpricing* is 5.969 and the t-statistics is 2.83. This result indicates after control for the potential endogeneity problem, 1 percent increase of underpricing would lead to 0.06 percent increase of the reserved shares. The over-identification test shows the Hansen-Sargan over-identification statistic is 1.08 and a p-value of 0.2986 under a Chi-sq distribution with one degree of freedom. Hence, we fail to reject the null that the instrumental variables are valid. The results from the simultaneous analyses confirm our previous empirical evidence on the relationship between DSP and IPO underpricing. We find, after control the potential endogeneity

problem, the relationship between DSP and underpricing is indeed two ways: bigger DSP lead to higher underpricing and higher underpricing also lead to bigger DSP⁴³.

3.4 *Alternative Hypotheses*

Our previous evidence supports the reward hypothesis: issuers tend to allocate more reserved shares when the expected underpricing is higher and they would also behave opportunistically to increase the reward to DSP recipient. Besides this reward hypothesis, some other hypotheses may also explain the role of DSP. In this paper, we also empirically test three of those hypotheses which we believe that are most relevant to DSP. They are the signaling hypothesis, the commitment hypothesis and the supplement demand hypothesis.

Under the signaling hypothesis (Leland and Pyle, 1977), high quality issuers could signal their quality by reserving more shares under the DSP and thus distinguish themselves from low quality issuers. There are several testable implications under the signaling hypothesis: (1) IPOs with DSP (or reserve more shares) in their prominent original prospectuses would be more likely to revise their offer price upward since they could distinguish themselves from low quality issuers; (2) If DSP is used signal firms' quality, firms with DSP (or reserve more shares) in their final prospectuses would performance better in the stock market (and/or in their accounting numbers) afterwards; (3) If the DSP can act as a signal, IPOs with DSP (or reserve more shares) would be more likely to conducted SEO within five years of the IPO and the SEO announcement effect would be less negative (Allen and Faulhaber, 1989; Grinblatt and Huang 1989; Welch, 1989). What is more, IPOs with DSP (or reserve more shares) would be more likely to initiate

⁴³ Our results are qualitative the same when we include the *Price Revision* variable in both equations.

dividends within five years of the IPO and the first dividend announcement effect would be more positive (Michaelis and Shaw, 1994). We find all of the predictions of signaling hypothesis are not empirically supported. Our empirical evidence show: (1) The offer price for firms with DSP program (or with higher percentage of reserved shares) does not more likely to be revised upwards. (2) The stock performance and accounting performance are indistinguishable between firms with DSP and firms without DSP. (3) Issuers with DSP are not more likely to come back by conducting SEO or more likely to initiate dividends payment. The SEO announcement effect and dividend initiation effect are also unrelated to DSP.

Under the commitment hypothesis (Brav and Gompers, 2003), reserved shares are used to align the interest of insiders (beneficiaries of the DSP) together with outsiders and reserved shares act as a commitment device to alleviate moral hazard problem inherent in IPO process. Since venture capital backing and high reputation underwriter could certify the quality of the issuers and thus partly eliminate the moral hazard problem, under the commitment hypothesis, their presence should decrease the necessity to adopting DSP and should increase the probability to drop the DSP program (or reserve less shares). Our empirical evidence in table III shows the *Underwriter Rank* is significant positive related to the size of DSP and the likelihood of DSP adoption. The coefficient estimates for *VC-backed Dummy* is also positive but insignificant. Further evidence from panel B of table V shows *Underwriter Rank* is significant positively related to $\Delta Reserved\ Shares$, while *Underwriter Rank* and *VC-backed Dummy* are generally are unrelated to the $\Delta DSP\ Dummy$. Our findings again do not support the commitment hypothesis.

Under the supplementary demand hypothesis, reserved shares are allocated to related persons in order to supplement the residual demand from the general public. When expected or

revealed market demand from the general public is low during the registration period, underwriters allocate more reserved shares to related persons; while when expected or revealed market demand from the general public is high during the registration period, underwriters allocate less reserved shares to related persons. The testable implication of supplementary demand hypothesis is that 1) the size of DSP and likelihood of DSP adoption should be negatively related to revealed market demand during the registration period; 2) issuers would increase (decrease) the allocation of reserved shares to related persons when the revealed market demand is high (low) during the registration period. Similar to previous analyses, we could use the *Price Revision* variable to proxy the market demand during the registration period. Empirical evidence for testing supplement demand hypothesis also lies in table III and table V. Table III has shown the *Price Revision* variable is positively related to the size of DSP and the likelihood of DSP adoption. Panel B of table V has also shown the *Price Revision* variable is positively related to the $\Delta Reserved\ Shares$ and the probability of the introduction of DSP; while it is negatively related to the withdrawn of DSP. These results imply underwriters allocate more (less) reserved shares to related persons when revealed market demand is high (low) during the registration period. They are also more likely to increase (decrease) the reserved shares or introduce (withdraw) DSP when the market demand is high (low). Our empirical evidence does not support the supplement demand hypothesis.

To sum up, in this sub-section, we test some alternative hypotheses, mainly the signaling hypothesis, the commitment hypothesis and the supplement demand hypothesis, which are most relevant to the role of DSP. We find none of those alternative hypotheses are empirically supported.

4. The Lockup on DSP

Field and Hanka (2001), Ofek and Richardson (2000) show most IPOs feature lockup restrictions, which prohibit pre-IPO shareholders from selling any of their shares from a pre-specified period, normally 180 days. Sometimes, the reserved shares under DSP are also subject to similar lockup provisions, although now is the DSP recipients but not the pre-IPO shareholders that are subject to lockup restrictions. If the reserved shares are subject to lockup restrictions, the reserved shares that purchased by the DSP recipients are not freely-tradable for a specified period after the listing date. An example of the lockup restriction on DSP is like “*To purchase reserved shares, those persons will be required to agree that, for a period of 60 days after the date of this prospectus, they will not, without the prior written consent of Robertson Stephens, offer, pledge, sell, contract to sell, sell any option, right or warrant to purchase or otherwise transfer or dispose of, directly or indirectly, any reserved shares, or any securities convertible into or exercisable or exchangeable for reserved shares or enter into any swap or other arrangement that transfers all or a portion of the economic consequences associated with the ownership of any reserved shares*⁴⁴.”

In the last section of this article, we examine the role of lockup in DSP. Previous studies (Field and Hanka, 2001; Brav and Gompers, 2003; Bradley, Jordan, Roten and Yi, 2001; Keasler, 2001; Ofek and Richardson, 2000) on lockup of pre-IPO shareholders shows most of the IPO have lockup restrictions. In contrast, we find only a small part of IPO got lockup restrictions on

⁴⁴ Excerpt from 424B4 filings of DIVINE INTERVENTURES INC on July 12, 2000

the reserved shares and the lockup length is relatively shorter. In our sample, 87.4% of the IPO features a lockup provision on pre-IPO shareholders' shares, while only 16.3% of the IPO features a lockup provision on reserved shares. The mean (median) lockup days on pre-IPO shareholders' shares are 184 (180) days, while the mean (median) lockup days on reserved shares are 127 (180) days. The summary statistics indicate the lockup length of lockup provision on reserved shares is significantly shorter than that on pre-IPO shareholders' shares.

In this paper, we examine two hypotheses associated with the lockup of DSP shares: the commitment hypothesis and the price support hypothesis.

First, Brav and Gompers (2003) show the lockup restrictions on pre-IPO shareholders' shares serve as a commitment mechanism to alleviate the moral hazard problem inherent in IPO listing. In the aftermarket insiders may not act in the best interest of shareholders. Firms with larger moral hazard incentives would have to accept a longer lockup in order to convince the public to buy stock in the offering. Similar to the lockup on pre-IPO shareholders in Brav and Gompers (2003), we argue the lockup on DSP recipients in DSP may also act a commitment mechanism to alleviate the moral hazard problem of the related persons. The commitment hypothesis predicts insiders of firms that are associated with greater moral hazard problem should be subjected to lockup for a longer period of time. Brav and Gompers (2003) argue IPO with lower *Log (Market Capitalization)*, lower *Book-to-Market*, lower *Cash Margin*, lower *Underwriter Rank*, higher *Primary Shares* and IPO without VC-backing are associated with higher moral hazard problem and should be locked up for a longer time period under the commitment hypothesis.

Second, under the price support hypothesis, lockup on DSP is to constrain the selling pressure from the DSP recipients right after the listing date. One of the services that underwriters provide in connection with an IPO is price support, intended to reduce price drops in the after-market for a few days or weeks (Eckbo, B.E., 2007; Aggarwal, 2000; Boehmer and Fische, 2003; Cotter et al., 2004; and Lewellen, 2006). If DSP recipients sell the allocated reserved shares in the after-market (the flipping behaviors in IPO), they would be higher price pressure on the secondary market and thus the lead underwriters would need more costly price support by buying more shares back. Lockup provision thus could act as a price support mechanism, which constraint the selling pressure after the firm gets listed. They are some empirical implications of the price support hypothesis on the DSP lockup. First, when the size of DSP is larger, the selling pressure from the flipping would be larger and thus underwriters are more likely to lockup the reserved shares or impose longer lockup days. Second, when the general market condition is not good, the probability and the cost associated with price support would be higher and thus the underwriters are more likely to lockup the reserved shares or impose longer lockup days. Third, Lewellen (2006) more reputable underwriters are subjective to more reputation lost from overpricing and thus are more likely to engage in price support. We thus predict underwriters with higher reputation are more likely to impose lockup restriction on reserved shares to decrease the cost of price support.

To examine the role of DSP lockup and to test the commitment and price support hypotheses, we estimate the following regression equation:

Lockup On DSP

$$\begin{aligned}
&= \alpha + \beta_1 * \%Reserved\ Shares + \beta_2 * VC-backed\ Dummy + \beta_3 \\
&* \text{Log} (Market\ Capitalization) + \beta_4 * Book-to-Market + \beta_5 \\
&* Cash\ Margin + \beta_6 * Underwriter\ Rank + \beta_7 * Primary\ Shares + \beta_8 \\
&* Total\ Shares\ Offered + \beta_9 * Market\ Return \\
&+ Year\ Dummies\ and\ Industry\ Dummies + \varepsilon \quad (5)
\end{aligned}$$

Under *Lockup On DSP*, we consider two variables that measure the lockup provision. The first one is the *Log (DSP Lockup Days)*, which is the log of 1 plus the number of lockup days on reserved shares. The second dependent variable is *DSP Lockup Dummy*, which is equal to 1 if issuers/underwriters impose a lockup on the reserved shares and 0 otherwise. Following Brav and Gompers (2003), we include following control variables: *VC-backed Dummy*, *Log (Market Capitalization)*, *Book-to-Market*, *Cash Margin*, *Underwriter Rank*, *Primary Shares*, *Total Shares Offered*. To investigate the effect of size of DSP and general market condition during the registration period under the price support hypothesis, we also include *%Reserved Shares* and *Market Return* variables. Finally, we include the year dummies and industry dummies to control potential year fixed effect and industry fixed effect. Because only firms with DSP could have lockup provisions, our sample for estimating equation (5) only consists of IPO with DSP.

[Insert Table IX Here]

Table IX reports the regression results on DSP lockup. The dependent variable for model (1) is *Log (DSP Lockup Days)* and the dependent variable for model (2) is *DSP Lockup Dummy*. We find the control variables in model (1) and (2) have quite similar coefficient estimates. The

coefficient estimates for *%Reserved shares* and *Underwriter Rank* is positive and significant, while the coefficient estimates for *Cash Margin* and *Market Return* is negative and significant. Other variables are insignificant: *Log (Market Capitalization)*, *Book-to-Market*, *Total Shares Offered* have positive coefficient estimates; while *VC-backed Dummy*, *Primary Shares* have negative coefficient estimates.

Our findings of lockup on DSP in Table IX are not uniformly consistent with the findings of lockup on pre-IPO shareholders' shares in Brav and Gompers (2003). Specifically, of the control variables, *VC-backed Dummy* and *Cash Margin* have the same direction in Brav and Gompers (2003); while *Log (Market Capitalization)*, *Book-to-Market*, *Underwriter Rank*, *Primary Shares* have the opposite directions. Our evidence here does not support that commitment explanation of lockup on DSP. That is, unlike lockup on pre-IPO shareholders' shares in Brav and Gompers (2003), lockup on reserved shares does not clearly serve as a commitment device to alleviate the moral hazard problem.

Our empirical analyses are more consistent with the price support hypothesis. Model (1) and model (2) in Table IX shows the coefficient estimates on *%Reserved Shares* is positive (0.046, 0.079) and significant (t-statistic 2.12, 2.14). The coefficient estimates on *Underwriter Rank* is also significant positive in model (2). Finally, the coefficient estimates on *Market Return* are significant negative. Those findings suggest that the underwriters are more likely to impose lockup restrictions and lockup length is significantly longer when size of DSP is higher, general market condition is poor and underwriters are more reputable. Our evidence here thus is more supportive of price support explanation of lockup and lockup constraint the selling pressure (because of flipping) right after listing.

5. Conclusion

The directed share program has become a fairly common feature of initial public offerings in recent years. It is an important component of the IPO process and also a valuable tool for the issuers to involve directors, officers, employees, suppliers and other business partners in the public offering process in the hope of giving them a stake in the issuers' future success. The directed share program is largely ignored by prior literature and our paper examines the role of DSP. In particular, we study why issuers adopt DSP.

We find supporting evidence that DSP reserve as a reward mechanism to provide DSP recipients with extra benefits in the IPO process. First, as price revision reflects market demand during the registration period and is a good predictor of underpricing, we use the price revision (market demand) as a proxy for expected underpricing. In support of the reward hypothesis, we find that both the size of DSP and the likelihood of DSP adoption are greater when expected IPO underpricing is high. Second, we find issuers behave opportunistically to maximize the reward to DSP recipients. The evidence is shown in that (1) issuers increasing the allocation of reserved shares to related persons in DSP when market demand and, hence, expected IPO underpricing is high during the registration period; (2) Issuers are also more likely to introduce (withdraw) the DSP when market demand and, hence, expected IPO underpricing is high (low) during the registration period. (3) Issuers with DSP strategically underprice the IPO to maximize the reward to DSP recipients. Conditioned on strong market demand during the registration period, issuers with DSP do not adjust the offer price upwards as much as issuers without DSP. Consistent with

Habib and Ljungqvist (2001) and Loughran and Ritter (2002), we find the incentive for issuers to reward DSP recipients is higher when the total shares offered accounts for a small part of shares outstanding and thus their personal loss from strategic underpricing is lower. We also test some alternative hypotheses to explain the role of DSP: the signaling hypothesis, the commitment hypothesis and the supplement demand hypothesis. We find all of those alternative explanations are not empirically supported.

In this paper, we also examine the relationship between actual IPO underpricing and DSP. The strong positive correlation between DSP and IPO underpricing suggests that the relationship between DSP and IPO underpricing may be endogenous. We estimate simultaneous equations using a set of instrument variables and find the relationship between DSP and underpricing is indeed two ways: bigger DSP lead to higher underpricing and higher underpricing also lead to bigger DSP. Finally, we examine the role of lockup in DSP.

Compared with lockup provision on pre-IPO shareholders' shares, we find less reserved shares are subject to lockup provision and the lockup length is relatively shorter. Consistent with the price support explanation of lockup, we find that the reserved shares in DSP are more likely to be locked up and the lockup length is significantly longer when the size of DSP is larger; when the general stock market condition is poor; and when the underwriters are more reputable. Our evidence on lockup in DSP does not support the commitment hypothesis in Brav and Gompers (2003).

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Figure I. DSP Time Trend

Figure I shows the time trend of DSP across our sample period from January 1, 1997 to December 31, 2010. The black bar (left Y-axis) shows the percentage of IPO with DSP across years and the dashed line (right Y-axis) shows the percentage of reserved shares for IPO with DSP across years.

Figure II. Illustration of Strategic Underpricing

Figure II illustrates the strategic underpricing in the case that market demand is higher than expected. In light of the partial adjustment phenomenon in initial public offerings, when revealed market demand is higher than expected, the offer price would only be partially adjusted upward and thus more money is left on the table (as shown in dotted lines). Because of the incentives to reward DSP recipients, issuers with DSP do not adjust the offer price upwards as much as issuers without DSP (as shown in dashed lines).

Figure III. DSP and IPO Underpricing

Figure III shows the time trend of DSP and underpricing across our sample period from January 1, 1997 to December 31, 2010. The black area (upper area) shows the percentage of IPO with DSP across years and the white area (lower area) shows the percentage of underpricing across years.

Table I. Sample Distribution by Year

Table I lists the sample distribution by year. The sample period is from January 1, 1997 to December 31, 2010. Only common stock offerings are included in our sample. We exclude American Depository Receipts, private placements, rights offerings, unit offerings, closed-end funds, Real Estate Investment Trusts (REITs), and penny stocks with offer price below five dollars from our sample. Firms that are not covered by the SEC Edgar database are also excluded. We further exclude firms with missing SDC new issues data. Our final sample consists of 1,843 initial public offerings (IPOs), of which 740 IPOs do not have DSP and 1,103 IPOs have DSP.

Issue Year	IPO Without DSP	IPO With DSP	Total Observations	Percent
1997	202	102	304	16.49
1998	78	52	130	7.05
1999	66	221	287	15.57
2000	14	163	177	9.60
2001	14	33	47	2.55
2002	21	49	70	3.80
2003	26	39	65	3.53
2004	70	125	195	10.58
2005	65	99	164	8.90
2006	54	104	158	8.57
2007	79	78	157	8.52
2008	11	10	21	1.14
2009	19	15	34	1.84
2010	21	13	34	1.84
Total	740	1,103	1,843	100.00

Table II. Summary Statistics

Table II provides the summary descriptive statistics for our IPO without DSP and IPO with DSP sub-samples, respectively. *%Reserved Shares* is the percentage of reserved shares under DSP. *DSP Lockup Dummy* is dummy variable for lockup provision on reserved shares. *DSP Lockup Days* is the number of lockup days on reserved shares. *Price Revision* is equal to (final offer price - initial mid-file price)/ initial mid-file price. *Offer Size* is equal to the total proceeds raised in the offering; while *Total Asset* (Compustat item *at*) is a measure of firm size. *Total Shares Offered* is equal to the total shares offered as a percentage of shares outstanding after the offering. *Primary Shares* is equal to the percent of offering that is newly issued shares. *Underwriter Rank* is equivalent on the Carter-Manaster ranking of underwriter's reputation. *NASDAQ Dummy*, and *VC-backed* are dummy variables for NASDAQ-listed firms, and VC-backed IPOs, respectively. *Market Return* is equivalent to the cumulative value-weighted market returns over the period from initial filing date to final issue date. To mitigate the influence of outliers, all the variables are winsorized at the 1st and 99th percentiles. Last two columns show the difference of mean and median between the IPO without DSP and IPO with DSP sub-samples.

Variables	IPO Without DSP				IPO With DSP				Difference Between	
	N	Mean	Median	Std Dev	N	Mean	Median	Std Dev	Mean	Median
<i>% Reserved Shares</i>	740	0.000	0.000	0.000	1,103	5.894	5.000	2.850	***	***
<i>DSP Lockup Dummy</i>	740	0.000	0.000	0.000	1,103	0.190	0.000	0.393	***	***
<i>DSP Lockup Days</i>	740	0.000	0.000	0.000	1,103	26.872	0.000	61.353	***	***
<i>Price Revision</i>	686	-0.050	-0.024	0.196	1,036	0.033	0.000	0.239	***	***
<i>Offer Size</i> (\$ billion)	740	0.120	0.053	0.213	1,103	0.150	0.081	0.209	***	***
<i>Total Asset</i> (\$ billion)	740	0.562	0.116	1.541	1,103	0.692	0.174	1.650	*	***
<i>Total Shares Offered</i>	740	0.349	0.285	0.224	1,103	0.320	0.260	0.209	***	***
<i>Primary Shares</i>	740	0.890	1.000	0.212	1,103	0.892	1.000	0.222		
<i>Underwriter Rank</i>	740	7.391	8.001	1.895	1,103	8.076	8.401	1.187	***	***
<i>VC-backed Dummy</i>	740	0.376	0.000	0.485	1,103	0.446	0.000	0.497	***	***
<i>NASDAQ Dummy</i>	740	0.723	1.000	0.448	1,103	0.696	1.000	0.460		
<i>Market Return</i>	740	0.052	0.054	0.078	1,103	0.035	0.035	0.077	***	***

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table III. Effects of Expected Underpricing on DSP

Table III reports the regression results on the effects of expected underpricing on percentage of reserved shares under DSP and the probability of DSP adoption. The dependent variable for models (1) is *%Reserved Shares*, which is the percentage of reserved shares under DSP. The dependent variable for models (2) is *DSP Dummy*, which is equal to 1 if issuers adopt a DSP as indicated in final prospectuses and 0 otherwise. Models (1) is estimated based on OLS regression, while models (2) is estimated based on logit regression. The independent variables are as defined in Table II. The t-statistics and z-statistics (in parentheses) for the OLS regressions and logit regressions, respectively, are calculated based on heteroskedasticity-consistent standard errors.

VARIABLES	(1) %Reserved Shares	(2) DSP Dummy
<i>Price Revision</i>	2.356*** (5.60)	1.244*** (3.90)
<i>Log (Offer Size)</i>	-0.202 (-1.01)	0.273** (2.05)
<i>Log (Total Asset)</i>	0.140 (1.08)	-0.021 (-0.24)
<i>Total Shares Offered</i>	-0.369 (-0.82)	0.304 (0.93)
<i>Primary Shares</i>	0.584 (1.50)	0.088 (0.29)
<i>Underwriter Rank</i>	0.404*** (6.39)	0.206*** (4.36)
<i>VC-backed Dummy</i>	0.006 (0.03)	0.067 (0.47)
<i>NASDAQ Dummy</i>	0.022 (0.10)	0.018 (0.11)
<i>Market Return</i>	-3.552*** (-2.82)	-2.189** (-2.31)
Constant	2.000 (1.25)	-3.711** (-1.98)
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
Observations	1,716	1,703
Adjusted/Pseudo R ²	0.211	0.175

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table IV. Effects of Expected Underpricing on DSP Terms Revision

Table IV reports the results on the effects of expected underpricing on DSP terms revision. Panel A shows the summary descriptive statistics for the DSP terms revision. $\Delta Reserved\ Shares$ is equal to $\%reserved\ shares$ in final prospectus - $\%reserved\ shares$ in initial filings. $\Delta DSP\ Dummy$ ($DSP\ Dummy$ in final prospectus - $\Delta DSP\ Dummy$ in initial filings) is equal to 1 if issuers introduce the DSP in amendments, -1 if issuers withdraw the DSP in amendments and 0 otherwise. Panel B reports the regression results on the effects of expected underpricing on DSP terms revision. The dependent variable for models (1) is $\Delta Reserved\ Shares$ and the dependent variable for models (2) is $\Delta DSP\ Dummy$. Models (1) is estimated based on OLS regression, while models (2) is estimated based on multinomial logit regression. The independent variables are as defined in Table II. The t-statistics and z-statistics (in parentheses) for the OLS regressions and multinomial logit regressions, respectively, are calculated based on heteroskedasticity-consistent standard errors.

Panel A. Summary descriptive statistics for DSP terms revision

Variable	N	Mean	Median	Std Dev
$\Delta Reserved\ Shares$	1,160	1.17	0.00	2.77

$\Delta DSP\ Dummy$	Observation	Percent
1: Introduction of DSP	92	4.99
0: No Change	1,527	82.85
-1: Withdrawn of DSP	224	12.15
Total	1,843	100.00

Panel B. Regression results on the effects of **Expected Underpricing** on DP terms revision

VARIABLES	(1)	(2)		
	Δ Reserved Shares	Introduction & Withdrawn of DSP		
		-1	0	1
<i>Price Revision</i>	0.984** (2.06)	-1.758*** (-3.07)		0.673** (2.07)
<i>Log (Offer Size)</i>	-0.046 (-0.20)	0.220 (0.94)		0.238 (1.62)
<i>Log (Total Asset)</i>	0.163 (1.08)	0.085 (0.56)		-0.014 (-0.14)
<i>Total Shares Offered</i>	-0.553 (-1.42)	-0.871* (-1.71)		-0.961** (-2.34)
<i>Primary Shares</i>	0.188 (0.46)	0.350 (0.60)		-0.125 (-0.35)
<i>Underwriter Rank</i>	0.087 (1.33)	-0.022 (-0.23)		-0.052 (-0.88)
<i>VC-backed Dummy</i>	0.269 (1.27)	0.050 (0.19)		-0.040 (-0.22)
<i>NASDAQ Dummy</i>	-0.341 (-1.56)	0.042 (0.13)		-0.401** (-2.09)
<i>Market Return</i>	0.277 (0.22)	2.124 (1.40)		1.318 (1.30)
Constant	3.414*** (3.72)	-4.308*** (-4.06)		-1.853*** (-2.91)
Year Fixed Effect	Yes	No	No	No
Industry Fixed Effect	Yes	No	No	No
Observations	1,080	1,722	1,722	1,722
Adjusted/Pseudo R ²	0.116	0.0227	0.0227	0.0227

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table V. Strategic Underpricing

Table V reports the results on the effects of DSP on partial adjustment. Panel A shows the univariate comparison of *%Partial Adjustment* for sub-sample of IPO without DSP and sub-sample of IPO with DSP. *%Partial Adjustment* is equal to (final offer price – initial mid-file price)/ (first-day closing price – initial mid-file price). Panel B reports the regression results on the effects of DSP on partial adjustment. The dependent variable for models (1) through (6) is *%Partial Adjustment*. Model (1) and (4) reports regression results for full sample, while model (2) and (5) reports regression results for sub-sample of IPO with low market demand (*Price Revision* ≤ 0); model (3) and (6) reports regression results for sub-sample of IPO with high market demand (*Price Revision* > 0). The independent variables are as defined in Table II. The t-statistics (in parentheses) are calculated based on heteroskedasticity-consistent standard errors.

Panel A. Univariate Comparison

	<i>%Partial Adjustment</i>		
	N	Mean	Median
IPO without DSP	660	0.56	0.5
IPO with DSP	998	0.46	0.31
Significant Different?		***	***

Panel B. Regression results on the effects of **Expected Underpricing** on partial adjustment

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All Sample	Low Demand	High Demand	All Sample	Low Demand	High Demand
	%Partial Adjustment			%Partial Adjustment		
<i>DSP Dummy</i>	-0.091*** (-2.72)	-0.051 (-0.95)	-0.082*** (-3.21)			
<i>% Revered Shares</i>				-0.015*** (-3.60)	-0.011 (-1.49)	-0.008*** (-2.65)
<i>Log (Offer Size)</i>	-0.146*** (-4.83)	-0.185*** (-3.59)	0.018 (0.72)	-0.151*** (-5.01)	-0.189*** (-3.68)	0.014 (0.56)
<i>Log (Total Asset)</i>	0.059*** (3.17)	0.096*** (3.15)	-0.007 (-0.47)	0.061*** (3.22)	0.096*** (3.14)	-0.005 (-0.33)
<i>Total Shares Offered</i>	0.261*** (3.33)	0.225* (1.70)	0.132** (2.32)	0.244*** (3.12)	0.214 (1.62)	0.121** (2.14)
<i>Primary Shares</i>	-0.068 (-0.95)	-0.069 (-0.58)	-0.057 (-1.02)	-0.054 (-0.75)	-0.065 (-0.54)	-0.052 (-0.92)
<i>Underwriter Rank</i>	0.009 (0.66)	0.036** (2.01)	-0.040** (-2.58)	0.011 (0.86)	0.038** (2.13)	-0.039** (-2.49)
<i>VC-backed Dummy</i>	-0.020 (-0.59)	0.007 (0.11)	-0.009 (-0.33)	-0.022 (-0.63)	0.004 (0.07)	-0.010 (-0.35)
<i>NASDAQ Dummy</i>	-0.094** (-2.26)	-0.068 (-1.08)	-0.051 (-1.25)	-0.092** (-2.21)	-0.067 (-1.06)	-0.049 (-1.19)
<i>Market Return</i>	-0.732*** (-3.20)	-0.458 (-1.38)	-0.324* (-1.84)	-0.732*** (-3.21)	-0.470 (-1.42)	-0.342* (-1.93)
Constant	0.910*** (6.40)	0.712*** (3.42)	0.753*** (4.12)	0.898*** (6.30)	0.719*** (3.45)	0.730*** (3.99)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,653	928	725	1,653	928	725
Adjusted R-squared	0.028	0.009	0.050	0.030	0.010	0.046

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table VI. The Incentive for Issuers with DSP to Reward the DSP Recipients

Table VI shows that the incentive for issuers with DSP to strategic underprice to reward the DSP recipients is higher when the cost is lower. *Total Shares Offered* is equal to the total shares offered as a percentage of shares outstanding after the offering. The dependent variable is *%Partial Adjustment*, which is equal to (final offer price – initial mid-file price)/ (first-day closing price – initial mid-file price). The independent variables are as defined in Table II. The t-statistics (in parentheses) are calculated based on heteroskedasticity-consistent standard errors.

VARIABLES	<i>Total Shares Offered</i>							
	>0.7	>0.6	>0.5	>0.4	>0.3	>0.2	>0.1	All
	<i>%Partial Adjustment</i>							
<i>DSP Dummy</i>	-0.116 (-1.41)	-0.130 (-1.31)	-0.114 (-1.25)	-0.094 (-1.24)	-0.084 (-1.55)	-0.098** (-2.49)	-0.095*** (-2.77)	-0.093*** (-2.77)
<i>Log (Offer Size)</i>	-0.006 (-0.06)	-0.064 (-0.66)	-0.107 (-1.24)	-0.116* (-1.73)	-0.137*** (-2.79)	-0.142*** (-3.95)	-0.136*** (-4.57)	-0.119*** (-4.10)
<i>Log (Total Asset)</i>	0.016 (0.24)	0.044 (0.71)	0.040 (0.68)	0.077* (1.73)	0.089*** (2.82)	0.067*** (2.84)	0.059*** (2.98)	0.051*** (2.71)
<i>Primary Shares</i>	-0.030 (-0.20)	-0.047 (-0.35)	-0.101 (-0.77)	-0.240* (-1.81)	-0.151 (-1.51)	-0.040 (-0.48)	-0.061 (-0.83)	-0.058 (-0.80)
<i>Underwriter Rank</i>	-0.041 (-1.07)	-0.049 (-1.42)	-0.041 (-1.31)	-0.024 (-0.94)	-0.012 (-0.62)	0.001 (0.06)	0.003 (0.23)	0.001 (0.07)
<i>VC-backed Dummy</i>	0.036 (0.22)	-0.030 (-0.22)	-0.121 (-1.10)	-0.011 (-0.13)	-0.058 (-0.99)	-0.013 (-0.32)	-0.041 (-1.16)	-0.041 (-1.19)
<i>NASDAQ Dummy</i>	0.071 (0.61)	0.024 (0.21)	-0.043 (-0.43)	-0.040 (-0.49)	-0.059 (-0.93)	-0.104** (-2.14)	-0.107** (-2.51)	-0.104** (-2.49)
<i>Market Return</i>	-1.331* (-1.89)	-1.430** (-2.23)	-0.505 (-0.90)	-0.363 (-0.74)	-0.872** (-2.33)	-0.770*** (-2.79)	-0.841*** (-3.64)	-0.727*** (-3.16)
Constant	0.997** (2.05)	1.212** (2.49)	1.457*** (4.10)	1.178*** (3.96)	1.056*** (4.78)	0.997*** (6.02)	1.019*** (7.09)	0.983*** (6.97)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	142	172	225	363	667	1,219	1,587	1,653
Adjusted R-squared	-0.013	-0.008	-0.016	-0.009	0.015	0.019	0.027	0.022

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Table VII. DSP and Actual IPO Underpricing

Panel A of Table VII the univariate comparison of actual IPO *Underpricing* for sub-sample of IPO without DSP and sub-sample of IPO with DSP. Panel B of table VII shows the correlation table of *Underpricing*, *DSP Dummy* and *%Reserved Shares*. *Underpricing* is equal to the first-day return (calculated from offer price to first-day closing market price).

Panel A. Univariate Comparison of actual IPO *Underpricing*

	Without DSP			With DSP			Is Mean Different?	Is Median Different?
	N	Mean	Median	N	Mean	Median		
<i>Underpricing</i>	740	0.13	0.05	1,103	0.30	0.12	***	***

Panel B. Correlation table of actual IPO underpricing and DSP

	<i>Underpricing</i>	<i>%Reserved Shares</i>	<i>DSP Dummy</i>
<i>Underpricing</i>	1.000		
<i>%Reserved Shares</i>	0.263	1.000	
(P-value)	0.000		
<i>DSP Dummy</i>	0.189	0.795	1.000
(P-value)	0.000	0.000	

Table VIII. DSP and Actual IPO Underpricing

Table VIII reports the simultaneous equation regression results for underpricing and DSP. The equation systems are as follows:

$$\text{Underpricing} = \%Reserved\ Shares + \text{Log}(\text{No of Underwriting Managers}) + \text{Contorls} + \epsilon \quad \dots (1)$$

$$\%Reserved\ Shares = \text{Underpricing} + \text{Customer Dummy} + \text{Supplier Dummy} + \text{Contorls} + \epsilon \quad \dots (2)$$

The dependent variable is *Underpricing* and *%Reserved Shares* in model (1) and (2), respectively. *Underpricing* is equal to the first-day return (calculated from offer price to first-day closing market price). *%Reserved Shares* is the percentage of reserved shares under DSP. We use *Log (No of Underwriting Managers)* to identify equation (2) of DSP and we use *Customer Dummy* and *Supplier Dummy* to identify equation (1) of Underpricing. The other independent variables are as defined in Table II.

VARIABLES	(1)	(2)	(3)	(4)
	<i>Underpricing</i>		<i>% Reserved shares</i>	
	First-state (dep.= % Reserved shares)	Second-stage (dep.=Underpricing)	First-stage (dep.=Underpricing)	Second-state (dep.= % Reserved shares)
<i>% Reserved Shares</i>		0.049* (1.82)		
<i>Underpricing</i>				5.969*** (2.83)
<i>Log (No of Managers)</i>	0.034 (0.23)	-0.066*** (-3.56)	-0.065*** (-3.49)	
<i>Customer Dummy</i>	1.503*** (3.17)		0.117 (1.03)	1.197** (2.45)
<i>Supplier Dummy</i>	0.713** (2.32)		-0.031 (-0.47)	0.997** (2.13)
<i>Log (Offer Size)</i>	-0.019 (-0.10)	0.065*** (2.88)	0.120*** (5.23)	-0.214 (-0.84)
<i>Log (Total Asset)</i>	0.067 (0.58)	-0.047*** (-3.25)	-0.042*** (-3.00)	0.280* (1.68)
<i>Total Shares Offered</i>	-0.512 (-0.92)	-0.372*** (-4.63)	-0.297*** (-4.39)	0.782 (0.70)
<i>Primary Shares</i>	0.238 (0.56)	0.070 (1.19)	0.052 (1.00)	0.401 (0.72)
<i>Underwriter Rank</i>	0.411*** (5.65)	0.007 (0.53)	0.023*** (2.63)	0.245** (2.47)
<i>VC-backed Dummy</i>	-0.098 (-0.47)	0.073*** (2.79)	0.068*** (2.65)	-0.344 (-1.25)
<i>NASDAQ Dummy</i>	-0.100 (-0.41)	0.088*** (2.80)	0.078*** (2.61)	-0.303 (-0.87)
<i>Market Return</i>	-1.718 (-1.31)	0.475*** (3.01)	0.203 (1.27)	-4.302*** (-2.73)
Constant	-1.955 (-1.60)	-0.155 (-1.36)	-0.278* (-1.87)	-0.552 (-0.56)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Observations	1,348	1,348	1,348	1,348
Adjusted R-squared	0.186	0.204	0.216	0.182

Table IX. The Determinants of Lockup on Reserved Shares

Table IX reports the regression results of lockup on reserved shares. The dependent variable for models (1) is *Log (DSP Lockup Days)*, which is the log of 1 plus the number of lockup days on reserved shares. The dependent variable for models (2) is *DSP Lockup Dummy*, which is equal to 1 if issuers/underwriters impose a lockup on the reserved shares and 0 otherwise. Models (1) is estimated based on OLS regression, while models (2) is estimated based on logit regression. The independent variables are as defined in Table II. The t-statistics and z-statistics (in parentheses) for the OLS regressions and logit regressions, respectively, are calculated based on heteroskedasticity-consistent standard errors.

VARIABLES	(1) Log (<i>DSP Lockup Days</i>)	(2) <i>DSP Lockup Dummy</i>
<i>% Reserved Shares</i>	0.046** (2.12)	0.079** (2.14)
<i>VC-backed Dummy</i>	-0.151 (-1.20)	-0.271 (-1.05)
<i>Log (Market Capitalization)</i>	0.044 (0.67)	0.120 (0.97)
<i>Book-to-Market</i>	0.099 (0.57)	0.276 (0.86)
<i>Cash Margin</i>	-0.029** (-2.00)	-0.047** (-2.57)
<i>Underwriter Rank</i>	0.083 (1.57)	0.182* (1.92)
<i>Primary Shares</i>	-0.113 (-0.35)	-0.162 (-0.41)
<i>Total Shares Offered</i>	0.277 (0.71)	0.300 (0.55)
<i>Market Return</i>	-1.476** (-2.07)	-3.031* (-1.93)
Constant	-0.423 (-0.28)	-3.070 (-1.09)
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
Observations	1,025	1,004
Adjusted/Pseudo R ²	0.178	0.247

*, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

Appendix. Example of DSP revisions in Initial Public Offering

The company is the QUINTUS CORP (CIK code 0001024678), which filed an initial prospectus on 10 Sep, 1999 and finally got listed on 16 Nov, 1999 at NASDAQ.

10-Sep-1999 S-1 (Initial prospectus)

No DSP found.

23-Sep-1999 S-1/A (AMENDMENT #1 TO FORM S-1)

No DSP found.

22-Oct-1999 S-1/A (AMENDMENT #2 TO FORM S-1)

No DSP found.

4-Nov-1999 S-1/A (AMENDMENT #3 TO FORM S-1)

No DSP found.

8-Nov-1999 S-1/A (AMENDMENT #4 TO FORM S-1)

The underwriters have reserved up to 200,000 shares of the common stock to be sold in this offering for sale to some of our employees and associates of our employees and directors, and to other individuals or companies who have commercial arrangements or personal relationships with us. Through this directed share program, **we intend to ensure that those individuals and companies that have supported us, or who are in a position to support us in the future, have the opportunity to purchase our common stock at the same price that we are offering our shares to the general public.** Prospective participants will not receive any investment materials other than a copy of this prospectus, and will be permitted to participate in this offering at the initial public offering price presented on the cover page of this prospectus. No commitment to purchase shares by any participant in the directed share program will be accepted until after the registration statement of which this prospectus is a part is effective and an initial public offering price has been established. The number of shares available for sale to the general public will be reduced by the number of shares sold through the directed share program. Any shares reserved for the directed share program which are not so purchased will be offered by the underwriters to the general public on the same basis as the other shares offered hereby.

12-Nov-1999 S-1/A (AMENDMENT #5 TO FORM S-1)

The underwriters have reserved up to 200,000 shares of the common stock to be sold in this offering for sale to some of our employees and associates of our employees and directors, and to other individuals or companies who have commercial arrangements or personal relationships with us...

15-Nov-1999 S-1/A (AMENDMENT #6 TO FORM S-1)

The underwriters have reserved up to 200,000 shares of the common stock to be sold in this offering for sale to some of our employees and associates of our employees and directors, and to other individuals or companies who have commercial arrangements or personal relationships with us...

15-Nov-1999 S-1/A (AMENDMENT #7 TO FORM S-1)

The underwriters have reserved up to 200,000 shares of the common stock to be sold in this offering for sale to some of our employees and associates of our employees and directors, and to other individuals or companies who have commercial arrangements or personal relationships with us...

16-Nov-1999 424B4 (Final Prospectus)

The underwriters have reserved up to 250,000 shares of the common stock to be sold in this offering for sale to some of our employees and associates of our employees and directors, and to other individuals or companies who have commercial arrangements or personal relationships with us...

Essay Three: CAR Associated With SEO Share Lockups: Real or Illusionary?

Abstract

In this paper, we examine the cumulative abnormal return (CAR) associated with SEO share lockups. An advantage over previous IPO share lockup studies is that we can examine the CAR at both the expiration as well as at the initiation of SEO share lockups. Similar to previous findings on the expiration of IPO share lockups, we find that the average CAR around the expiration of SEO share lockups is significantly negative. However, this result is mainly attributed to inappropriate benchmarking of the CAR. When appropriately benchmarked against a control group of SEO firms that do not have any share lockup expiration over the same event period, we find that the negative CAR associated with the expiration of SEO share lockups is not significantly different from that of the control group. At the initiation of SEO share lockups, we find that there is also, on average, a significant negative CAR at the event date, but the negative abnormal return is a temporary phenomenon that reverses itself within a short period of time. Our findings in this study do not support the *downward sloping demand curve* explanation of the lockup expiration effect.

JEL Classification: G00; G14; G24; G3

Keywords: SEO, Lockup Expiration, Cumulative Abnormal Return, Efficient Market, Downward Sloping Demand Curve, Temporary Price Pressure.

1. Introduction

In this paper, we examine the cumulative abnormal return (CAR) associated with SEO share lockups. Unlike previous studies that focus on IPO share lockup, an advantage from studying SEO share lockups is that, we can examine the CAR around the expiration as well as the initiation of SEO share lockups. Lockup agreements in both SEOs and IPOs are voluntary agreements between the issuers and the underwriters that prohibit the pre-SEO and pre-IPO shareholders, respectively, from selling their shares for a pre-specified period of time. The typical lockup period is about 90 days for SEOs and 180 days for IPOs. Upon the expiration of the lockup agreement, a large amount of shares that are previously prohibited from entering the market would become freely tradable. Under the efficient market hypothesis, there should not be any abnormal market reactions around the expiration of the share lockups as the lockup expiration dates and the shares subjected to lockup are all publicly available information that are clearly specified in the prospectuses.

However, contrary to the efficient market hypothesis, previous IPO studies (Field and Hanka, 2001; Brav and Gompers, 2003; Bradley, Jordan, Roten and Yi, 2001; Keasler, 2001; Ofek and Richardson, 2000) show that the average CAR around the expiration of IPO share lockups is significantly negative. Field and Hanka (2001), for example, find a significant three day abnormal return of about -1.5% around the expiration of IPO share lockups. The effect also appears to be permanent as the average CAR remains significant at -2.7% over a longer event window of [-5, +50]. In previous studies, the negative abnormal return around the expiration of share lockups is generally attributed to a *downward sloping demand curve* explanation (Field and Hanka, 2001; Ofek and Richardson, 2000). Under the *downward sloping demand curve*

hypothesis, the release of the lockup shares shifts the supply curve positively and if the demand curve is downward sloping then we should expect a permanent drop in the share price.

In this paper, we provide two additional tests on the *downward sloping demand curve* explanation of the lockup expiration effect. First, we examine whether the positive shift in the supply curve at the expiration of SEO share lockups is *really* associated with a negative CAR or just an illusion due to wrong benchmarking of the CAR. At first glance, we find that the average CAR around the expiration of SEO share lockups is significantly negative. Similar to previous findings on the expiration of IPO share lockups, we find that the mean (median) CAR around the expiration of SEO share lockups is significantly negative at -0.1% (-0.3%) over a [-1, +1] event window and at -0.9% (-1.4%) over a longer [-20, +20] event window. However, this result may be attributed to inappropriate benchmarking of the CAR.

Previous studies have shown that the long-run market-adjusted returns for SEOs are significantly negative and tend to exhibit a downward drift over a five-year post-issue period. The observed negative CAR around the expiration of SEO share lockups may thus be associated with the SEO's long-run return underperformance, rather than the expiration of share lockups. To provide an appropriate benchmark for the CAR around the expiration of SEO share lockups, we constructed two groups of SEOs. The lockup expiration group consists of SEO issues with the most common lockup period of 90, 120, or 180 days. In comparison, the matched control group consists of SEOs that do not have any lockup expiration over the [-20, +20] event window around the lockup expiration group's share unlock event date. By design, the control group's CARs would not be affected by any lockup expiration effects, but would capture the effect of any SEO long-run return underperformance. When appropriately benchmarked against the control group, we find that the negative CAR associated with the expiration of SEO share

lockups is not significantly different from that of the control group. The above results suggest that the negative CAR around the expiration of SEO share lockup is an illusion and is mostly attributed to the SEO's long-run return underperformance⁴⁵.

Second, we examine the CAR around the initiation of SEO share lockups, which coincides with the SEO issue date. On average, there is a net reduction of about 8% in the overall supply of tradable shares at the initiation of SEO share lockups.⁴⁶ Thus, under the *downward sloping demand curve* hypothesis, we should expect the CAR around the initiation of SEO share lockups to be significantly positive. However, contrary to the *downward sloping demand curve* hypothesis, we find that there is, on average, a significant negative CAR around the event date. Furthermore, the negative abnormal return around the event date is a temporary phenomenon, which reverses itself within a short period of time. As a further test of the *downward sloping demand curve* hypothesis, we applied multivariate analysis to examine whether the CAR around the initiation of SEO share lockups is related to the change in the supply of tradable shares. Our regression results do not support the predictions of the *downward sloping demand curve* hypothesis.

The rest of the paper is organized as follows. Section II provides a brief review of the lockup agreement, CAR around the expiration of share lockups, and various hypotheses on the lockup expiration effect. Sample description is given in section III. Section IV provides a detail

⁴⁵ For IPO setting, calendar-time portfolio regression approach analyses results show the α coefficient estimates for the long *Lockup Group* and short *Control Group* hedge portfolio over the $[-1, 1]$ date window are significantly negative, while the α coefficient estimates for the long *Lockup Group* and short *Control Group* hedge portfolio over the $[-20, 20]$ date window are close to zero and not significant. The results indicate that in IPO, the lockup expiration effect may be temporary.

⁴⁶ Supply increases by about 20% due to the commencement in the trading of newly issued shares at the SEO issue date, but supply also decrease by about 28% at the same time due to the initiation of SEO share lockups.

analysis of the CAR around the expiration of lockup agreements. We then examine the CAR around the initiation of SEO share lockups in section V. Finally, section VI concludes the paper.

2. Literature review

While a lockup agreement is not required by the SEC or any other states law, almost all new issuance of equities have lockup agreements, especially in more recent time period. Lockup agreements are hereby voluntary agreements between the issuers and their underwriters that prohibit officers, directors, and significant shareholders from selling their shareholdings for a specified period.⁴⁷ The lockup period, which is the time period from the issuance of the new equity to the lockup expiration day, has increasingly become standardized at 180 days for IPOs and 90 days for SEOs. The number of shares subjected to lockup agreements accounts for about two-third and one-third, respectively, of the outstanding shares in IPOs and SEOs. Upon the expiration of lockup agreements, the lockup shares are released and can be freely traded, i.e., up to the volume limits defined by Rule 144.⁴⁸ The release of the lockup shares could potentially result in a sharp increase in the supply of tradable shares.

An important feature of the lockup agreements is that the information on both the lockup period and the number of shares subject to lockup is publicly available and clearly specified in the IPO and SEO prospectuses. The expiration of the lockup agreement is also largely an anticipated event as many websites and financial intermediaries do warn investors about the

⁴⁷ In certain circumstance, the underwriter can release a small part of shares prior to the expiration of the lockup period in early releases or in follow-on offerings. Field and Hanka (2001) find that insiders report substantial early sales of locked-up shares in only about 6% of IPOs, i.e., due to early releases of the lockup or follow-on offerings.

⁴⁸ Rule 144 applies to the re-sale of shares that are issued outside a registered offering. Under Rule 144, the restricted shares can only be sold to the public after a minimum holding period of at least one year. Thereafter, the restricted shares can only be sold in small increments and are subject to volume restrictions.

upcoming share lockup expirations.⁴⁹ In an efficient market, the expiration of the lockup agreement should be a non-event because the lockup expirations are fully anticipated by investors and any impact from the release of the lockup shares should have already been factored into the share prices prior to the lockup expiration dates.

But, contrary to the efficient market hypothesis, previous studies show that there is a “return anomaly” associated with the widely anticipated expiration of lockup agreements. In a study of 1,948 IPO lockup expirations over a 10-year period from 1988 to 1997, Field and Hanka (2001) find a significant CAR of -1.5% over a three-day [-1, +1] event window. Furthermore, the losses are three times larger in VC-backed IPOs than non-VC-backed IPOs (-2.3% versus -0.8%). The average CAR also remains significant at -2.7% over a longer event window of [-5, +50], which suggests that the “return anomaly” is not a temporary phenomenon. Similarly, Bradley et al. (2001) find that IPO lockup expirations are, on average, associated with a significant three-day CAR of -1.4% and the losses are concentrated in VC-backed firms. Keasler (2001) finds that the negative abnormal returns around lockup expirations are greater for firms not influenced by SEC Rule 144 than for firms that are influenced by SEC Rule 144. Ofek and Richardson (2000) find a permanent 1% - 3% drop in share price around IPO lock-up expirations, but argue that the “return anomaly” associated with lock-up expiration is not arbitrageable.

Several hypotheses on explaining the above lockup expiration effect have been proposed and tested in previous studies. First, the *price pressure* hypothesis posits that a large inflow of sell orders around lockup expiration may temporarily depress share prices, i.e., the temporary decline in prices is required in equilibrium to attract liquidity providers. Contrary to the

⁴⁹ Santarus Incorporated, which was listed on Nasdaq in 2004, also warned investors in its prospectuses that “[upon the expiration of lockup agreement], sales by our current stockholders of a substantial number of shares, or the expectation that such sales may occur, could significantly reduce the market price of our common stock.”

hypothesis, both Ofek and Richardson (2000) and Field and Hanka (2001) find that the price decline is permanent and does not rebound in subsequent weeks. Second, the *short-selling constraint* hypothesis argues that the negative abnormal return is due to difficulties in short-selling newly-public stocks (Ofek and Richardson, 2000). However, contrary to the *short-selling constraint* hypothesis, Geczy, Musto and Reed (2002) find that IPOs that are very easy to short-sell also experience significant price drop around lockup expirations.

Third, the *trading cost* hypothesis argues that the price drop around lockup expiration is due to an increase in trading costs. The *trading cost* hypothesis is also not supported empirically. For example, Field and Hanka (2001) find little evidence of a meaningful increase in bid-ask spread after lockup expiration. Cao, Field and Hanka (2004), on the contrary, show that both quote depth and trading activity improve substantially after lockup expiration. Krishnamurti and Thong (2008) furthermore find that both insiders selling and unwinding by venture capitalists after lockup expiration are associated with a decline in the quoted and effective spreads.

Fourth, the *bid-ask bounce* hypothesis (Ofek and Richardson, 2000) argues that a trade at the end of the lockup period is more likely to be seller- rather buyer-initiated because of the incentive for existing shareholders to sell their shares for diversification reasons. The “return anomaly” is thus a spurious effect caused by an increase in the proportion of trades executed at the bid price. Empirical evidence also does not support the *bid-ask bounce* hypothesis. For example, Field and Hanka (2001) find that the abnormal return is driven by a permanent and parallel decline in both the bid price and ask price, rather than a change in the proportion of trades at the bid price. Also, contrary to the hypothesis, Gao (2005) finds that active buy-initiated trades increase significantly before lockup expiration. Ofek and Richardson (2000) furthermore

argue the bid-ask spread required in theory to induce the observed price decline associated with *bid-ask bounce* effect is unreasonably high.

Fifth, the *worse-than-expected insider sales* hypothesis posits that insider sales convey bad news and, hence, the abnormal return around lockup expirations is caused by insider sales that exceed investors' expectations. In partial support of this hypothesis, Field and Hanka (2001) find that the CAR is significantly more negative when there are reported insiders sales near the unlock day. However, firms that reported insider sales around lockup expiration account for only 17% of their sample.⁵⁰ For the remaining 83% of firms that do not have reported insider sales, their abnormal returns remain significantly negative. We can, therefore, conclude that the negative abnormal return is not driven by worse-than-expected insider sales.

Finally, the *downward sloping demand curve* hypothesis is based on the assumption that the demand curve for stocks is downward sloping. The hypothesis posits that upon lockup expiration, a large amount of shares that are previously prohibited from entering the market will be freely tradable. The release of the lockup shares shifts the supply curve positively and if the demand curve is downward sloping then we should expect a drop in the share price. The *downward sloping demand curve* hypothesis is different from the *price pressure* hypothesis in that the former predicts a permanent drop in share prices around lockup expiration, while the latter posits a temporary effect. The *downward sloping demand curve* hypothesis also predicts that the magnitude of the negative abnormal return is positively correlated with the magnitude of increase in the supply of shares.

⁵⁰ In Field and Hanka (2001), the period for reported insider sale is within an event window of ± 2 weeks. Over a longer event window of ± 2 months, Aggarwal, Krigman, and Womack (2002) find that about 60% of the IPOs do not have insider selling around lockup expiration.

Both Ofek and Richardson (2000) and Field and Hanka (2001) find that the price decline around lockup expiration is somewhat consistent with the *downward sloping demand curve* hypothesis. For example, both find that the price decline around lockup expiration is permanent and does not rebound in subsequent weeks. Furthermore, Field and Hanka (2001) find that the abnormal return around lockup expiration is significantly more negative when a larger proportion of the outstanding shares are locked up and also when trading volume is abnormally high. On the other hand, they also find that the CAR is significantly negative in cases where the trading volume around lockup expiration is less than one percent of the public float. Field and Hanka (2001) thus caution that “the abnormal return cannot be entirely explained by the increase in the supply of shares, though it could be caused by a change in the market's expectations about the future supply of shares.”⁵¹

3. Sample Description

We first identify the SEO issues from the Securities Data Corporation (SDC) New Issues database. Our sample period is from the beginning of 1988 to the end of 2008. This is because the information on lockup agreement is only available in SDC from 1988 onwards. We then exclude issues without any lockup provisions as well as issues that have missing lockup expiration date. Only common stock offerings are included in our sample. We further exclude penny stocks with offer price below five dollars, carve-outs, and rights issues. We also exclude

⁵¹ The downward sloping demand curve for stocks is a controversial issue in previous literature. Harris and Gurel (1986) and Shleifer (1986) argue that the positive abnormal return associated with stocks' inclusion into the S&P 500 index implies a downward sloping demand curve for stocks. Gao and Ritter (2010) explicitly assume a downward sloping demand curve in their study on the marketing of SEO. Ofek and Richardson (2003) also assume that market demand is downward sloping in their study on the relation between internet stock collapse and the unprecedented level of the lockup expirations and insider sales. However, Schultz (2008) finding on the internet stock collapse casts doubts on the downward sloping demand curve. In a study on aggregate demand curve, Cha and Lee (2001) claim that their findings are consistent with a horizontal market demand curve for equities.

issues that are contaminated by earnings announcement within three days of the lockup expiration date. Stock returns are obtained from the CRSP database, while accounting information is extracted from the COMPUSTAT database. To be included in our sample, the issues must have sufficient stock returns data over a [-20, +20] event days window and non-missing accounting information. Our final sample consists of 4,467 SEOs.⁵²

[Insert Table I here]

Table I reports the summary descriptive statistics for our SEO sample. The mean (median) total proceeds raised in SEO are \$121 million (\$60 million). The shares offered for sale in SEO are from newly issued shares (primary shares) and/or shares owned by existing shareholders (secondary shares). On average, about 72% percent of the shares offered for sale in a SEO are primary shares. Comparable to prior literature, we find that the mean (median) first-day return for SEO is 2.9% (1.5%).

SDC reports both the percentage and the number of shares subject to lockup, but Field and Hanka (2001) indicate that this SDC data item is “wrong or missing in 45 percent of cases.” Alternatively, Field and Hanka (2001) suggest using the fraction of shares not sold in the IPO as a proxy for the percentage of shares locked up. They find that, on average, 95 percent of the shares retained by pre-IPO shareholders cannot be sold before the unlock date. Similar to Field and Hanka (2001), we also examine use the fraction of shares not sold as a proxy for the percentage of shares locked up for our SEO sample. Table I reports both the direct and indirect measures of the percentage of shares locked up. In our SEO sample, we find the actual percentage of shares locked up differs substantially from the fraction of unsold shares. This is

⁵² We find that the SDC database wrongly classifies 78 IPO issues as SEO issues. We have accordingly excluded these 78 issues from our SEO sample.

because a large portion of the unsold shares in an SEO are held by the public and these shares are not subjected to lockup. Thus, the fraction of unsold shares is not a good proxy for the percentage of shares locked up in a SEO. Accordingly, in our analysis, we use the direct measure of the percentage of shares locked up. Overall, we find that roughly about one-third of the outstanding shares in a SEO are locked up.

There is a wide dispersion of the lockup period for our sample. The lockup period ranges from less than 30 days to more than 730 days for SEO. However, most lockup periods are concentrated at 90, 120, and 180 days. The mean (median) lockup period is 108 days (90 days). Also, there is a clear trend that the SEO's lockup period is increasingly standardized at 90 days. Table I shows that 60 percent of the SEOs have the standardized lockup period.

4. Analysis of CAR around Lockup Expiration

4.1 Negative CAR Around Lockup Expirations

Following Field and Hanka (2001), the Cumulative Abnormal Return (CAR) for firm i around the lockup expiration date (event day = 0) is calculated as follows:

$$CAR_i = \left[\prod_{t=-n}^{+n} \left(\frac{1 + R_{i,t}}{1 + R_{m,t}} \right) - 1 \right] \quad (1)$$

where $R_{i,t}$ is the CRSP daily return for firm i on day t relative to unlock day (event day 0) and $R_{m,t}$ is the CRSP value-weighted market return on day t . Our findings remain qualitatively the same when CAR is measured based on raw returns, market model, and equal-weighted market return.

[Insert Figure I here]

Figure I plots the average CAR around SEO lockup expiration. In contradiction to the efficient market hypothesis, we find a permanent decline in the share prices around the SEO lockup expiration. The share prices, which start to decline mostly from event day -10 onwards, drop significantly on event day 0 and continue to decline further post-lockup expiration.

[Insert Table II here]

In Table II, we tabulate the CARs of SEO lockup expirations over several event window periods. Overall, we find the CARs for SEO lockup expiration are significantly negative over both a three-day [-1, +1] window period and a longer [-20, +20] window period. The mean (median) three-day [-1, +1] CAR for SEO lockup expiration is significant at -0.1% (-0.2%), while the mean and median CAR over the [-20, +20] window period are significant at -0.9% and -1.3%.

4.2 Benchmarking the CAR Around SEO Lockup Expiration

In the previous section, we find that, contrary to the market efficiency hypothesis, the average CAR around the expiration of SEO share lockups is significantly negative. In this section, we examine whether the negative CAR around the expiration of SEO share lockups is *real* or just an *illusion* due to wrong benchmarking of the CAR. Previous studies have shown that the market-adjusted long-run returns for SEOs are significantly negative and tend to exhibit a downward drift. For example, Loughran and Ritter (1995) study shows that, on average, the

returns of issuing firms in SEOs underperform comparable non-issuing firms by 7% per annum over a five-year period after the offering date.

[Insert Figure II here]

In Figure II, we plot the average long-run market-adjusted return performance for our SEO sample. The market-adjusted return is calculated based on the CAR formula given in Equation (1). Consistent with previous findings, Figure II shows that the SEOs in our sample exhibit similar long-run stock return underperformance over a five-year period. There are several hypotheses associated with the long-run underperformance of SEOs. Under the market timing hypothesis, the underperformance is a result of informed insiders taking advantage of windows of opportunity by issuing overvalued shares when the market condition or timing is favorable (Loughran and Ritter, 1995; Baker and Wurgler, 2000). The earnings management hypothesis (Teoh, Welch, and Wong, 1998) posits that the firm's long-run underperformance is associated with unusually aggressive pre-issue management of earnings. Others, however, have challenged the validity of the long-run underperformance finding (Eckbo, Masulis, and Norli, 2000; Gompers and Lerner, 2003; Schultz, 2003).

Our objective in this paper is not to resolve the long-run underperformance debate, but to highlight that the negative CAR around SEO lockup expiration may actually be associated with the SEO's long-run downward trend in market-adjusted return post-issue date, rather than the expiration of lockup agreements. As such, the negative CAR around SEO lockup expiration may just be an illusion, which can be attributed to inappropriate benchmarking of the CAR.

[Insert Figure III here]

To provide an appropriate benchmark for the CAR around SEO share lockup expiration, we first align all the SEO issues according to post-issue date. As illustrated in Figure III, we then construct two groups of SEOs for each of the three most common lockup expiration events, namely 90, 120, and 180 days.⁵³ First, consider the 90-day lockup expiration event. The lockup expiration group consists of all SEO issues with lockup period of 90 days. The lockup expiration group is then matched against a control group that consists of SEOs that do not have any share lockup expiration over the $[-20, +20]$ window around the 90-day lockup expiration event. Second, the lockup expiration and control groups for each of the other (120-day and 180-day) lockup expiration events are also similarly constructed. Third, the lockup expiration and control groups for the 90-day lockup expiration event are then pooled together with those for the 120-day lockup expiration and 180-day lockup expiration events.⁵⁴ Finally, we compute the CAR for both the lockup expiration group and the control group. By design, the control group's CARs are not affected by lockup expirations, but would incorporate the effects of any SEO long-run return underperformance. Hence, by comparing the CAR of lockup expiration group with that of the control group, we can determine whether the negative CAR around SEO lockup expiration is actually due to the expiration of lockup agreement or an illusion due to the SEO long-run return underperformance.

[Insert Table III here]

In Table III, we provide a simple univariate analysis of the CARs for both the lockup expiration group and the control group. The p-values for the t-test and the non-parametric

⁵³ Overall, 79% of the SEO issues in our sample have lockup expiration event dates of 90, 120, or 180 days.

⁵⁴ Our results are qualitative the same when the lockup expiration group and control group analysis is done separately for each of the lockup expiration events, i.e., when the data are not pooled together.

Wilcoxon rank-sum test for the mean and median difference in CARs for the two groups, respectively, are shown in the last two columns of Table III. Overall, we find that for SEO issues, the mean and median CARs for the lockup expiration group are not statistically different from those for the control group.⁵⁵ This finding applies for CARs over both a three-day [-1, +1] window and a longer [-20, +20] window. Although not shown, we also obtain similar results for other event windows, such as [-3, +3], [-5, +5], and [-10, +10]. The above finding thus suggests that the negative CAR around the expiration of SEO share lockups is just an illusion that is mostly attributable to the SEO long-run return underperformance.

4.3 Multivariate Regression Analysis

In the earlier univariate analysis, we did not control for potential differences in firm and issue characteristics. To do so, we perform the following multivariate regression analysis:

$$CAR [-n, +n] = \alpha + \beta_1 * Lockup\ Dummy + \beta_2 * Control\ Variables + \varepsilon \quad (2)$$

where $CAR [-n, +n]$ is the cumulative abnormal return over a $[-n, +n]$ event window. The *Lockup Dummy*, which is a variable that takes on the value of 1 for observations pertaining to the lockup expiration group and 0 otherwise, is included to test for differences, if any, in the CARs for the lockup expiration group and the control group. Following previous studies (Field and Hanka, 2001; Brav and Gompers, 2003; Bradley et al., 2001; Ofek and Richardson, 2000), we include the following control variables in our multivariate regression analysis: *Lockup Period* (length of lockup period in days), *Lockup Shares* (fraction of post-issue shares locked up), *Size* (market

⁵⁵ Although not reported, we find that the SEO lockup expiration group, which accounts for 79% of the overall SEO sample, is representative of the SEO sample. Statistically, the mean and median CARs for the SEO lockup expiration group are not significantly different from that of the overall SEO sample.

capitalization of firm), *Market-to-Book* (market value-to-book value ratio), *Leverage* (total debt-to-total assets ratio), *Underwriter Rank* (Carter-Manaster ranking of underwriter's reputation), *NYSE Dummy* (dummy variable for NYSE listing), *High Tech Dummy* (dummy variable for high technology firms), *Primary Shares Offered* (percent of offering that is primary shares), *Underpricing* (first-day return as measured by the percent change in first-day closing price relative to offer price), *Price Run-up* (cumulative return from issue date to 21 days prior to the lockup expiration event), and *Abnormal Volume* (abnormal trading volume over the lockup expiration event window).⁵⁶ We also include calendar year dummies to control for possible year effects.

[Insert Table IV here]

The CAR regression results for SEO issues are tabulated in Table IV. Consistent with the previous univariate results, we find that there is no significant difference in the CARs for the lockup expiration group and the control group. For example, the *Lockup Dummy* variable is insignificant in all the regression models and across both [-1, +1] and [-20, +20] event windows. This finding supports the argument that the lockup expiration effect is merely an illusion that is mostly attributable to the SEO long-run return underperformance. Another noteworthy finding is that *Lockup Shares* is not significant in all the regression models. This finding casts further doubts on the validity of the *downward sloping demand curve* explanation of the lockup expiration effect, which predicts a negative relation between CAR and *Lockup Shares*.

⁵⁶ Following Ofek and Richardson (2000), the abnormal trading volume is measured by dividing the average daily volume over the lockup expiration event window by the average daily trading volume from day -50 to day -21 (relative to the lockup expiration event date).

Among the other control variables, both *Size* and *Underwriter Rank* are consistently significant across all the CAR regressions. We find that the CARs are significantly higher for larger firms, but lower for SEOs with more reputable underwriters. Longer *Lockup Period* is also generally associated with higher CAR. The *Market-to-Book*, *Leverage*, *NYSE Dummy*, and *Primary Shares Offered* variables are only significant in the CAR [-20, +20] regressions. The *Price Run-up* and *Abnormal Volume* variables' relations with CAR are not consistent across the [-1, +1] and [-20, +20] event windows. *Price Run-up* is significant and negatively related to CAR [-1, +1], but positively related to CAR [-20, +20]; while *Abnormal Volume* is positively related to CAR [-1, +1], but negatively related to CAR [-20, +20].

4.4 Robustness Checks

First, we examine the robustness of our results by controlling for the slope of the demand curve. Following Baker, Coval, and Stein (2007), Moeller, Schlingemann, and Stulz (2004), and Haggard and Pereira (2005), we include two additional control variables that proxy for the slope of the demand curve, namely: *Analyst Dispersion* and *Idiosyncratic Risk*⁵⁷. The *Analyst Dispersion* variable is measured by the dispersion in analyst long-term earnings growth forecast; while *Idiosyncratic Risk* is measured by the standard deviation of the residuals of the regression of daily excess return on the Fama-French three factors (R_M , SMB, HML) and Fama-French 48-

⁵⁷ In the presence of heterogeneous investor opinion and short sale constraints, the demand elasticity would be less than perfect and thus lead to a downward-sloping demand curve. In the model of Miller (1977), pessimistic investors must be induced to purchase shares through discounting, leading to a downward-sloping demand for shares. Chen, Hong, and Stein (2002) shows that diversity of opinion about a firm's growth prospects leads to a downward demand curve for its stock. Wurgler and Zhuravskaya (2002) show that downward-sloping demand can also arise when idiosyncratic risk creates a lack of perfect substitutes for stocks, making arbitrage risky. Following Baker, Coval, and Stein (2007), Moeller, Schlingemann, and Stulz (2004), and Haggard and Pereira (2005), we include the *Analyst Dispersion* and *Idiosyncratic Risk* variables as proxies for the slope of the demand curve. *Analyst Dispersion* is a measure of the heterogeneity of investor beliefs. *Idiosyncratic Risk* prevents riskless arbitrage through elimination of perfect substitutes for stocks, also theorized to result in downward-sloping demand.

industry portfolio return. Table V tabulates the results associated with the above robustness check. The regression results, however, must be taken with a slight caution because the number of observations drops significantly after including the above two additional control variables. Due to data limitation, we find that the number of observations actually drops by about 60% for our SEO regressions.

[Insert Table V here]

Our previous key findings are nevertheless robust with respect to the inclusion of both the *Analyst Dispersion* and *Idiosyncratic Risk* variables. For the SEO regressions, we find that the *Lockup Dummy* variable is mostly insignificant. One exception is Model 2 of the CAR [-20, 20] regression, where the CAR for the lockup expiration group is (on the contrary) significantly less negative than the CAR for the control group. Overall, the inclusion of the two additional variables that control for the slope of the demand curve actually reinforces our key findings. The two variables that proxy for the slope of the demand curve are also insignificant in most of the CAR regressions.

Second, another robustness check that we performed is to conduct the (univariate and multivariate regression) analyses for each of the (90, 120, or 180 days) lockup expiration events separately, instead of pooling all the data together. Although not reported, we find that our key findings are generally the same when the analyses are performed separately for each of the lockup expiration event dates. Finally, we also find that our key results are qualitatively the same when CAR is measured based on raw returns, market model, and equal-weighted market return.

Third, we also examine the robustness of our results using the calendar-time portfolio regression approach. The calendar-time portfolio regression approach adopted in this paper is similar to that of Loughran and Ritter (1995), Ikenberry et al. (2000), and Mitchell and Stafford (2000). In each calendar date, first we identify our overall sample portfolio, which consists of all the firms that have just completed SEO within 420 days⁵⁸ prior to the calendar date. The portfolio is re-balanced on a daily basis at each calendar date to drop all firms that have reached the end of the 420 days holding period and to add all firms that have just completed a SEO. For each calendar date, the overall sample portfolio is then divided into two groups: *Lockup Group* and *Control Group*. The *Lockup Group* consists of firms that have lockup expiration dates within the $[-20, 20]$ date window centered at the calendar date; while the *Control Group* consists of firms that do not have lockup expiration dates within the $[-20, 20]$ date window centered at the calendar date. Under this portfolio re-balancing strategy, the number of stocks in the portfolio can vary over time due to the entry of new firms and exit of old firms. In some dates, the number of stocks in the portfolio can be quite small. Following Ikenberry et al. (2000), we drop those dates where the portfolio has less than six stocks to minimize the effect of idiosyncratic noise. The above *Lockup Group* is constructed using a $[-20, 20]$ date window centered at the calendar date. Alternatively, we also construct both the *Lockup Group* and the *Control Group* using the $[-1, 1]$ date window. The daily portfolios returns for the *Lockup Group* and the *Control Group*, as well as a hedge portfolio (long *Lockup Group* and short *Control Group*), are estimated using both equal weighted method and value weighted method (the weights are based on both the offer size and total asset).

⁵⁸ We choose 420 days holding period because the lockup days are rarely longer than 420 days. Our results are robust when we choose 1 year (365 days) holding period, as well as 2 year, 3 year, 4 year and 5 year holding periods.

Next, we estimate the abnormal portfolio return by regressing the portfolio's excess returns against the Fama and French's (1993) three factors and Carhart's (1997) momentum factor, as in Equation (3) below:

$$R_{pt} - R_{ft} = \alpha + \beta_{mkt}(R_{mt} - R_{ft}) + \beta_{smb}SMB_t + \beta_{hml}HML_t + \beta_{umd}UMD_t + \epsilon_t \quad (3)$$

where the dependent variable is the daily excess returns on the portfolio; $R_{mt} - R_{ft}$, SMB_t , and HML_t are the Fama and French's (1993) three factors; UMD_t is the Carhart's (1997) momentum factor; and α is a measure of the average daily abnormal return on the portfolio. The daily time series data for all four factors are downloaded from Professor Kenneth R. French's website.

[Insert Table VI here]

Table VI reports the four-factor calendar-time portfolio regression results. For each subsample, we report the estimated α for portfolio constructed under the $[-1, 1]$ date window as well as the $[-20, 20]$ date window. The number of observations differs across the $[-1, 1]$ date window and the $[-20, 20]$ date window because of the earlier requirement that each daily portfolio must have a minimum of six stocks.

For the portfolio constructed under the $[-1, 1]$ date window, we find the α coefficient estimates for the long *Lockup Group* and short *Control Group* hedge portfolio are close to zero and not significant. The results are similar across equal weighted hedge portfolios, as well as valued weighted hedge portfolios based on offer size and total asset. We also find for portfolio constructed under the $[-20, 20]$ date window, the results are qualitatively the same. In sum, using

the four-factor calendar-time portfolio regression approach, we find the *Lockup Group* does not underperform the *Control Group* around the lockup expiration date under both the $[-1, 1]$ date window and $[-20, 20]$ date window.

5. Analysis of CAR around the Initiation of SEO Share Lockups

An advantage in studying SEO share lockups, instead of IPO share lockups, is that we can examine the CAR around the expiration as well as the initiation of SEO share lockups. The *downward sloping demand curve* hypothesis posits a negative relation between CAR and the increase in the supply of tradable shares upon the release of the lockup shares at the unlock date. Conversely, under the *downward sloping demand curve* hypothesis, we should expect a positive relation between the CAR and locked-up shares at the initiation of SEO lockup agreement.

In this section, we first establish the CAR around the initiation of SEO share lockups, which coincides with the issue date. We then examine the relation between the CAR and the change in the supply of tradable shares around the initiation of SEO share lockups. On the issue date, the overall supply of tradable shares is affected by two competing forces. On one hand, there is a reduction in the supply of tradable shares due to the initiation of SEO share lockups. On the other hand, the supply of tradable shares increases with the commencement in the trading of newly issued (primary) shares. The net effect is that there could be either an increase or decrease in the overall supply of tradable shares.

For the SEO sample, we find that there is, on average, a net reduction of about 8% in the overall supply of tradable shares at the initiation of SEO share lockups. On average, supply increases by about 20% due to the commencement in the trading of newly issued shares at the

SEO issue date, but supply also decrease by about 28% at the same time due to the initiation of SEO share lockups. Thus, under the *downward sloping demand curve* hypothesis, we should expect the CAR around the initiation of SEO share lockups to be significantly positive, on average, as a result of the net reduction in the overall supply of tradable shares.

[Insert Figure IV here]

Figure IV provides a time-series plot of the average CAR around the initiation of SEO share lockups. Contrary to the *downward sloping demand curve* hypothesis (on lockup initiation), we find that stock prices decline sharply starting from about day -5 until the event day 0 itself. Thereafter, stock prices gradually recover. The negative CAR around the event date is thus a temporary phenomenon, which reverses itself within a short period of time.

[Insert Table VII here]

The CARs across different event windows are tabulated in Table VII. The mean (median) CAR over the [-5, 0] window is statistically significant at -1.9% (-1.9%); while the mean (median) CAR over the [+1, +20] window is significantly positive at 2.2% (1.0%). Thus, both the mean and median CARs typically decline over a [-5, 0] event period, but the mean and median CARs fully recover subsequently over a [+1, +10] period and a [+1, +20] period, respectively.

Having established the CAR around the initiation of SEO share lockups, we now examine its relation with the change in the supply of tradable shares. In our multivariate analysis, we estimate two regression models. In Model 1, we regress the CAR against $\Delta \text{Tradable Shares}$;

while in Model 2, we regress the CAR against *New Shares Issued* and *Lockup Shares*. The *New Shares Issued* variable is defined as the number of new (primary) shares issued divided by total shares outstanding post-issue; while *Lockup Shares* is equal to the fraction of post-issue shares that are locked up. The Δ *Tradable Shares* variable, which is a measure of the net change in the supply of tradable shares, is obtained by subtracting *Lockup Shares* from *New Shares Issued*.

In both Model 1 and Model 2, we include the following control variables: *Lockup Period* (length of lockup period in days), *Size* (market capitalization of firm), *Market-to-Book* (market value-to-book value ratio), *Leverage* (total debt-to-total assets ratio), *Underwriter Rank* (Carter-Manaster ranking of underwriter's reputation), *NYSE Dummy* (dummy variable for NYSE listing), and *High Tech Dummy* (dummy variable for high technology firms). We also include calendar year dummies to control for possible year effects.

[Insert Table VIII here]

The multivariate regression results are tabulated in Table VIII. The overall results do not support the *downward sloping demand curve* hypothesis, which posits a positive relation between CAR and locked-up shares at the initiation of SEO lockup agreement. Contrary to the *downward sloping demand curve* hypothesis, we find that the *Lockup Shares* variable is not statistically significant in all the CAR regressions. Both the *New Shares Issued* and Δ *Tradable Shares* variables are similarly not statistically significant in all the CAR regressions. Among the control variables, *Size* is consistently significant and positively related to the CAR around the initiation of SEO share lockups. The *Underwriter Rank* and *High Tech Dummy* variables are both significant and negatively related to CAR around the initiation of SEO share lockups.

6. Conclusion

In this paper, we examine the CAR associated SEO share lockups. Again, an advantage associated with studying SEO share lockups is that we can examine the CAR at both the expiration as well as at the initiation of share lockups. Using this setting, we provide two additional tests on the *downward sloping demand curve* hypothesis, which posits a permanent drop (increase) in share prices around the expiration (initiation) of shares lockup. The *downward sloping demand curve* hypothesis also posits a negative (positive) relation between the CAR and locked-up shares around the expiration (initiation) of share lockups.

Our study yields two key findings that are contrary to the *downward sloping demand curve* hypothesis. First, we find that the negative CAR associated with the expiration of SEO share lockups is not significantly different from the CAR of a control group of SEO firms that do not have any share lockup expiration over the same event period. This finding suggests that the negative CAR around the expiration of SEO share lockups is merely an illusion that is mostly attributable to the SEO long-run return underperformance. Also, contrary the *downward sloping demand curve* hypothesis, we did not find any significant relation between the locked-up shares and CAR around the expiration of SEO share lockups.

Second, contrary to the *downward sloping demand curve* hypothesis, we find that there is, on average, a negative share price reaction around the initiation of SEO share lockups. The negative CAR around the initiation of SEO share lockups is furthermore a temporary phenomenon that reverses itself within a short period of time. Also, contrary the *downward sloping demand curve* hypothesis, the CAR around the initiation of SEO share lockups is not

significantly related to either the locked-up shares, new (primary) shares issued or net change in the supply of tradable shares.

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Figure I. Cumulative Abnormal Return around the Expiration of SEO Share Lockups

Figure I plots the average cumulative abnormal return (CAR) over a [-20, +20] event window around the expiration of SEO share lockup. The CAR is calculated based on the market-adjusted model used in Field and Hanka (2001). The sample consists of 4,467 SEO issues from 1988 to 2008.

Figure II. Long-run Return Underperformance of SEO Issues

Figure II plots the average cumulative abnormal return (CAR) performance of SEOs over a 5-year post-issue date period. The CAR is calculated based on the market-adjusted model used in Field and Hanka (2001). The sample consists of 3,592 SEO issues from 1988 to 2004.

Figure III. The Design of Lockup Expiration Group and Control Group

Figure III illustrates the construction of the lockup expiration group as well as the control group for each of the three most common lockup expiration events, namely 90, 120, and 180 days. First, consider the 90-day lockup expiration event. All the SEO issues are initially aligned according to post-issue date. We then construct the two groups of SEOs. The lockup expiration group consists of all SEO issues with lockup period of 90 days; while the matching control group consists of SEOs that do not have any share lockup expiration over the $[-20, +20]$ window around the 90-day lockup expiration event. Second, the lockup expiration and control groups for each of the other (120-day and 180-day) lockup expiration events are then similarly constructed. Third, the lockup expiration and control groups for all the lockup expiration events are then pooled together.

Figure IV. Cumulative Abnormal Return around the Initiation of SEO Share Lockups

Figure IV plots the average cumulative abnormal return around the initiation of SEO share lockups. The CAR is calculated based on the market-adjusted model used in Field and Hanka (2001). The sample consists of 4,467 SEO issues from 1988 to 2008.

Table I. Summary Statistics

Table I provides the summary descriptive statistics for our SEO sample. The sample period is from 1988 to 2008. Offer size is based on the total proceeds raised by the issue. Underpricing refers to the first-day return, which is measured from the offer price to first-day closing market price. Percent of primary shares offered is equal to the fraction of total offering that is new share. Percent of shares locked up is equal to the number of shares that are subjected to lockup restrictions divided by total shares outstanding after the offering. Fraction of unsold shares is equal to the fraction of post-issue shares that are retained by pre-issue shareholders. Lockup period is measured based on to the number of lockup days. Fraction of firms backed by venture capital is equal to the percentage of issues that are venture capital backed.

Period: 1988 - 2008	<i>Obs</i>	<i>Mean</i>	<i>Median</i>
<i>Offer Size</i> (total proceeds in \$ million)	4467	121	60
<i>Underpricing</i> (first-day return)	4417	2.9%	1.5%
<i>Percent of Primary Shares Offered</i>	4466	72%	95%
<i>Percent of Shares Locked up</i>	1145	28%	25%
<i>Fraction of Unsold Shares</i>	4092	84%	86%
<i>Lockup Period</i> (days)	4467	108	90
<i>Fraction of Firms with Lockup Period < Median</i>	4467	10%	
<i>Fraction of Firms with Lockup Period = Median</i>	4467	60%	
<i>Fraction of Firms with Lockup Period > Median</i>	4467	30%	
<i>Fraction of Firms backed by Venture Capital</i>	4467	0%	

Table II. Cumulative Abnormal Return around Lockup Expirations

Table II reports the cumulative abnormal return (CAR) around lockup expirations for SEO issues. The CAR is calculated based on the market-adjusted model used in Field and Hanka (2001). The sample period is from 1988 to 2008. The CARs are winsorized at the 1st and 99th percentiles. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% level, respectively.

<i>Cumulative Abnormal Return (CAR)</i>				
<i>Event Period</i>	<i>Mean</i>		<i>Median</i>	
Day -20 to -6	-0.3%	*	-0.3%	**
Day -20 to -11	0.0%		-0.1%	
Day -10 to -6	-0.3%	***	-0.3%	***
Day -5	0.0%		-0.1%	
Day -4	0.0%		-0.1%	**
Day -3	0.1%		-0.1%	
Day -2	0.1%		0.0%	
Day -1	0.0%		-0.1%	*
Day 0	-0.1%	*	-0.2%	***
Day +1	0.0%		-0.1%	*
Day +2 to +10	-0.4%	***	-0.4%	***
Day +11 to +20	-0.1%		-0.2%	
Day +2 to +20	-0.5%	**	-0.7%	***
Day -1 to +1	-0.1%	*	-0.2%	***
Day -20 to +20	-0.9%	***	-1.3%	***
Observations	4,467			

Table III. Cumulative Abnormal Return for Lockup Expiration Group and Control Group

Table III provides a univariate comparison of the CARs for lockup expiration group and control group for our SEO sample. As illustrated in Figure III, the lockup expiration group consists of issues with the most common lockup period of 90, 120, or 180 days. In comparison, the matched control group consists of issues that do not have any lockup expiration over the [-20, +20] event window around the lockup expiration group's share unlock event date. By design, the control group's CARs are not affected by any lockup expiration effects, but would capture the effect of any SEO long-run return underperformance. The sample period is from 1988 to 2008. Differences in the mean and median distribution between the lockup expiration group and control group are tested based on t-test and Wilcoxon rank-sum test, respectively. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% level, respectively.

Cumulative Abnormal Return								
Event Window	Lockup Expiration Group			Control Group			T-Test	Wilcoxon rank-sum test
	<i>Obs</i>	<i>Mean</i>	<i>Median</i>	<i>Obs</i>	<i>Mean</i>	<i>Median</i>	<i>p-value</i>	<i>p-value</i>
CAR [-1, +1]	3545	-0.002 *	-0.003 ***	8589	0.000	-0.002 ***	0.224	0.297
CAR [-20, +20]	3545	-0.011 ***	-0.016 ***	8589	-0.008 ***	-0.009 ***	0.439	0.300

Table IV. Cumulative Abnormal Return (CAR) Regression Results for SEO Issues

Table IV reports the regression results for the CAR around SEO lockup expirations. CAR [-1, 1] and CAR [-20, 20] are dependent variables that represent the CAR over the [-1, +1] and [-20,+20] event windows, respectively. *Lockup Dummy* is an independent variable that takes on the value of 1 for observations pertaining to the lockup expiration group and 0 otherwise. The other control variables in the regression analysis are as follows: *Lockup Period* (length of lockup period in days), *Lockup Shares* (fraction of post-issue shares locked up), *Size* (market capitalization of firm), *Market-to-Book* (market value-to-book value ratio), *Leverage* (total debt-to-total assets ratio), *Underwriter Rank* (Carter-Manaster ranking of underwriter's reputation), *NYSE Dummy* (dummy variable for NYSE listing), *High Tech Dummy* (dummy variable for high technology firms), *Primary Shares Offered* (percent of offering that is primary shares), *Underpricing* (first-day return as measured by the percent change in first-day closing price relative to offer price), *Price Run-up* (cumulative return from issue date to 21 days prior to the lockup expiration event), and *Abnormal Volume* (abnormal trading volume over the lockup expiration event window). Calendar year dummies are included to control for possible year effects. The sample period is from 1988 to 2008. Coefficients denoted with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively. The t-statistics are reported below in parentheses.

Variables	CAR [-1, 1]				CAR [-20, 20]			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
<i>Lockup Dummy</i>	-0.001 (-0.89)	-0.001 (-0.31)	-0.001 (-0.89)	-0.001 (-0.31)	-0.001 (-0.35)	0.005 (0.59)	-0.002 (-0.44)	0.005 (0.56)
Log (<i>Lockup Period</i>)	0.001 (0.54)	0.007** (2.26)	0.001 (0.68)	0.008** (2.41)	0.010** (2.04)	0.005 (0.48)	0.009* (1.74)	0.004 (0.38)
<i>Lockup Shares</i>		-0.002 (-0.44)		-0.003 (-0.48)		0.008 (0.43)		0.009 (0.46)
Log (<i>Size</i>)	0.002*** (4.57)	0.004*** (3.11)	0.003*** (5.23)	0.005*** (3.73)	0.034*** (18.24)	0.046*** (10.00)	0.030*** (15.81)	0.044*** (9.04)
<i>Market-to-Book</i>	-0.000 (-0.97)	0.000 (0.71)	-0.000 (-0.91)	0.000 (0.85)	0.000 (0.62)	0.002*** (2.77)	0.000 (0.39)	0.002*** (2.69)
<i>Leverage</i>	0.001 (0.49)	0.006 (1.09)	0.001 (0.58)	0.007 (1.23)	-0.016* (-1.90)	0.014 (0.69)	-0.018** (-2.07)	0.011 (0.56)
<i>Underwriter Rank</i>	-0.002*** (-3.98)	-0.002** (-2.23)	-0.002*** (-4.25)	-0.003** (-2.50)	-0.011*** (-7.13)	-0.011*** (-3.19)	-0.010*** (-6.32)	-0.010*** (-3.05)
<i>NYSE Dummy</i>	0.001 (0.84)	0.001 (0.31)	0.001 (0.65)	0.001 (0.23)	-0.017*** (-4.02)	-0.023** (-2.17)	-0.014*** (-3.35)	-0.022** (-2.08)
<i>High Tech Dummy</i>	0.001 (0.85)	-0.002 (-0.79)	0.001 (0.67)	-0.002 (-0.97)	-0.003 (-0.67)	-0.013 (-1.50)	-0.001 (-0.17)	-0.012 (-1.37)
<i>Primary Shares Offered</i>	-0.001 (-0.75)	0.001 (0.16)	-0.001 (-0.76)	0.001 (0.30)	0.014*** (3.36)	0.053*** (4.55)	0.014*** (3.41)	0.052*** (4.42)
<i>Underpricing</i>	0.003 (0.36)	-0.022 (-1.15)	0.004 (0.50)	-0.021 (-1.13)	-0.002 (-0.06)	-0.071 (-1.06)	-0.007 (-0.24)	-0.069 (-1.03)
<i>Price Run-up</i>			-0.005* (-1.91)	-0.008* (-1.93)			0.058*** (6.80)	0.020 (1.29)
<i>Abnormal Volume</i>			0.002*** (2.93)	0.002** (2.21)			-0.014*** (-3.06)	-0.003 (-0.31)
<i>Constant</i>	0.001 (0.10)	-0.053** (-2.48)	-0.003 (-0.36)	-0.063*** (-2.90)	-0.155*** (-5.01)	-0.283*** (-4.15)	-0.123*** (-3.93)	-0.264*** (-3.74)
<i>Calendar Year Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,791	2,991	11,788	2,991	11,791	2,991	11,788	2,991
Adjusted R-square	0.003	0.005	0.006	0.011	0.038	0.055	0.047	0.055

Table V. Cumulative Abnormal Return (CAR) Regression – Robustness Checks

Table V reports the regression results for the CAR around lockup expirations. CAR [-1, 1] and CAR [-20, 20] are dependent variables that represent the CAR over the [-1, +1] and [-20,+20] event windows, respectively. *Lockup Dummy* is an independent variable that takes on the value of 1 for observations pertaining to the lockup expiration group and 0 otherwise. The other control variables in the regression analysis are as follows: *Lockup Period* (length of lockup period in days), *Lockup Shares* (fraction of post-issue shares locked up), *Size* (market capitalization of firm), *Market-to-Book* (market value-to-book value ratio), *Leverage* (total debt-to-total assets ratio), *Underwriter Rank* (Carter-Manaster ranking of underwriter's reputation), *NYSE Dummy* (dummy variable for NYSE listing), *High Tech Dummy* (dummy variable for high technology firms), *Primary Shares Offered* (percent of offering that is primary shares), *Underpricing* (first-day return as measured by the percent change in first-day closing price relative to offer price), *Price Run-up* (cumulative return from issue date to 21 days prior to the lockup expiration event), *Abnormal Volume* (abnormal trading volume over the lockup expiration event window), *Analyst Dispersion* (dispersion in analyst long-term earnings growth forecast), and *Idiosyncratic Risk* (standard deviation of the residuals of the regression of daily excess return on the Fama-French three factors and Fama-French 48-industry portfolio return). Calendar year dummies are included to control for possible year effects. The sample period is from 1988 to 2008. Coefficients denoted with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively. The t-statistics are reported below in parentheses.

Variables	CAR [-1, 1]		CAR [-20, 20]	
	Model 1	Model 2	Model 1	Model 2
<i>Lockup Dummy</i>	-0.001 (-0.67)	-0.001 (-0.19)	0.007 (1.19)	0.026* (1.87)
Log (<i>Lockup Period</i>)	0.001 (0.40)	0.008 (1.58)	0.008 (1.18)	0.020 (1.31)
<i>Lockup Shares</i>		0.001 (0.13)		0.021 (0.68)
Log (<i>Size</i>)	0.003*** (3.48)	0.005** (2.00)	0.025*** (9.30)	0.025*** (2.75)
<i>Market-to-Book</i>	0.000 (0.17)	0.000 (1.32)	0.001*** (2.64)	0.004*** (2.82)
<i>Leverage</i>	0.003 (0.85)	-0.006 (-0.61)	-0.030** (-2.15)	-0.001 (-0.03)
<i>Underwriter Rank</i>	-0.002*** (-2.74)	-0.001 (-0.22)	-0.013*** (-4.02)	-0.017** (-2.11)
<i>NYSE Dummy</i>	0.001 (0.61)	0.000 (0.02)	-0.011* (-1.83)	-0.037** (-2.27)
<i>High Tech Dummy</i>	-0.001 (-0.34)	-0.007 (-1.62)	0.004 (0.61)	0.012 (0.80)
<i>Primary Shares Offered</i>	0.000 (0.24)	0.013** (2.40)	0.008 (1.30)	0.060*** (3.50)
<i>Underpricing</i>	0.005 (0.49)	-0.013 (-0.51)	-0.041 (-1.30)	-0.140 (-1.32)
<i>Price Run-up</i>	-0.005 (-1.44)	-0.010 (-1.36)	0.053*** (4.02)	0.014 (0.53)
<i>Abnormal Volume</i>	0.001 (1.21)	0.001 (0.45)	-0.046*** (-8.04)	-0.027*** (-2.66)
<i>Analyst Dispersion</i>	-0.004 (-1.13)	0.001 (0.12)	0.001 (0.04)	0.010 (0.20)
<i>Idiosyncratic Risk</i>	0.001 (0.61)	-0.003* (-1.66)	-0.005 (-1.16)	-0.016** (-2.00)
<i>Constant</i>	-0.005 (-0.41)	-0.066* (-1.91)	-0.042 (-0.90)	-0.137 (-0.89)
<i>Calendar Year Dummies</i>	Yes	Yes	Yes	Yes
Observations	5,104	1,083	5,104	1,083
Adjusted R-square	0.001	0.007	0.065	0.052

Table VI. Cumulative Abnormal Return (CAR) Calendar-time Portfolio Regression

Table VI reports the four-factor calendar-time portfolio regression results. In each calendar date, first we identify our overall sample portfolio, which consists of all the firms that have just completed SEO within 420 days prior to the calendar date. The portfolio is re-balanced on a daily basis at each calendar date to drop all firms that have reached the end of the 420 days holding period and to add all firms that have just completed a SEO. For each calendar date, the overall sample portfolio is then divided into two groups: *Lockup Group* and *Control Group*. The *Lockup Group* consists of firms that have lockup expiration dates within the $[-20, 20]$ date window centered at the calendar date; while the *Control Group* consists of firms that do not have lockup expiration dates within the $[-20, 20]$ date window centered at the calendar date. We require each portfolio should have at least six stocks to minimize the effect of idiosyncratic noise. The above *Lockup Group* is constructed using a $[-20, 20]$ date window centered at the calendar date. Alternatively, we also construct both the *Lockup Group* and the *Control Group* using the $[-1, 1]$ date window. The portfolios returns for those two groups, as well as a hedge portfolio (long *Lockup Group* and short *Control Group*), are calculated using equal weighted method, as well as value weighted method. The excess returns of the portfolios are then regressed on the Fama and French (1993) three factors and the Carhart (1997) momentum factor using the following models: $R_{pt} - R_{ft} = \alpha + \beta_{mkt}(R_{mt} - R_{ft}) + \beta_{smb}SMB_t + \beta_{hml}HML_t + \beta_{umd}UMD_t + \epsilon_t$. To conserve space, we only report the α coefficient estimate for each regression. The t-statistics are in parentheses.

CAR [-1, 1]									
	Equal Weighted			Value Weighted (Offer Size)			Value Weighted (Total Asset)		
	a	Obs	AdjR2	a	Obs	AdjR2	a	Obs	AdjR2
(1) Lockup Group	-0.001 (-1.57)	1,217	0.393	-0.000 (-0.92)	1,217	0.350	-0.000 (-1.01)	1,217	0.322
(2) Control Group	-0.000 (-1.40)	1,217	0.891	-0.000 (-1.43)	1,217	0.862	-0.000 (-0.71)	1,217	0.735
(3) Lockup - Control Group (1) - (2)	-0.000 (-1.23)	1,217	-0.001	-0.000 (-0.60)	1,217	0.011	-0.000 (-0.71)	1,217	0.008

CAR [-20, 20]									
	Equal Weighted			Value Weighted (Offer Size)			Value Weighted (Total Asset)		
	a	Obs	AdjR2	a	Obs	AdjR2	a	Obs	AdjR2
(1) Lockup Group	-0.000 (-0.00)	5,210	0.718	-0.000 (-0.84)	5,210	0.592	0.000 (0.19)	5,210	0.528
(2) Control Group	-0.000 (-0.37)	5,210	0.879	-0.000 (-1.13)	5,210	0.819	-0.000* (-1.70)	5,210	0.674
(3) Lockup - Control Group (1) - (2)	-0.000 (-0.38)	5,210	0.030	-0.000 (-0.24)	5,210	0.016	0.000 (1.37)	5,210	0.019

Table VII. Cumulative Abnormal Return around the Initiation of SEO Share Lockups

Table VII reports the cumulative abnormal return (CAR) around the initiation of SEO share lockups. The sample consists of 4,467 SEO issues from 1988 to 2008. ***, **, and * denote significantly different from zero at the 1%, 5%, and 10% level, respectively.

<i>Event Period</i>	<i>Observations</i>	Cumulative Abnormal Return	
		<i>Mean</i>	<i>Median</i>
Day -5	4,467	-0.065%	-0.173% ***
Day -4	4,467	0.054%	-0.086% **
Day -3	4,467	-0.205% ***	-0.283% ***
Day -2	4,467	-0.363% ***	-0.354% ***
Day -1	4,467	-0.662% ***	-0.533% ***
Day 0	4,467	-0.695% ***	-0.751% ***
Day +1	4,467	0.211% ***	-0.047%
Day +2	4,467	0.380% ***	0.175% ***
Day +3	4,467	0.152% ***	0.038% **
Day +4	4,467	0.209% ***	0.001% **
Day +5	4,467	0.126% ***	-0.039%
Day +6 to +10	4,467	0.540% ***	0.208% ***
Day +11 to +20	4,467	0.538% ***	0.164% ***
Day -5 to 0	4,467	-1.901% ***	-1.886% ***
Day +1 to +10	4,467	1.629% ***	0.730% ***
Day +1 to +20	4,467	2.197% ***	1.006% ***
Day -1 to +1	4,467	-1.121% ***	-1.368% ***
Day -5 to +5	4,467	-0.855% ***	-1.534% ***
Day -5 to +10	4,467	-0.289%	-1.144% ***
Day -5 to +20	4,467	0.312%	-0.877%

Table VIII. Multivariate Analysis of CAR around the Initiation of SEO Share Lockup

Table VIII reports the regression results for cumulative abnormal return (CAR) around initiation of SEO share lockups. *New Shares Issued* is equal to the number of new (primary) shares issued divided by total shares outstanding post-issue; while *Lockup Shares* is equal to the fraction of post-issue shares that are locked up. The *ΔTradable Shares* variable, which is a measure of the net change in the supply of tradable shares, is obtained by subtracting *Lockup Shares* from *New Shares Issued*. The other control variables are as follows: *Lockup Period* (length of lockup period in days), *Size* (market capitalization of firm), *Market-to-Book* (market value-to-book value ratio), *Leverage* (total debt-to-total assets ratio), *Underwriter Rank* (Carter-Manaster ranking of underwriter's reputation), *NYSE Dummy* (dummy variable for NYSE listing), and *High Tech Dummy* (dummy variable for high technology firms). Calendar year dummies are included to control for possible year effects. The sample period is from 1988 to 2008. Coefficients denoted with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively. The t-statistics are reported below in parentheses.

Variables	CAR [-5, 0]		CAR [+1, +20]		CAR [0]		CAR [-5, +5]		CAR [-5, +10]		CAR [-5, +20]	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
<i>ΔTradable Shares</i>	0.009 (0.85)		0.013 (0.82)		-0.001 (-0.10)		-0.005 (-0.37)		0.000 (0.00)		0.020 (1.12)	
<i>New Shares Issued</i>		-0.001 (-0.06)		0.034 (0.96)		-0.012 (-1.01)		-0.014 (-0.48)		-0.000 (-0.01)		0.035 (0.82)
<i>Lockup Shares</i>		-0.011 (-0.97)		-0.007 (-0.43)		-0.002 (-0.39)		0.002 (0.17)		-0.000 (-0.01)		-0.017 (-0.83)
<i>Log (Lockup Period)</i>	-0.016* (-1.78)	-0.015* (-1.69)	0.006 (0.41)	0.004 (0.31)	-0.006 (-1.35)	-0.005 (-1.18)	-0.016 (-1.48)	-0.016 (-1.41)	-0.016 (-1.23)	-0.016 (-1.21)	-0.012 (-0.72)	-0.013 (-0.77)
<i>Log (Size)</i>	0.021*** (5.86)	0.021*** (5.72)	0.027*** (5.03)	0.028*** (5.07)	0.009*** (5.06)	0.009*** (4.84)	0.031*** (6.87)	0.030*** (6.74)	0.037*** (7.29)	0.037*** (7.20)	0.049*** (7.48)	0.049*** (7.45)
<i>Market-to-Book</i>	-0.000 (-0.98)	-0.001 (-1.00)	0.001 (1.25)	0.001 (1.28)	-0.000 (-1.40)	-0.000 (-1.44)	-0.001 (-1.27)	-0.001 (-1.28)	-0.000 (-0.12)	-0.000 (-0.12)	0.000 (0.52)	0.000 (0.53)
<i>Leverage</i>	-0.044** (-2.54)	-0.043** (-2.46)	0.014 (0.54)	0.012 (0.45)	-0.016* (-1.81)	-0.015* (-1.66)	-0.057*** (-2.65)	-0.056*** (-2.59)	-0.051** (-2.07)	-0.051** (-2.06)	-0.033 (-1.07)	-0.035 (-1.10)
<i>Underwriter Rank</i>	-0.007*** (-2.61)	-0.007*** (-2.64)	-0.006 (-1.47)	-0.006 (-1.40)	-0.003* (-1.90)	-0.003** (-2.00)	-0.010*** (-3.19)	-0.011*** (-3.21)	-0.013*** (-3.32)	-0.013*** (-3.31)	-0.014*** (-2.82)	-0.013*** (-2.77)
<i>NYSE Dummy</i>	-0.005 (-0.51)	-0.006 (-0.54)	-0.040** (-2.45)	-0.039** (-2.40)	-0.005 (-0.85)	-0.005 (-0.93)	-0.017 (-1.30)	-0.018 (-1.33)	-0.027* (-1.78)	-0.027* (-1.78)	-0.045** (-2.31)	-0.044** (-2.28)
<i>High Tech Dummy</i>	-0.019*** (-2.63)	-0.019*** (-2.62)	-0.008 (-0.75)	-0.008 (-0.77)	-0.005 (-1.44)	-0.005 (-1.41)	-0.022** (-2.41)	-0.021** (-2.39)	-0.027*** (-2.62)	-0.027*** (-2.62)	-0.027** (-2.08)	-0.027** (-2.09)
<i>Constant</i>	0.154 (1.35)	0.155 (1.37)	0.217 (1.28)	0.214 (1.26)	0.105* (1.83)	0.106* (1.86)	0.243* (1.75)	0.244* (1.75)	0.172 (1.08)	0.172 (1.08)	0.431** (2.12)	0.429** (2.11)
<i>Calendar Year Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	981	981	981	981	981	981	981	981	981	981	981	981
Adjusted R-square	0.073	0.072	0.024	0.023	0.037	0.038	0.082	0.081	0.070	0.069	0.075	0.074