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Jaemin Kim
San Diego State University

Kuntara Pukthuanthong
San Diego State University

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IPO Firm Executives, Compensation, and Selling

Jaemin Kim^{*}
San Diego State University

and

Kuntara Pukthuanthong^{}**
San Diego State University

Introduction

IPO firm executives are significant net sellers in the year immediately following the IPO year. Two significant variables affecting their sales are the number of stock options exercised during the year and the number of shares held at the end of the preceding year. Contrary to the findings of the previous studies, the number of stock options and the number of restricted stocks turn out to be insignificant. The evidence suggests that IPO executives sell mainly to realize a significant part of their undiversified wealth; however, they do not sell to explicitly hedge against stock option grants or to exploit potential overvaluation.

* Jaemin Kim is an Assistant Professor of Finance at the College of Business Administration, San Diego State University. His research interests are in the areas of corporate payout policy, executive compensation, and international finance. He currently teaches Financing the Emerging Enterprise and Fundamentals of Finance. He holds Ph.D. from the University of Washington.

** Kuntara Pukthuanthong is an Assistant Professor of Finance at the College of Business Administration, San Diego State University. Her research interests include topics in initial public offerings, executive/employee compensation, and entrepreneurship. She currently teaches International Business Finance and Entrepreneurial Finance. She holds a doctorate degree of business administration from the University of California, Irvine.

Compared to large, established corporations, young and small IPO firms have to make a broader set of decisions that will have substantial impacts on future performance. Such important decisions include choices on organizational structure, control mechanisms, board composition, and employee/executive compensation as well as various operational arrangements. Moreover, many such managerial functions take place in a dynamic environment, where new equity is raised and thus ownership structure undergoes major changes.

With respect to the compensation issue, one of the most popular methods for pre-IPO or newly listed firms (hereafter IPO firms) to compensate their executives is equity-based arrangements, i.e. stocks and stock options.¹ Equity based compensation is heavily used by IPO firms, because many firms in the IPO stage experience a relative lack of cash and face potentially large agency costs arising from uncertainty and risk inherent in small and unknown firms. While the executives of IPO firms continue to receive stock options and restricted stocks, they can sell part of their firms' stock at the time of IPO or at the expiration of a typical six month lock-up period after IPO. A rapid decline in ownership can increase agency costs, unwinding the intended incentive effect of stock options and restricted stocks.

In this paper, we focus on the executives of the firms that went public between 1992 and 2002 to examine the determinants of their trading activities. To the best of our knowledge, how IPO firm executives trade, particularly in response to stock options and restricted stock grants, is a question that has received relatively little attention in previous studies. A potential exception to this is Ofek and Yermack (2000) who found that executives with higher ownership hedge stock options by selling unrestricted stocks that they already own, thus effectively undoing the incentive effect. By focusing on IPO firms with heavier use of equity-based compensation, we complement the existing literature by exploring questions that include: 1) are IPO executives net-sellers or net-buyers of their own firms' stocks?; 2) what affects their buy or sell trades?; and 3) do they sell to explicitly hedge against stock option grants or restricted stock grants, thereby neutralizing the incentive effect of stock options?

First of all, we find that IPO firm executives are significant net sellers in the year immediately following the IPO year. On average, these executives sell 21 % of the combined number of (i) the shares held at the end of the IPO year; plus (ii) the shares obtained through option exercise in the year immediately following the IPO year; plus (iii) the restricted shares awarded in the year immediately following the IPO year. The result of the significant net sales by executives is not driven by a small number of extremely large records, or outliers, typically observed in executive compensation data. Such selling intensity appears to taper off after the first two years. Second, the two significant factors affecting selling activities by IPO firm executives are the number of shares held at the beginning of the year and the number of stock options exercised during the year. In particular, we find that about every share acquired through option exercise is sold. This finding is robust to different specifications with respect to outliers, the high-tech bubble period, and inclusion of various control variables. Third, the number of restricted stocks, and particularly the number of stock options, turn out to be

¹ Use of equity based compensation by U.S. corporations increased substantially in the 1990's. Bebchuk and Grinstein (2005) document that for the top five executives of S&P 500 firms, equity based compensation was 37 % of their total compensation in 1993, and this portion increased to 55 % by 2003. Employee stock options, in particular, have been a popular form of compensation. According to Jones and Burchman (2002) and Weisbenner (2000), by the mid-1990s, more than nine out of ten U.S. companies were granting stock options.

insignificant. In other words, the evidence in this study does not support the view that IPO firm executives explicitly hedge stock option grants by selling unrestricted shares they already own, or that these executives sell as many unrestricted stocks as restricted stocks awarded to them. This finding differs from the study by Ofek and Yermack (2000). Fourth, our study shows that IPO underpricing, changes in market-to-book ratio, and changes in stock return volatility do not influence the trading activities of the IPO firm executives. If IPO underpricing, as measured by the first day closing price over the offer price minus one, proxies executive's profit-taking incentives, then this profit motive does not explain executive sales. Similarly, potential overvaluation, as measured by an increase in market-to-book ratio, does not lead to more selling by executives.

The result that IPO executives sell significantly is consistent with the popular view. Our contribution lies in shedding light on the determinants of such selling activity by IPO executives: as IPO firm executives sell significantly, particularly in the first two year period around IPO, the two important factors influencing their selling trades are the number of shares held at the beginning of the year and the number of stock options exercised during the year, but not other variables mentioned above. This taken together with other results of this study suggests that IPO firm executives sell mainly to realize a significant part of their wealth tied up in their firms, and thus reduce risks embedded in their undiversified portfolios. These IPO executives have incentives to unwind their a priori undiversified positions, because a substantial amount of their wealth is in the form of their own firms' stocks or stock options. In addition, the value of their human capital is significantly correlated with their firms' performance. Again, however, we do not find evidence that the executives sell to explicitly hedge against stock option grants or to exploit potential mispricing.

The paper is organized as follows: Section 1 describes the sample, data, and variables used in this study. Section 2 and Section 3 provide univariate analyses and multiple regressions, respectively. We conclude in Section 4. And, in the Appendix, we offer brief institutional details on executive stock options and restricted stocks.

I. Data, sample, and descriptive statistics

A. Data and sample

As we examine the trading activity and equity compensation of the executives of the firms that went public for the period 1992-2002, the primary data sources are the Thomson Financial SDC IPO database and the S&P ExecuComp. We exclude from the IPO dataset close-end funds, REITs, financial institutions, ADRs of companies already listed in their home countries, and limited partnerships, consistent with the criteria used in previous studies (Ritter (1991), and Krigman, Shaw, and Womack (1999)). We supplement the IPO dataset with prospectuses collected from the SEC Electronic Data Gathering, Analysis, and Retrieval (EDGAR) service. ExecuComp provides annual compensation data for proxy named executives, or the five highest paid executives, for the companies listed in S&P 1500 (S&P 500, S&P Mid-cap 400, S&P Small-cap 600). Thus, our sample consists of IPO firm executives whose compensation data exist in S&P ExecuComp. We also use CRSP and Compustat for other variables used in this study. Variables are constructed year by year for each executive, and the final sample consists of 3,999 executive-years for 940 executives from 236 IPO firms between 1992 and 2002.

B. Descriptive statistics and variable definitions

Table I provides an overview of the characteristics of the 236 IPO firms (1992-2002) that have data in the S&P ExecuComp database. Yearly tabulation shows that more than 50 % of the total IPOs took place during the high-tech boom years from 1996 to 1999. The number of IPOs decreased rapidly in the post-bubble years, 2000, 2001, and 2002. Profitability, as measured by after-tax net income in the most recent 12-month period before the IPO, is on average 25.8 million dollars for the entire sample period. It is notable that the mean value of the after-tax net income, after peaking in 1997 (43.8 million), turns negative in 1998 (-10.6 million dollars). In 1998, both the mean and median revenues, as measured over the 12-month period before the IPO, are the lowest in the 1990s, although they go back up in 1999. The ages of IPO firms, as defined by the number of years between the founding date and the IPO date, show a declining tendency during the internet boom period. During the same period, the degree of underpricing, defined as the first-day closing price over the offer price minus one, increases sharply. In fact, the mean and median values of underpricing are the largest in 2000 with the mean and median being 123.1 % and 64.3 %, respectively. In sum, Table I reveals a pattern that around the high-tech boom years, the profitability of IPO firms tends to decline and relatively younger firms go public with heavier underpricing.

As mentioned previously, variables used in this study are measured over a fiscal year (T) for each executive (i). For brevity, T's and i's are omitted from the notations when doing so causes no ambiguity. In Table II, we list the descriptive statistics for equity compensation and share ownership data for the executives of the 236 IPO firms, starting from the IPO year.² SHROWN is the split-adjusted number of shares held by each executive at the yearend of a fiscal year. BLK_VALU is the dollar value of stock options granted to an executive in a fiscal year, as measured by S&P Black-Scholes methodology. SOPTGRNT is the split-adjusted number of stock options granted to an executive in a fiscal year. RSTKGRNT is the dollar value, as of the grant date, of restricted stocks granted to an executive in a fiscal year. RSTK_SH is the estimated split-adjusted number of restricted stocks granted to an executive in a fiscal year, obtained by dividing RSTKGRNT with PRCCF, the fiscal yearend closing share price. SOPTEXSH is the split-adjusted number of stock options exercised by an executive in a fiscal year.

Table II shows that stock option is a more dominant form of executive equity compensation for IPO firms, as compared to restricted stock. In terms of mean dollar value, the stock option grants are more than 14 times of restricted stock grants. In terms of the number of shares granted, the mean and median for stock options far exceed those for restricted stocks. The average number of stock options an executive receives per year is 215,166, whereas the average number restricted stocks an executive receives per year is 4,605. The median for stock option is 40,000, while the median for restricted stock is zero. Executives on average exercise 159,728 stock options per year. The ratio of SOPTEXSH to SOPTGRNT averaged over all the executive-years is more than 80 % (unreported in the table). This means that in a given year, executives exercise substantial amount of vested stock options they already own, relative to the number of new stock options they receive. As shown in Table II, it is noteworthy that executive compensation distributions are extremely right-skewed with SOPTGRNT being the most skewed: there are very large values in each compensation variable. For example, the ExecuComp data record that Margaret Whitman,

² Data for the years prior to the IPO year are unavailable in the ExecuComp database with a very small number of exceptions, which we didn't include.

CEO of eBay Inc., received split-adjusted 172.8 million stock options in 1998 when her firm went public, and exercised all of them in the same year. These numbers appear as the maximum values in both SOPTGRNT and SOPTEXSH in Table II. The issue of outliers will be addressed in the following sections.

II. Univariate analyses

Because executives exercise stock options and receive restricted stocks, the number of shares they hold (SHROWN) can increase even when executives are net sellers of their unrestricted shares. Thus, the number of shares sold minus the number of shares purchased by an executive in a year (NETSELL) is defined as the number of restricted stocks granted in a year plus the number of stock options exercised in a year minus the change in the number of shares held by an executive at the yearend, or $(\text{SOPTEXSH} + \text{RSTK_SH} - \Delta\text{SHROWN})$. ΔSHROWN is $(\text{SHROWN}_T - \text{SHROWN}_{T-1})$.³

Panel A of Table III shows NETSELL as compared to SOPTGRANT, SOPTEXSH, RSTK_SH, and SHROWN_{T-1} during the first year after IPO, and Panel B for all the years combined. In Panel A, while NETSELL, SOPTGRNT, SOPTEXSH, and RSTK_SH are measured for the year immediately following the IPO year,⁴ SHROWN_{T-1} is measured at the end of the IPO year, or at the beginning of the following year. In the first year after IPO, NETSELL is on average 432,613 shares, amounting to 605 % of the combined value of SOPTEXSH and RSTK_SH. In other words, an average executive sells much more shares than the shares they acquire through option exercise plus the restricted shares they receive. This means that an executive sells a significant chunk of the unrestricted shares that they already own. NETSELL is 22 % relative to SHROWN_{T-1} . Panel A also shows NETSELL is 21 % of SOPTEXSH, RSTK_SH, and SHROWN_{T-1} combined. That is, net sales by an average executive amount to 21 % of all the shares he would have possessed if he had not sold any share by the end of the year immediately following the IPO year.

In Panel B, where all the years are considered, executives' selling intensity tapers off on average, although executives still sell quite a bit. Executives on average sell way more shares than they obtain through option exercise and stock awards (168 %). Also, NETSELL is 13 % relative to SOPTEXSH, RSTK_SH, and SHROWN_{T-1} combined. In terms of median values, executive selling is less intense compared to mean values (11-16 % compared to 13-21 %); however, the pattern of significant sales persists.

As observed in Table II, the skewness of the compensation variables is severe. To test whether the skewness arising from extreme positive values derives the results, we exclude 2 % of the largest values of each of the four variables, SOPTGRANT, SOPTEXSH, RSTK_SH, and SHROWN_{T-1} , and perform the same univariate analyses as above. The intensity of NETSELL, or % NETSELL, actually tends to increase further, suggesting that executive selling documented in Table III is not driven by outliers. The results without outliers are not reported here for brevity.

In Panel C of Table III, to further examine the significance of executive net sales, we perform hypothesis tests of zero mean and median for NETSELL in the year following the IPO year. Both tests show that NETSELL is highly significant with p-values less than 0.01, and the mean and median being 410,288 and 13,344 shares, respectively (Panel C).

³ To put it another way, $\text{SHROWN}_T = \text{SHROWN}_{T-1} + \text{SOPTEXSH} + \text{RSTK_SH} - \text{NETSELL}$.

⁴ In the IPO year, NETSELL cannot be calculated due to the unavailability of data.

Similar to Ofek and Yermack (2000), we split the sample into two groups based on the number of shares owned in the IPO year relative to the combined number of stock options and restricted stocks granted in the following year. Panel D is for the low ownership sub-sample, in which the number of shares held in the IPO year is less than the combined number of stock options and restricted stocks granted in the following year. And Panel E is for the high ownership sub-sample, in which the number of shares held in the IPO year is larger than the combined number of stock options and restricted stocks granted in the following year. Both panels again show that executives are on average significant net-sellers, regardless of the relative sizes of their initial holdings. In summary, the univariate results in Table III reveal that the executives of the IPO firms sell a significant portion of their stock holdings in the year following the year of initial public offering.

III. Regression analyses

A. Model

In our regression analyses of the trading activities of IPO firm executives, $NETSELL_T$ is regressed on four key variables of equity based executive compensation; the number of stock options granted ($SOPTGRNT_T$), the number of stock options exercised ($SOPTEXSH_T$), the number of restricted stocks granted ($RSTK_SH_T$), and the number of shares held in the previous yearend ($SHROWN_{T-1}$). Also as control variables, underpricing ($UNDERPRC$), changes in market-to-book ratio ($\Delta MKTBK$) and return volatility ($\Delta VOLAT$) are included. More formally, our base model is as follows:

$$NETSELL_{i,T} = C_0 + C_1 SOPTGRNT_{i,T} + C_2 SOPTEXSH_{i,T} + C_3 RSTK_SH_{i,T} + C_4 SHROWN_{i,T-1} + C_5 UNDERPRC + C_6 \Delta MKTBK_{i,T} + C_7 \Delta VOLAT_{i,T} + \varepsilon_{i,T} \quad (1)$$

If executives wish to hedge the risk arising from stock options granted to them, then they will sell the unrestricted shares they already own. Based on the Black-Scholes option valuation model, executives will sell the number of shares equal to the option hedge ratio times the number of options granted. This suggests a positive relation between net sales by executives ($NETSELL$) and the number of stock options granted to executives ($SOPTGRNT$) (Ofek and Yermack (2000)).⁵

In addition to the number of granted stock options ($SOPTGRNT$), the number of exercised stock options ($SOPTEXSH$) is included in the regression. The standard portfolio theory predicts that as the number of exercised stock options increases the number of shares executives hold, other things being equal, they will sell newly acquired shares, or increase their net sales ($NETSELL$), to diversify and rebalance their portfolios.

The same diversification argument applies to restricted stock grants. A higher number of restricted stocks granted to an executive will lead to more selling by the executive. The number of restricted stocks granted ($RSTK_SH$) is predicted to be positively associated with executive's net sales ($NETSELL$).

Ofek and Yermack (2000) document that executives with higher ownership tend to sell more aggressively than the executives with lower ownership, consistent with the portfolio

⁵ Alternatively, if the value of stock option increases, for instance, due to a rise in stock price, then executives can also increase share sales to hedge the risk, as the option delta goes up. We do not test this in this study, as the data source does not provide full information on stock option value changes.

theory that once certain ownership level is reached, investors actively rebalance their portfolios. To account for prior ownership levels, we include $SHROWN_{T-1}$.⁶

The relation between the number of stock options and the degree of underpricing has been explored in the literature (Lowry and Murphy (2005), Rocholl (2005), Taranto (2003)). Although evidence is inconclusive on the significance of such a relation, underpricing can induce executives' selling activity to the extent that the degree of underpricing proxies executives' profit-taking incentives (Aggarwal, Krigman, and Womack (2002)). If so, the coefficient for UNDERPRC (underpricing) will have a positive sign. UNDERPRC is defined as the first day closing price over the offer price minus one.

The relation between trading activities of insiders and market-to-book ratio is well documented. Rozeff and Zaman (1998) find that cross-sectionally, there are more frequent insider buying trades relative to selling trades for value stocks (low market-to-book stocks) relative to growth stocks (high market-to-book stocks), and that insider buying increases as an individual stock becomes a value stock from a growth stock across time. In a similar context, Lakonishok and Lee (2001) show that insiders are contrarian traders. These results are confirmed by Jenter (2005) who asserts that managers time their trades to take advantage of the perceived mispricing, as measured by market-to-book ratio. Apart from mispricing, if the share price increases, insiders are likely to rebalance their portfolios by selling their stocks, again consistent with the portfolio theory. Market-to-book ratio captures this price induced portfolio rebalancing effect, in addition to potential mispricing. Thus, changes in market-to-book ratio, $\Delta MKTBK$, enter the regressions. MKTBK is obtained by dividing MKTVAL by COMMEQ, in which MKTVAL is the market value of equity, measured by multiplying the number of common shares outstanding by the closing price at the fiscal yearend and COMMEQ is the total common equity (Compustat annual data item number 60). $\Delta MKTBK_T$ is $MKTBK_T$ minus $MKTBK_{T-1}$.

If the risk levels of their firms increase, then other things being equal, insiders will be inclined to sell their stock holdings because their wealth tied up to their firms become riskier. Meulbroek (2000) finds relatively high incidence of insider sales in internet-based firms characterized with high volatility. If this cross-sectional relation also holds across time, then an increase in return volatility will be associated with an increase in executive's net sales, or a decrease in net purchase. Therefore, changes in return volatility, $\Delta VOLAT$ ($= VOLAT_T - VOLAT_{T-1}$), are expected to have a positive relation with NETSELL. VOLAT is the standard deviation of daily common stock returns measured over a fiscal year for each firm.

B. Results

In Table IV, we focus on the IPO year and the following year. The first column tabulates the results of OLS regressions with NETSELL regressed on SOPTGRNT, SOPTEXSH, RSTK_SH, and $SHROWN_{T-1}$. In the second column, three control variables, UNDERPRC, $\Delta MKTBK$ and $\Delta VOLAT$, are added. White heteroskedasticity consistent standard errors are used in all the regressions in this study. As pointed out in the previous section (Table II), executive compensation variables are extremely right-skewed. To avoid a case in which a small number of extremely large observations sway the regression results dramatically, we exclude 2 % of the largest values of each of the four independent variables

⁶ Instead of including $SHROWN_{T-1}$, Ofek and Yermack (2000) split the sample into two, and run separate regressions. We address this issue in the robust check section.

(SOPTGRNT, SOPTEXSH, RSTK_SH, and SHROWN_{T-1}).⁷ We also perform the same regressions analyses with 1 % exclusion and no exclusion. As will be discussed later, the results remain qualitatively the same with or without the exclusion of outliers. Thus, for brevity, we report only the results with 2 % exclusion.

In Table IV, the coefficient for SOPTGRNT is not at all significant in both the first and second regressions. This differs from the Ofek and Yermack (2000)'s finding that SOPTGRNT is a significant variable. SOPTEXSH on the other hand is highly significant with the t-statistics in the range of 5.99-9.09, suggesting that executives sell substantial amount of the shares they obtain by exercising stock options. In fact, the coefficients of 0.97 and 1.07 in the two equations indicate that about every share acquired through option exercise is sold. This is consistent with the predicted relation between NETSELL and SOPTEXSH in that an executive attempts to diversify and rebalance his portfolio by selling newly acquired shares. The number of restricted stocks granted (RSTK_SH), however, turns out to be insignificant, contrary to the result of the previous study (Ofek and Yermack (2000)).

How many shares an executive holds to begin with (SHROWN_{T-1}) is an important explanatory variable. The positively significant coefficients have t-statistics in the range of 2.99 – 3.05: the more shares an executive holds at the beginning of the year, the more shares he sells during the year. By selling their stock holdings, executives reduce risk exposure of their portfolios and realize a significant part of their wealth tied up to their firms. The coefficients of 0.16 in both equations indicate that an executive on average sells 16 out of every 100 share increase in their stock holdings.

It is noteworthy that in the second regression, none of the control variables (UNDERPRC, ΔMKTBK, ΔVOLAT) is significant. If we assume that underpricing proxies executives' profit-taking incentives, then such profit-seeking behavior does not explain executive's massive selling activities in the year following the IPO year.⁸

Interestingly, the insignificant result for ΔMKTBK is different from the findings of previous research. We conjecture that this might be due to the fact that the five highest paid executives of IPO firms examined in this study are a set far smaller than a typical set of insiders investigated in prior studies, in which an insider is broadly defined as a person having an "insider relationship" or beneficial ownership as specified by various sections of the Securities Exchange Act of 1934, the Investment Company Act of 1940, and the Public Utility Holding Company Act of 1935. These insiders typically include officers, directors, and large block holders (10 % or more), and other beneficial shareholders whom the law specifies as having a special relationship with the company.

In Table V, we examine the full panel data with the years spanning from 1992 to 2004, the most recent year when the executive compensation data are available. The two regressions in Table V have the same specifications as those in Table IV with the second regression carrying three additional variables (UNDERPRC, ΔMKTBK, ΔVOLAT).

The results in Table V closely resemble those of Table IV. Again, SOPTEXSH and SHROWN_{T-1} are significant explanatory variables, whereas SOPTGRNT and RSTK_SH are

⁷ The minimum values are all zeros.

⁸ Aggarwal, Krigman, and Womack (2002) find evidence that underpricing leads to more analyst research coverage, which is followed by more insider selling at the expiration of the lockup. The study by Aggarwal et al. and ours differ in terms of the scope of the insiders, the data sources, the variable measurement period, and the sample period. Exclusion of UNDERPRC in this model and in other models in this study does not change the results.

not. SOPTEXSH has the coefficient 0.96, or about one, in both equations with the t-statistics 10.48 and 10.57. This again shows that executives sell about every share they obtain through option exercise. The coefficients for $SHROWN_{T-1}$, 0.10 in both equations, are also highly significant. Just like the results in Table IV, $UNDERPRRC$, $\Delta MKTBK$, and $\Delta VOLAT$ are all insignificant.⁹ A consistent finding in both Table IV and in Table V is that what influences executive sales significantly are two variables; SOPTEXSH and $SHROWN_{T-1}$. In other words, how many options an executive exercises (i.e. how many shares he acquires) and how many shares an executive holds to begin with are the two most important determinants of his selling activity.

C. Robustness check

The insignificant result for SOPTGRNT is different from the significant finding by Ofek and Yermack (2000), who instead of including $SHROWN_{T-1}$ in the regression, split the sample based on initial holding size and run separate regressions. We include $SHROWN_{T-1}$ explicitly in the regression, as it is an important explanatory variable to predict selling activities of an executive. Not surprisingly, this variable is found to be significant in all the regressions in this study. As part of robustness check, however, we did perform regression analyses with split samples similar to those in Ofek and Yermack (2000). Our results remain unchanged: SOPTEXSH is significant, but SOPTGRNT is not.¹⁰

Additionally, to examine whether our findings are sensitive to potential outliers, we winsorized each of the four variables, SOPTGRNT, SOPTEXSH, $RSTK_SH$, and $SHROWN_{T-1}$ by removing 1 % of the largest observations, instead of 2 % as reported in the previous sections. We also perform the same analyses without excluding any observations. The results remain virtually unchanged whether we exclude nothing (unreported) or 1 % (unreported) or 2 % (reported) of the largest values.

Late 90s are characterized by high-tech business boom or ‘internet bubble’ followed by stock market plunge. As shown in Table I, many companies went public despite weak earnings and frail valuations during the high-tech boom period. To examine whether executive trading activities in conjunction with their compensations differ in any way in this internet bubble period, we split the sample into the bubble period (year 1999 and 2000) and the non-bubble period. Again, the results, unreported here, remain about the same regardless of the internet bubble period. Nevertheless, we note that while the significance of SOPTEXSH and $SHROWN_{T-1}$ persists, SOPTGRNT is significant in one regression under the following three simultaneous conditions: (1) the bubble period is excluded, (2) no potential outlier is excluded, and (3) all the years, not just the first two years of IPO, are considered except for the two bubble years. Once one of the conditions is relaxed, SOPTGRNT becomes insignificant. In particular, the result is heavily driven by a small number of extremely large values, as the removal of such outliers (1 % or 2 %) renders SOPTGRNT insignificant. We conclude that the significance of SOPTGRNT is not robust.

We also examine correlation coefficients among variables used in the regressions. In line with our regression results, NETSELL is highly correlated with $SHROWN_{T-1}$. Among independent variables, we do not observe a serious multi-collinearity problem except for the

⁹ Given the panel dataset, we also performed the regressions of fixed effect and random effect models. The results remain about the same, and are not reported for brevity.

¹⁰ We can only speculate that the different results in Ofek and Yermack (2000) could be due to the fact that their sample is for the period 1992-1995, while ours is for IPO firms from 1992 to 2002.

high correlation ranging from 0.36 to 0.46 between SOPTGRNT and SOPTEXSH. We run regressions with these two variables entering the regressions separately. The significance of SOPTEXSH and SHROWN_{T-1} remains unchanged, while SOPTGRNT remains insignificant and no clear pattern emerges for RSTK_SH. The significance of SOPTEXSH and SHROWN_{T-1} persists throughout different specifications, and is robust to inclusion of outliers and the high-tech boom period. We summarize our findings in the following conclusion section.

IV. Conclusion

This study investigates the trading activities of the executives of the firms that went public between 1992 and 2002. To examine what determines IPO firm executives' trades, we focus on equity based compensation and its implications on net sales (or purchases) by these executives. IPO firms use equity based compensation heavily because they experience relative lack of cash compared to large, well-established firms, and also because they face enhanced challenge of aligning the interests of outside shareholders with those of the executives given the uncertainty and risk inherent in small and young IPO firms. Our findings are summarized as follows:

(1) IPO firm executives are significant net sellers in the year immediately following the IPO year. On average, IPO firm executives sell 21 % of the combined number of (i) the shares held at the end of the IPO year (SHROWN_{T-1}) plus (ii) the shares obtained through option exercise in the year immediately following the IPO year (SOPTEXSH) plus (iii) the restricted shares awarded in the year immediately following the IPO year (RSTK_SH). (2) Two significant variables affecting selling activities of IPO firm executives are the number of stock options exercised during the year (SOPTEXSH), and the number of shares held at the end of the preceding year (SHROWN_{T-1}). In particular, about every share acquired through option exercise is sold. (3) The number of stock options (SOPTGRNT) and the number of restricted stocks (RSTK_SH) turn out to be insignificant in explaining executives' net sales. (4) IPO underpricing ($\overline{\text{UNDERPRC}}$), changes in market-to-book ratio (ΔMKTBK), and changes in return volatility (ΔVOLAT) do not explain executives' trades. These findings are robust to different specifications, inclusion of outliers and the high-tech bubble period.

We contribute to the literature by providing insights on the determinants of selling activities of IPO executives: as IPO firm executives sell significantly, particularly in the first two year period around IPO, the two significant variables affecting their sales are the number of shares held at the beginning of the year and the number of stock options exercised during the year. We do not find any convincing evidence, however, that executive net sales are directly linked to an explicit attempt to hedge against stock option grants, or that executives sell to exploit potential overvaluation as measured by market-to-book ratio, a result different from that of previous studies. These findings suggest that IPO executives sell mainly to realize a significant part of their undiversified wealth tied up to their own firms.

Appendix:
Brief institutional details on executive stock options and restricted stocks

Since stock option and restricted stock grants are a private contract between a firm and its employees, compensation contracts can differ across firms. Typical stock options, however, expire in ten years with three to four year vesting periods or with a portion of the options vested every year for several years. When stock options are fully vested, the holders of the options can exercise them by purchasing their firms' shares at a pre-determined exercise price. When stock options are granted, the exercise price is usually set at the current market price. A major difference between a typical executive/employee stock option and a standard exchange-traded option is that the executive/employee stock option is prohibited from being sold.¹¹

Recently, the issue of backdating stock option grant dates received much attention from the press. There have been studies and reports that corporations often set stock option grant dates retroactively so that the exercise price, typically set as the market price as of the grant date, is recorded low to boost the value of the stock options (Lie (2005), Narayanan and Seyhun (2005), Maremont (2005)). Shares obtained by stock option exercise are essentially a new equity issue which undergoes the same disclosure and registration procedures as any other new equity issue. On the other hand, new stock option grants had not been subject to such stringent disclosure requirements. The SEC amended the rules so that, effective as of August 29, 2002, insiders are required to file Form 4 within two business days of when there is a change in their holdings, including stock option awards. Related to this, Heron and Lie (2006) present evidence that such backdating practice weakened significantly following this SEC rule change. In January 2006, the SEC proposed new disclosure rules that require more specific and detailed reporting of executive pay.¹²

Although ownership transfer is banned for executive stock options, other derivative transactions are not banned, thus leaving room for managers to engage in various derivative arrangements with investment banks (Bettis, Bizjak, and Lemmon (2001), Smith and Eisinger (2004), Smith (2004)). Bettis, Bizjak, and Lemmon (2001) report a study on corporate insiders' use of costless collars or equity swaps that reduce their ownership and risk exposure. According to Hall and Murphy (2003), some firms offer 'cashless exercise programs,' in which executives simply receive the difference between the market price and the exercise price either in terms of cash or shares, while most companies require executives to pay cash to purchase newly issued shares.

Whether or not to treat stock options as expenses was at the heart of a controversy. In 2004, FAS (Financial Accounting Standard) 123R, an amendment to FAS 123, required expensing the cost of equity based compensation at fair market value in financial statements. After some delay and a reprieve in compliance dates by the SEC, the new disclosure requirements now apply to large public corporations with fiscal years beginning after June 15, 2005. For small public corporations and private firms, the compliance date is December 15, 2005.¹³ Regardless of the new rules, for tax purposes, the spread between the market and the

¹¹ This does not exclude the possibility of revising the option contract. For example, the exercise price can be re-set, or other arrangements involving investment banks can be made possible if stock options are out-of-the money for quite a while.

¹² SEC Press Release No. 2006-10.

¹³ See SEC release number 33-8563, April 15th, 2005.

exercise prices has been treated as an expense and thus is tax-deductible.¹⁴ This is one of the reasons why Hall and Murphy (2000) posit the ‘perceived cost hypothesis’ to explain the large, sub-optimal amount of stock options granted in the past decade. From the perspective of a company issuing stock options, options are ‘perceived’ as inexpensive and attractive, because the grants do not involve a cash outlay, yet the spread (market price – exercise price) is tax deductible, whereas on the income statement, the option spread had not been recognized as an expense until the recent regulatory change.

Restricted stock, another form of equity based compensation, is restricted from being traded to a third party, as the name implies. Typically, restricted stock carries dividend rights and voting rights. Once restricted stocks are vested, then executives can sell them in the open market. Additionally, executives can sell shares of their own firms if those shares were purchased with their own funds. Executives are prohibited, however, from short-selling their own firms’ stocks.¹⁵

¹⁴ This tax-deductibility applies to non-qualified stock options. For qualified stock options (or incentive stock options) in which employees must hold the stock for at least one year after exercise to sell, the difference between the selling price and the exercise price is not tax-deductible for the corporation. This is one reason why non-qualified stock options are the prevalent form of stock option. (Hall and Murphy (2003))

¹⁵ Securities and Exchange Act of 1934 Section 16(c) prohibits insiders (officers, directors, and 10 % or more owners) from borrowing and then selling their own company stock.

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Table II
Descriptive Statistics: Executive Compensations for the Sample Firms

Table II shows equity compensation and share ownership of the five highest paid executives of the firms that went public for the period 1992-2002. There are 3,999 executive-years (N), starting from the IPO year, for 940 executives. SHROWN is the split-adjusted number of shares held by each executive at the yearend of a fiscal year. BLK_VALU is the dollar value of stock options granted to an executive in a fiscal year, as measured by S&P Black-Scholes methodology. SOPTGRNT is the split-adjusted number of stock options granted to each executive in a fiscal year. RSTKGRNT is the dollar value, as of the grant date, of restricted stock granted to each executive in a fiscal year. RSTK_SH is the estimated split-adjusted number of restricted stock granted to an executive in a fiscal year obtained by dividing RSTKGRNT with PRCCF, the fiscal yearend closing share price. SOPTEXSH is the split-adjusted number of stock options exercised by each executive in a fiscal year.

	SHROWN	BLK_VALU	SOPTGRNT	RSTKGRNT	RSTK_SH	SOPTEXSH
	(shares)	(\$)	(shares)	(\$)	(shares)	(shares)
Mean	2,201,018	1,624,116	215,166	111,026	4,605	159,728
Median	132,000	240,625	40,000	0	0	0
Maximum	902,412,500	369,311,600	172,800,000	27,868,408	1,001,020	172,800,000
Minimum	0	0	0	0	0	0
Skewness	36	25	59	18	16	48

Table III
Univariate Analyses: Net Sales by Executives

Table III shows univariate analyses of net sales (NETSELL) along with SOPTGRNT, SOPTEXSH, RSTK_SH, and SHROWN_{T-1}. NETSELL is defined as (RSTK_SH + SOPTEXSH – ΔSHROWN). RSTK_SH is the yearly estimate for the number of restricted stocks granted to an executive obtained by dividing RSTKGRNT with the fiscal yearend price, in which RSTKGRNT is the dollar value, as of the grant date, of restricted stock granted to an executive. SOPTEXSH is the split-adjusted number of stock options exercised by each executive in a fiscal year. ΔSHROWN is (SHROWN_T - SHROWN_{T-1}) in which SHROWN is the number of shares held by each executive at the fiscal yearend. The low (high) ownership sub-sample is a sub-sample in which the number of shares held in the IPO year is less (greater) than the number of stock options and restricted stocks granted in the following year. The results of t-tests and Wilcoxon Sign Rank tests of zero mean and median are listed.

	Panel A: First year after IPO		Panel B: All years considered	
	Mean	Median	Mean	Median
(1)SOPTGRNT	136,876	25,000	215,754	40,000
(2)SOPTEXSH	67,603	0	159,369	0
(3)RSTK_SH	3,937	0	4,605	0
(4)SHROWN _{T-1}	1,970,423	83,679	2,021,233	149,933
(5)NETSELL	432,613	13,029	276,147	17,001
(5)/[(2)+(3)]	605%		168%	
(5)/(4)	22%	16%	14%	11%
(5)/[(2)+(3)+(4)]	21%	16%	13%	11%

Hypothesis tests of zero mean and median NETSELL (first two years)				
	Mean	Median	T-test	Rank test
Panel C: Entire sample				
	432,613	13,029	2.63	13.64
p-value			0.0087	0.0000
Panel D: Low ownership sample				
	86,325	1,000	3.08	4.83
p-value			0.0023	0.0000
Panel E: High ownership sample				
	590,934	24,700	2.47	12.70
p-value			0.0138	0.0000

Table IV
Regression: IPO year and the following year

NETSELL from the IPO year to the following year is regressed on SOPTGRNT (or SOPTGRNT_{T-1}), SOPTEXSH, RSTK_SH, SHROWN_{T-1}, UNDERPRC, ΔMKTBK, and ΔVOLAT. NETSELL is defined as (SOPTEXSH + RSTK_SH – ΔSHROWN). SOPTEXSH is the split-adjusted number of stock options exercised by each executive in a fiscal year. RSTK_SH is the estimated number of restricted stock granted to an executive in the following year obtained by dividing RSTKGRNT with the average of fiscal yearend prices, in which RSTKGRNT is the dollar value, as of the grant date, of restricted stock granted to each executive. SOPTGRNT is the number of stock options granted to each executive in a fiscal year. ΔSHROWN is (SHROWN_T – SHROWN_{T-1}) in which SHROWN is the number of shares held by each executive at the fiscal yearend. UNDERPRC (underpricing) is the first-day closing price over the offer price minus one. MKTBK, market-to-book ratio, is MKTVAL divided by COMMEQ, in which MKTVAL is the market value of equity (the number of common shares outstanding multiplied by the fiscal yearend closing share price), and COMMEQ is the total common equity (Compustat annual data item number 60). ΔMKTBK is (MKTBK_T – MKTBK_{T-1}). VOLAT is the standard deviation of daily returns measured over a fiscal year, and ΔVOLAT is (VOLAT_T – VOLAT_{T-1}). White heteroskedasticity consistent standard errors are used. * denotes the significance level 10 %, ** 5 %, and *** 1 %, based on a two tailed test.

variable	coefficient	t-stat	p-value	variable	coefficient	t-stat	p-value
Intercept	-49964.37	-1.36	0.1733	Intercept	-31566.29	-0.78	0.4341
SOPTGRNT	0.01	0.03	0.9770	SOPTGRNT	-0.01	-0.03	0.9739
SOPTEXSH	***0.97	9.09	0.0000	SOPTEXSH	***1.07	5.99	0.0000
RSTK_SH	2.08	1.30	0.1952	RSTK_SH	1.88	1.12	0.2643
SHROWN _{T-1}	***0.16	2.99	0.0029	SHROWN _{T-1}	***0.16	3.05	0.0024
				UNDERPRC	-82901.18	-1.15	0.2513
				ΔMKTBK	-2870.67	-0.89	0.3750
				ΔVOLAT	2460324.00	0.59	0.5563
R-squared	0.2160			R-squared	0.2210		

Table V
Regression: Full Panel (1992-2004)

NETSELL for the full panel period 1992-2004 is regressed on SOPTGRNT (or SOPTGRNT_{T-1}), SOPTEXSH, RSTK_SH, SHROWN_{T-1} , ΔMKTBK , and ΔVOLAT . NETSELL is defined as $(\text{SOPTEXSH} + \text{RSTK_SH} - \Delta\text{SHROWN})$. SOPTEXSH is the split-adjusted number of stock options exercised by each executive in a fiscal year. RSTK_SH is the estimated number of restricted stock granted to an executive in the following year obtained by dividing RSTKGRNT with the average of fiscal yearend prices, in which RSTKGRNT is the dollar value, as of the grant date, of restricted stock granted to each executive. SOPTGRNT is the number of stock options granted to each executive in a fiscal year. ΔSHROWN is $(\text{SHROWN}_T - \text{SHROWN}_{T-1})$ in which SHROWN is the number of shares held by each executive at the fiscal yearend. UNDERPRC (underpricing) is the first-day closing price over the offer price minus one. MKTBK, market-to-book ratio, is MKTVAL divided by COMMEQ, in which MKTVAL is the market value of equity (the number of common shares outstanding multiplied by the fiscal yearend closing share price), and COMMEQ is the total common equity (Compustat annual data item number 60). ΔMKTBK is $(\text{MKTBK}_T - \text{MKTBK}_{T-1})$. VOLAT is the standard deviation of daily returns measured over a fiscal year, and ΔVOLAT is $(\text{VOLAT}_T - \text{VOLAT}_{T-1})$. White heteroskedasticity consistent standard errors are used. * denotes the significance level 10 %, ** 5 %, and *** 1 %, based on a two tailed test.

variable	coefficient	t-stat	p-value	variable	coefficient	t-stat	p-value
Intercept	*-27930.13	-1.91	0.0563	Intercept	-24060.12	-1.52	0.1294
SOPTGRNT	0.07	0.84	0.4026	SOPTGRNT	0.07	0.89	0.3761
SOPTEXSH	***0.96	10.57	0.0000	SOPTEXSH	***0.96	10.48	0.0000
RSTK_SH	-0.83	-0.65	0.5149	RSTK_SH	-0.85	-0.67	0.5046
SHROWN _{T-1}	***0.10	5.68	0.0000	SHROWN _{T-1}	***0.10	5.69	0.0000
				UNDERPRC	-20629.31	-0.74	0.4598
				ΔMKTBK	-305.34	-0.16	0.8740
				ΔVOLAT	367003.30	0.40	0.6893
R-squared	0.1828			R-squared	0.1832		