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As of 1998, nine percent of the shares of all firms in the US, primarily young and small ones, have been owned, essentially by about 17 million employees. The recent trend of new ventures to grant company-wide stock options plans is an alignment of the interests of management, shareholders, and non-managerial employees. This paper empirically explores the hypothesis that company-wide stock options plans primarily serve the interests of the firm's management. This is true, whether or not, management owns a stake in the firm's equity, though the degree of his or her motivation varies depending on the size of his/her stake in the firm's equity. The paper unambiguously disproves the view that grants of employee stock options are meant to ease cash flow strains for small young firms.

I. Introduction

A recent trend among small new firms is to grant company wide stock options. In some industries, e.g., in the technology sector, at the time that the firm is established and well before it goes public owned, already exists an employment contract with a provision about the grant of stock options that may be exercised up until and on the day the firm would go public. Newly established firms find that to compete for skilled labor, they need to offer options to all employees from the very start of the firm's operations.

Increasingly, new small size firms grant company wide stock options as an incentive plan. A study by National Center for Employee Ownership (NCEO)[11] demonstrates that as of 1999, nine percent of the shares of all firms in the US, primarily new small firms, were owned by 17 million employees. It estimates that in

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[1] National Center for Employee Ownership (NCEO) study (1999) also available online at www.nceo.org , NCEO online library. Other sources: Press Release, September 21, 1998 Current Practices in Stock Option Plan Design, and, General Accounting Office with the site www.gao.com.

the US, as of 1999, there were 16,100 such plans in effect, 3,000 of which were company-wide or "broad"[2]. By 1998, the number of such plans had undergone an almost tenfold increase from its level in 1975. Actually, only 15% of these firms were public, the rest were closely held and therefore small. Interestingly, most public firms allow employees a stake of less than 10% of the firm's equity, while closely held firms allow up to 30%.

Boards of directors tend to think that "broad" plans are in shareholders' best interest. Recently, these boards have also been cited as favoring the grant of ESOs as a mechanism to attract skilled labor. Proponents of the opposite view argue that managers act in their own best interest, which runs against the idea that alignment of managers and shareholders interests should be observed.

Several hypotheses, attempting to explain ESO plans, have been proposed in the literature (see Section 1.1). First is the 'incentive' argument, which says that ESO plans induce real gains, manifested by higher employee productivity or reduction of agency costs. The above is induced, either as a reaction to an existing plan, or, in anticipation to the adoption of such a plan, as a reward for superior current performance. The second hypothesis states that the adoption of an ESO plan conveys some credible information, not already reflected in stock prices.

The hypotheses so far pertain to the change in the firm's overall value, while the remaining ones refer to the conflict among the firm's various claimholders. Accordingly, the third hypothesis raises the possibility that an incentive plan may trigger tax benefits[3], either to the shareholders or to the employees.

The fourth hypothesis says newly established growth firms, which may not be in a position to meet their immediate cash flow obligations, could ease their strain by substituting deferred equity for cash wages.

The final hypothesis says that an ESO plan may serve the interests and goals of the firm's top management. In this event, ESO plans are granted by managers who wish to maximize the value of their own claim. One implication of that is the "over-retention" of funds, which arises when managers retain funds in the firm, for instance, by substituting some equity for cash wages, in order to increase the coverage of their own claim. Additionally, and this is the focus of this paper, managers may enhance their own interests, by making riskier or less risky investments subsequent or prior to an ESO plan, which may affect the value of the options held by the firm's employees.

The natural question to the above is whether managers increase the firm's exposure to risk after granting an ESO plan, or, managers of riskier firms tend to grant ESO plans more often than managers of less risky firms do? The answer is not trivial and is somewhat different than the case in which options are granted **solely** to the firm's top management. In the latter case, managers have an incentive to undertake riskier investments in order to increase the value of their already owned, options, which, at the same time, may have a negative long-term effect on their equity-holdings or reputation. With "broad" ESO plans, increasing the firm's risk may increase the value of the employees' options as well, therefore managers may have to share the benefits.

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[2] The NCEO study deals with actual share ownership, that is, plans that have granted shares (Employee Stock Ownership Plan – ESOP), or options that have been exercised (under Employee Stock Options plans – ESO). Theoretically, however, stocks can be viewed as zero-exercise-price options, or options with a very low exercised priced can be viewed as leveraged shares. Thus, for the purpose of this paper, no distinction is made whether the plan is ESOP or ESO.

[3] Employee stock ownership plans are governed by sections 401(A) and 4975(E) (7) of the Internal Revenue Code and in section 407(D) (6) of the Employee Retirement and Income Security Act (FRI SA). See also FASB exposure draft leading to SFAS 123 (Swieringa, 1987).

The increasing the risk in order to increase the value of the already owned options argument, can be erroneous. A positive relationship between risk and options value is applicable to firm-external options for a given share price. ESOs are firm-internal warrants, whose issuance may affect prices. Thus, it is possible that increasing risk and granting ESOs will negatively affect warrants prices, if the share price declines sufficiently, in reaction to the plan and to the higher level of risk.

I.A Manager's motivation in granting ESO plans

This study attempts model and test the manager's motivation in the decision to grant an ESO plan (the fifth hypothesis above). It adds previously disregarded variable, the manager's stake in the firm's equity. The interaction between this and other variables already analyzed, points to a set of interpretations variable than the conventional ones. The decision to grant an ESO plan and the extent of a manager's control, or alternatively, the threat of being diluted, are related to variables such as, the firm's risk, or, the manager's choice of the firm's level of risk, and the extent to which debt is used.

Here the term manager-owner will refer to a manager who is supported or nominated by a major shareholder as opposed to a professional manager, most likely, of a diffused-ownership firm, whose interests are not aligned with those of a specific shareholder. The two managers have different motivation in their decision making. This observation may lead to a non-linear type of hypothesis, i.e., the decision to grant an ESO plan may not demonstrate a monotonic relation with the above variables. This means that an ESO plan is more or less likely only when the extreme levels of some of these variables occur.

The position adopted here is that ESO plans serve the interests of the manager-owner, without any consideration given to the interests of other claimholders. The first hypothesis is that managers will increase the firm's risk when they grant an ESO plan, or alternatively, managers of risky firms will tend to grant ESO plans, if they **have a controlling interest** in the firm's equity. This paper will show that under a certain condition, the higher the firm's level of risk, the smaller the number of options the firm needs to grant. Hence, managers, concerned with the risk of dilution of their controlling stake[4], will focus on the **number** of options granted to the employees**, given** the optimal overall value of the options package. This ensures that higher risk is associated with fewer options, and is not trivial, as demonstrated in Proposition 1. Actually, the value of the options increases with risk only when the firm's overall expenses-per-share exceed the difference between the firm's cash-inflow-per-share and the exercise price of the option. The paper demonstrates that the strategy of high-risk ESO plans clearly dominates other strategies in conjunction with the following parameters: the number of options granted, the level of the managers' equity holdings, and the use of ESO plans as a mechanism to finance **future** wages, if the employees exercise their options and pay the exercise price.

When it comes to claims on the firm's cash flows, the firm faces legal, stated by contracts, and practical priorities, dictated by business practices. The firm has to disburse funds to various claimholders in a manner that will best ensure its ability to continue to operate. Thus, the professional manager competes against other cash flow claimholders such as employees and debt holders. This paper hypothesizes the following:

[4] Alternatively, the firm could have issued ESOs that may be exercised to non-voting shares. These ESOs, however, are less valuable and thus will require issuing of more ESOs, and more importantly, a grant of ESOs of non-voting shares would lack the incentive argument underlying such grants.

(i) The higher the firm's debt ratio, the more a professional manager will seek action to reduce "competition" on the part of other claimholders, such as the employees, who have claims on the firm's cash flows. Thus, granting an ESO plan that partially substitutes equity for cash wages, or, a potential increase in cash wages, serves this purpose.

(ii) Even though the value of the claims held by the firm's employees, managers, and debt holders may not change, the grant of an ESO plan that substitutes equity for a cash-wage claim, increases the priority of the claim held by the professional manager.

(iii) Grant of an ESO plan may substitute equity for cash-wages as a source of financing. Thus, as the firm's debt ratio increases, the more likely the firm is to seek this alternative form of financing.

With the above in mind, consider two firms of equal equity size and **equal** equity risk. If one of the firms has a higher debt ratio, ceteris paribus, the overall firm's level of risk must be **lower**. Thus, the higher the level of debt and the lower the level of the firm's overall risk the more likely a professional manager will be to grant an ESO plan. The relationship, however, between risk and the decision by a **manager-owner** to grant an ESO plan, isolating for the firm's debt ratio, is ambiguous, since there is conflict between this manager's goal to protect his/her cash flow claim (i.e., higher debt and low risk are more likely to trigger the grant of an ESO plan), and his/her wish to protect his/her equity claims. That is, low risk is less likely to trigger the grant of an ESO plan.

This paper will initially test the conventional hypotheses and proceed from there. If, for example, empirical evidence rejects the fourth hypothesis, and concludes that ESOs are not granted by firms because they are under a cash flow strain, the paper will then proceed to isolate the relevant parameters which are related to the fifth hypothesis. These parameters are: grant of an ESO plan, firm's level of risk, and managerial stake in the firm's equity and the risk of management's dilution of its controlling position.

It is doubtful that any of these parameters alone can explain the motivation underlying the granting of ESO plans. This paper will first examine the relationship between the decision to grant an ESO plan, risk and level of control. Interestingly, while it is widely accepted that higher risk industries tend to grant ESO plans, the hypothesis regarding the risk level of individual firms may be rejected. If the sector's risk level can explain an ESO plans while individual firms' risk can not, then the measure of risk should be defined in relative terms, i.e., individual firm's risk relative to the firm's industry risk.

Failure of the tests that consider the joint impact of all the independent variables to explain the decision to grant an ESO, will be interpreted as support for a **non-linear** relationship: at the extreme values of the variables - "high risk - high level of control" and "low risk low level of control" - the grant of ESO plans is more likely than otherwise. Thus, this paper will proceed in testing the cross-variables hypotheses, that is, testing, e.g., the relationship between risk and grant of an ESO plan, for a sub-sample of firms with high level of control as opposed to a sub sample of firms with low level of control.

In the event of confirmation of the non-linear relationship, we will interpret the result as support for this paper's hypothesis, which is divided into two parts:

First, manager-owners will be inclined to increase the firm's level of risk upon the grant of an ESO plan, or alternatively, managers of firms with a high level of risk

will tend to grant ESO plans, if they **have a controlling interest** in the firm's equity. Second, firms with managers who do not own a stake of the firm's equity, will tend to grant an ESO plan the higher the firm's debt ratio and the lower the over-all risk level of the firm.

I.B Review

A large body of literature examines the motivation underlying granting of ESO plans. The Economics literature, for example, focuses on the "incentive argument"; namely, whether granting of an ESO plan enhances the firm's performance, or, reduces agency costs. As Conte and Svejnar (1990), point out, the results are inconclusive[5].

The accounting and finance literature explores the tax benefit hypothesis and the information effect. Hite and Long (1982), and Miller and Scholes (1982) discuss the tax hypothesis, whether the plan affects corporate tax, or the recipients of the benefits of the plan. Executive options and alignment of managers and shareholders interests are discussed in Noreen(1976), Larcker (1983), Brickley, Bhagat and Lease (1985), Tehranian and Waegelein (1985), Warner (1985), Healy (1985), Agrawal and Mandelker (1987), Lambert et al. (1991), and Hemmer (1993). The results demonstrate significant positive stock price reactions to these plans, which makes it difficult to argue that these plans are merely "excessive perks" whose adoption may hurt shareholders.

This segment of the literature is also concerned with the proper valuation of employee-stock-options, so that expenses reported by firms that grant these options will not be misstated. Additionally, it was argued that the adoption of plans reveals positive insider information that can serve as a credible signal. Specifically, a plan that involves a bigger equity stake for the senior management may be viewed as a disclosure of a credible signal (Brickley et al. (1985)).

Managerial literature focuses on how employee motivation and performance are affected by incentive plans and disregards, however, the firm's point of view. Kraizberg et al. (2000) demonstrates that even when considering the employees' point of view, ESO plans are not necessarily superior to other incentive schemes.

The key issue is whether the grant of an ESO plan triggers a redistribution of the firm's cash flows, or whether the real gains, induced by the plan, are allocated among the firm's claimholders. When a firm's claimholder, such as the manager, may take action that may increase the value of his own claim at the expense of other claimholders, one may wonder what stops him/her from emptying all other claims. Following Jensen and Meckling (1976), Harris and Raviv (1979), Fama (1980), Jensen and Ruback (1983), it is clear that there are mechanisms that protect the value of the non-active claimholders. These are either external market mechanisms, such as the threat of take-overs, share prices reflecting that the firm's management has acted prudently or imprudently, or internal corporate mechanisms, such as the replacement of top management (Coughaln and Schmidt (1985). These mechanisms, however, are not practical when the top management owns the majority of the firms' shares. In this case, the managers' actions may not coincide with other claimholders' interests, since the managers are able to conceal their motivation, irrespective of whether or not they are internally monitored.

[5] Interestingly, similar literature, dealing with executive compensation and relative performance evaluation mode, is also inconclusive (see Jensen and Murphy (1990), Gibbons and Murphy (1990), Barro and Barro(1990), Janakiraman, Lambert and Larcker(1992), Aggarwal and Samwick(1998, 1999).)

Jensen and Zimmerman (1985) and Warner (1985)[6] concluded that exists both direct and indirect evidence suggesting alignment of mangers' and shareholders' interests when management grants itself stock options. Therefore, there is a positive relationship between executive compensation and firm performance or stock price reaction.

Self-serving motivation has been discussed in the literature, with several implications. First, the self-serving view is reinforced when the managers' horizon is shorter than the corporation's infinite life (Jensen and Meckling (1976), and Tehranian and Waegelein (1985)). Managers may tend to take riskier investments when their salaries are linked to the firm's performance, as, for instance, when they grant themselves stock options[7]. This conclusion agrees with option theory, since a higher risk will tend to increase the value of those options (Agrawal and Mendelker (1987) Lewellen, Lorderer and Martin (1987), Lambert, Larcker and Verrechia(1991). Finally, the over-retention problem arises because managers have incentives to retain funds to increase the coverage of their fixed salary claims (Tehranian and Waegelein (1985), Lambert (1989)).

Brickley et al. (1985) demonstrate that while introduction of long-term compensation plans increases shareholder wealth, when the latter is measured by abnormal returns of common shares, but yet, plans with option components show lower returns, though these results are not statistically significant.

II. The model

The **number** of ESOs granted is a crucial variable for a manager who owns a major stake in the firm's equity, and may therefore have to face dilution of his control. The model that follows does not go counter to the conventional view that an ESO plan will induce positive real effects, in addition, the model allows for the possibility that the grant of an ESO plan may substitute cash wages or cash wage increases.

The model is a single period model, in which all cash flows are realized at the end of the period. However, decisions such as granting an incentive plan and reactions of employees and managers to the plan, occur at the beginning of the period. The labor market is competitive, the capital markets are efficient, and firm's securities are traded continuously. Transaction costs are disregarded and there is no asymmetry of information.

Some important ESO aspects that are very unlikely to alter the paper's conclusions, are ignored. For example, it is implicitly assumed that whether or not there is a positive relationship between the grant of ESOs and increased employees' effort, the managers' motivation to grant ESOs, as described here, is not affected.

The model considers a firm whose uncertain net cash flows are allocated among four claimholders: tax collectors, wage recipients, managers, who may or may not own equity, and non-managerial shareholders. Wages are initially assumed to be riskless[8]; that is, in any state of the world, the firm's inflows exceed wage claims. Managers may own a share of the firm's equity, while their compensation package is

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[6] Cf. their review of a series of papers by Murphy (1985), Benston (1985), Healy (1985), Brickley, Bhagat and Lease (1985), Coughaln and Schmidt (1985), Tehranian and Waegelein (1985), Johnson, Magee, Nagarajan and Newman (1985), Lambert and Larcker (1985), and Lewellen, Lorderer and Rosenfeld (1985).

[7] [7] In principle, an ESO plan must be approved by the board of directors. It is easier for the managers to ask for board approval when it comes to a company-wide plan, rather than a limited Executive Compensation plan. See Smith and Watts (1984), Coughlan and Scmidt , and Brickley et al (1985).

[8] This assumption is not crucial since the conclusions of this model are reinforced if wages are assumed to be risky.

linked to the firm's total inflows and is subject to risk because their claim has a lower priority than that of wage recipients. Finally, the payoff of any security can be spanned by substituted securities. Specifically, there is a set of uniquely priced state contingent claims. To make the presentation simpler, without loss of generality, a simple discrete model is developed. There is a set of state contingent claims, which promise one dollar, if state i $(i \in H)$ occurs. Each claim's current value is q_i, thus, the risk-free rate of interest, r^f [9] equals

$$1/\sum_{i}^{H} q_i - 1 \ , \ i \in H . \tag{1}$$

Initially, the firm pays fixed wages in the amount of $\overline{W}$, where the firm's cash flows are $F_i, i \in H$. $\overline{W} < F_i, \forall i$.

Senior management's claim is M_i. Thus, the net earnings at the end of the period, or shareholders' claim in state *i*, given the tax rate of τ, is:

$$E_i = (F_i - \overline{W} - M_i)(1-\tau) . \tag{2}$$

The current value of equity is therefore:

$$E_0 = \sum_{i}^{H} q_i E_i = \sum_{i}^{H} q_i (F_i - \overline{W} - M_i)(1-\tau) . \tag{3}$$

The current share price is $S_o = E_o / N_o$, where N_0 is the initial number of shares.

The firm considers granting an ESO plan to all employees at the beginning of the period; the total number of options granted is *Nc*, whose value is *C* each, given that the exercise price is *X*. The ESOs expire at the end of the period after earnings are reported. The firm decides to grant an ESO plan, among other things, expecting to induce positive real effects, such as increased sales, increased productivity, etc. Let B_i be the net expected gains for state *i*. It is assumed that there is a well-defined relationship between gains and the overall value of the ESOs. That is, the overall value of the ESO package and the level of the desired gains are exogenously determined (see Conte and Savenjar(1990). Thus, if there exists a unique optimal plan[10], the firm needs to issue a package of options with value equal to $(NcC)^*$, so that the package may induce the desired goal (such as real gains, lower agency costs etc.). Thus,

$$NcC = (NcC)^* . \tag{4}$$

It is assumed, initially, that the labor market and the market for managers are competitive; that is, managers and employees are substitutable, and competitive labor

[9]This assumption by no means implies that the model assumes risk-neutrality. Rather, risk-aversion is imbedded in the value of the contingent claims, q.

[10] As it is mentioned earlier, whether or not, there is a positive relationship between granting ESOs and *B* is an important issue, but hardly relevant to the issue raised in this paper, therefore, we might as well assume that *B*, if positive, is given exogenously. Similarly, the issue whether there exists an optimal contract does not alter the conclusion of this model.

markets dictate an implicit employment contract, according to which λ, $0 \le \lambda \le 1$, of the value of the real gains, B_i, are allocated, ex-post, to the employees [11]. □ is a market not a policy variable and need not be linear in B_i. Hence, if the labor market is competitive, the cash wages at the beginning-of-the-period, W_0, are:

$$W_0 = \overline{W} / (1 + r^f) - \left\{ Nc.C - \lambda \sum q_i B_i \right\}, \tag{5}$$

This equation implies that the actual wages employees receive at the beginning of the period equal $\overline{W} /(1 + r^f)$, set exogenously, and $\lambda \sum q_i B_i$ are the net expected gains. These amounts are either paid in cash, W_0, or in options whose value equals *NcC*.

While the value of a single share before the issuance is S_0^B, its value afterwards is:

$$S_0^A = (E_0 - NcC) / N_0 = \sum_i^H q_i S_i \ , \tag{6}$$

where S_i is the value of a share, if state i is realized. This is true, since at the end of the period, if all ESO holders are rational, the price of a single share is:

$$S_i = \begin{cases} (E_i + NcX)/(N_0 Nc) & if \quad > X \\ (E_i / N_0 & if \quad \le X \end{cases} \tag{7}$$

and,

$$C = \sum_i^H q_i \, MAX\{(S_i - X), 0\} = \quad \sum_i q_i . MAX\left[\frac{E_i - N_0 X}{N_0 + Nc}, 0 \right] \tag{8}$$

Equation (8) implies that the firm needs to choose the number of options, which in its turn affects the value of the options, so that the value of the package is $(NcC)^*$.

In lieu of one of this paper's hypotheses, that the number of options granted is a crucial control variable for a manager who owns a stake in the firm's equity, Proposition 1 will derive the relationship between risk and number of options needed, given (NcC)*.

[11] The definition of a competitive labor market must be on an ex-post basis. If it were an ex-ante implicit contract, then employees would have the incentive to underperform in reaction to the plan. On the other hand, an ex-post contract is less realistic, primarily due to wage rigidity. If we allow, however, a multi-period scenario with memory, the ex-post contract is a reasonable assumption. This assumption also allow a trade-off between wages and otther compensation such as ESOs, on basis other than a dollar for dollar.

Proposition 1

If the labor market is competitive and the capital market is efficient in the sense that all securities are properly priced, then the following relationship is valid: Given that an optimal ESO plan must have a value of *(NcC)**, **the higher the risk level** associated with management compensation**, the lower the number of ESOs,** *Nc***,** a firm needs to grant under an incentive plan**,** if there is a state of nature, *j*, in which,

$$(F_j - W_j - M_j)(1-\tau) < N_0 X \,, \tag{9}$$

where W_j is wages in state *j*, N_0 the initial number of shares, and *X* the exercise price.

Alternatively, the lower the risk management compensation is subject to, the **more** likely condition (9) is to be met, so that the negative relationship between risk and the number of ESOs holds. Thus, the larger the amount of wages that are substituted by the grant of an ESO plan, the **less** likely it is that condition (9) will be met.

Proof

(Available from the authors upon request)

III. Data

The sample consists of 119 firms that are traded primarily on the NASDAQ. Data on firms that granted ESO plans were obtained from Proxy Statements (DEF14A) submitted to the SEC. We have established three sets of sub-samples[12]:

- In 1999-2000, 42 firms reported that they had granted an ESO plan, and more than 20% of their shares are held by a group of three or less investors, or a closely related group**.** Firms, are controlled by another firm, are included in the sample only if the holding company is controlled by an individual or a closely related group.
- In 1999, 38 firms reported they had granted an ESO plan, and no single shareholder held more than 10% of outstanding shares, and no group of three or less investors holds more than 20% of the firm's outstanding shares.
- A randomly selected set of 29 firms which have never been engaged in an ESO plan, 12 with a controlling group and 17 without a controlling group.

The ESO plans have the following characteristics:

(i) Any single full-time wage recipient is entitled to participate in the ESO plan.

(ii) All options granted under the ESO plan can be exercised to regular shares with unrestricted voting rights.

(iii) All sample firms have gone public prior to 1999, and their ESO plans may have started as early as 1994.

The first two sub-samples are mostly comprised of firms listed on the NASDAQ with foreign shareholders[13] owning some of them, and 33 of these are

[12]The first two sub-sets are believed to be an exhaustive list for this period, while the 60 firms in the third subset were selected based on the availability of data about holding patterns.

"technology firms". This may create a potential bias, since one may suspect that "technology firms" are riskier, irrespective of this paper's hypothesis that managers-owners, while granting ESO plans, tend to increase the firm's risk. Thus, in order to control for a possible "industry effect" we define an industry-adjusted risk measure (see section IV.2).

A portion of the firms have granted an ESO plan before or on the date of the initial public offering[14]. Both because they were about to go public and that 'going public' is associated with the grant of an ESO plan, employees had expected the plan well before it had actually been announced. In most firms, the initial employment contract of most employees provided for a future ESO plan, contingent upon the firm going public.

IV. Methodology and the results

This paper hypothesizes that the decision to grant a company-wide ESO plan and the change in the firm's level of risk as well as in the firm's level of debt are linked to the issue of whether or not the firm's manager has a controlling stake in the firm's equity. Specifically, if the manager has a controlling stake in the firm, he will be inclined to increase the firm's level of risk, if an ESO plan is granted, or alternatively, the management of high-risk firms will tend to grant an ESO plan.

On the other hand, firms whose management does not hold a controlling interest in the firm's equity, will tend to do the opposite, that is, an ESO plan is more likely as the firm's debt ratio increases and the over-all level of risk of the firm is lower.

We begin by testing the hypothesis that states that the grant of an ESO plan is meant to induce real gains, which is not in conflict with this paper's hypotheses.

IV.A ESO plan as a mechanism to induce employees' performance

The conventional view is that granting ESO plans is meant to induce and enhance employees' performance and therefore constitutes an alignment of shareholders', management's, and employees' interests. Thus, if we confirm this conventional view - **and** - this paper's hypothesis, we may conclude that granting an ESO plan is an efficient tool that induces real net gains, while also serving the interests of the firm's manager.

The relationship between employees' performance and granting an ESO plan is tested through two variables: sales-per-employee in annual terms, and sales-per-overall-costs of employees, (including cash wages reported by the firm, but not the value of the options granted through ESO plans). We also test directly the relationship between shareholder claims, earnings, and the grant of ESO plans. The results are in Table 1:

We cannot reject the hypothesis of a positive relationship between employees' performance and the granting of ESO plans. We cannot say, however, whether or not firms with superior employee performance tend to grant ESOs as a reward, or whether granting ESOs positively impacts employee performance. This question is probably less significant in view of the fact that employees with superior performance internalize the likelihood of a future reward in the form of an ESO or a bonus plan.

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[13] In some foreign markets, such as Israel and Sweden, most firms are controlled by shareholders who have majority-interest in the firm's equity. This characteristic is widespread even though these firms are traded in the US.

[14] In some firms in the first two-samples employees have signed an employment contract whereby upon going public they will be granted ESOs.

IV.B ESO plan as a mechanism to ease cash flow strains

The key variables are the firm's level of risk and level of shareholders' holdings and the grant of ESO plans. Risk, however, can be alternatively linked to a different scenario. That is, one may hypothesize that growth firms, which are riskier by nature, are likely to have cash flow strains, and thus, ESO plans which can partially substitute cash wage obligations, may serve as a mechanism to ease these cash flow strains.

The validity of this alternative hypothesis may be tested, either through the indirect relationship between risk and grant of ESO plans, or by analyzing the direct relationship between granting ESO plans and variables that are correlated with cash flow strains. If risk, by itself, is the explanatory variable, then we must observe a monotonic relationship between risk and granting ESO plans (see IV.3 below). Below we will present the direct test of the cash-flow-strains hypothesis. One may expect that firms under cash flow strains are more likely to grant ESO plans.

We tested the event of granting ESO plans against three variables that are highly correlated with cash flow strains. The first two, Earnings per Share (*EARNING*) and Dividend Yield *(DIV.YIELD*) are both negatively correlated with cash flow strains. The third variable is Dividend Payout ratio (*DIV.PAYOUT*).

We also believe that debt burden can be positively related to cash flow strains, that is, firms with higher debt-to-equity ratio (*DEBT.EQ*) will tend to grant ESO plans in order to ease some of the debt service burden. This variable, however, is tricky; in fact a positive relationship between debt-to-equity and granting of ESO plans may support the conventional hypothesis IV.2, that is; that firms under heavy burden of debt tend to ease cash flow strains by granting of ESO plans, but it can equally well support this paper's hypothesis in IV.4. But if the cash flow strains hypothesis, tested on other variables (*EARNING, DIV.YIELD*) is rejected, we may conclude that a positive relationship between debt-to-equity ratio and grant of ESO plan supports this paper's hypothesis. The results are given in Table II.

The significant positive relationship between grant of ESO plans and earnings-per-share, dividend-payout ratio, and dividend yield tend to support the rejection of the hypothesis that the major motivation for granting ESO plans is the need to ease cash flow strains, since the results indicate that firms with fewer cash flow strains tend to grant more ESO Plans than firms which do face cash flow strains.

On the other hand, the significant positive relationship between granting of ESO plans and debt-to-equity ratio could indicate that firms with a heavy debt burden may tend to ease this burden by granting ESO plans, and thereby reduce cash wages obligations. We suspect, that this relationship stems from another motivation, hypothesized here (see IV.4). We believe the results in IV.4 will support this assertion.

IV.C Over all logistic multiple regression

Logistic regression estimates the probability of occurrence of binary event, given continuous values of the explanatory variables.

Let the grant of an ESO plan be a binary variable with value '0' if ESO plan has not been granted, and '1' if it has been granted. We wish to estimate the probability *Pr*

$$\Pr(ESO = 1, / X_1 = x_1, ... X_i = x_i, ..., X_n = x_{n)}, \qquad i = 1, n \quad (10)$$

where *X* is the vector of the explanatory variables.

$\frac{\Pr(.)}{1-\Pr(.)}$ is the odds ratio, while $0 \leq Pr(.) \leq 1$, the odds ratio is an unrestricted positive number, and $Ln\frac{\Pr(.)}{1-\Pr(.)}$ is a well defined number. Thus we may make the assumption that

$$Ln\frac{\Pr(.)}{1-\Pr(.)} = \sum_{j=1}^{m} \beta_j X_{ij} + \varepsilon_i \,, \quad i = 1,n \tag{11}$$

and the estimator for Pr(.) is therefore:

$$\hat{\Pr}(.) = \frac{e^{\sum b_j X_{ij}}}{1 + e^{\sum b_j X_{il}}} \qquad \text{and}, \quad 0 \leq \hat{\Pr}(.) \leq 1. \tag{12}$$

The first step is a simple multiple variable logistic regression where the model is:

$$ESO = \alpha + \beta_1 DIV.PAYOUT + \beta_2 DIV.YIELD + \beta_3 CONTROL + \beta_4 BETA + \beta_5 BETA.IND +$$

$$\beta_6 BETA.DIF + \beta_7 EARNING + \beta_8 EMPLOY + \beta_9 DEBT.EQ + \varepsilon \tag{13}$$

where
DIV.PAYOUT - Ratio of dividends payout to earnings
DIV.YIELD - Dividend yield
CONTROL - Fraction of shares owned by the controlling shareholders
BETA - Level of the firm's risk measured by its beta.
BETA.IND - Level of risk of the firm's industry measured by industry beta
EARNING - Firm's earnings per share
EMPLOY - Firm's number of employees
DEBT.EQ - Debt-to-equity ratio
BETA.DIF - We may need to reconsider the issue of measuring the firm's level of risk, since one may argue that the sample includes firms that belong to riskier industries. Interestingly, while it is common to think of higher risk industries such as the technology sector as tending to grant ESO plans, the hypothesis regarding the level of risk of individual firm may be rejected. This will be the case if this paper finds that sector's risk level **does** explain the grant of ESO plans while the risk level of individual firm, measured by *BETA*, **does not**. Thus, we believe that the measure of risk should be defined in relative terms, i.e., individual firm's risk relative to the risk of the firm's industry.[15] Thus, we define the risk differential *BETA.DIF*, as:

{beta(i)/beta(I) – 1}, for firm *i* in industry *I* (14)

The results are described in Table III. The first stage of the multiple variable regression re-confirms the finding in IV.3, that is, the motivation underlying granting

[15] S&P 500 for NYSE listed securities, and the NASDAQ index for the remaining ones.

ESO plans may not be the firm's cash flow strains. Interestingly, using the stepwise regression procedure, the results indicate that the most significant explanatory variables for the grant of ESO plans are the dividend payout ratio, the debt-equity ratio and the industry's beta. This may lead to the conclusion that (i) prospering firms tend to grant ESO plans, perhaps, substituting conventional bonus plans to employees, and, (ii) firms in riskier industries tend to grant ESO plans.

The lack of confirmation, so far, for this paper's main hypothesis is expected since the motivations that are believed to be the ground for the decision to grant ESO plans are different than the conventional ones, and/or are in conflict with each other. Thus, the decision to grant an ESO plan may be non-linear with respect to variables such as the firm's risk and level of control, that is; "high risk - high level of control" and "low risk – low level of control can both trigger an ESO plan. Verification of this hypothesis requires a different type of analysis, pursued in the next section.

IV.D Risk, control and grant of ESO plans

This paper hypothesizes that the decision to grant an ESO plan, the firm's level of risk (either over-all risk or equity risk), the firm's debt ratio, and managerial stake in the firm's equity are non-linearly related.

A manager-owner would be reluctant to grant an ESO plan, if it threatens his or her control of the firm by diluting his or her equity position. However, since, the higher the firm's level of risk the lower the risk of dilution (see proposition 1), he or she will be more inclined to approve the grant of an ESO plan. Alternatively, management will tend to increase the firm's level of risk while granting an ESO plan. On the other hand, diffused-ownership firms in which management does not hold any interest in the firm's equity, will tend to do the opposite, that is, a decision to grant an ESO plan is more likely as the firm's debt ratio increases and the over-all level of risk of the firm decreases.

Thus, we test the relationship between granting ESO plans and risk, while viewing 'control' as an exogenous parameter, for each of the following sample sets:

- Firms which have or have not granted ESO plans, but have a group of major shareholders who control the firm and appoint their management team, and,
- Firms, which have or have not granted ESO plans, and no shareholder effectively controls the firm.
-

Then we re-shuffle the data and sort it by level of differential risk (*DIFF*), i.e., the relative level of firm's risk to that of its industry:

- Firms which have or have not granted ESO plans, but *DIFF* is greater than zero, i.e., riskier than their respective industry, and,
- Firms which have or have not granted ESO plans, but *DIFF* is smaller than zero, i.e., less risky than their respective industry.

The results are shown in Table IV.

Unlike the previous results in section IV.3., where these variables were tested simultaneously, the results here tend to support this paper's hypotheses:

(i) Differential firm's risk level (*DIFF*) is negatively related to ESO plans when there is no controlling shareholder, but positively when there is a group of shareholders who effectively control the firm's decisions.

(ii) Level of control is negatively related to the grant of ESO plans when the firm's equity is less risky than its industry, and positively related when the firm's equity is riskier than their respective industry

(iii) Though debt-equity ratio was a crucial variable in section IV.3, the results here indicate that this ratio is significant only for diffused-ownership firms in which no shareholder effectively controls the firm. This finding supports our assertion that the relationship between the debt ratio and the grant of an ESO plan does not stem from the cash flow strains hypothesis.

The results clearly demonstrate that firms which have granted ESO plans, can be dichotomized along the following two types of managerial objective functions:
(i) If the firm is substantially controlled by a shareholder, the riskier its equity the more likely it is to grant an ESO plan. In this case, under this paper's hypothesis that relies on Proposition 1, the objective of a manager-owner is to avoid dilution of his or her controlling position by minimizing the number of options granted given a constant optimal value of the overall option package.
(ii) Low-risk firms with diffused-ownership are more likely to grant ESO plans when their debt ratio is high, since the firm's managers are concerned with securing their cash flow claims. While this paper's hypothesis is related to the over all level of risk of the firm, we could not verify that 'low-risk-equity' and 'low-over-all-risk' have the same effect on the manager's decision.

V. Conclusion

The trend of "broad" ESO plans is often cited as a mechanism of improving employees' performance, or easing cash flow strains, or attracting highly skilled labor. The above arguments suggest an alignment of interests of all the firm's claimholders.

Irrespective of whether or not granting an ESO plan actually serves the interests of the employees, the shareholders, and the firm's creditors, this paper hypothesizes that granting ESO plans serves the goals of the firm's managers, which, in turn, depend on the managers' motivations which stem from the specific type of their firms.

This paper empirically supports that a manager-owner, motivated by the wish to avoid **dilution** of his **controlling** position, is more likely to grant an ESO plan, the **riskier** the firm's equity, while a manager of a **diffused ownership** firm, is more likely to grant an ESO plan when the firm's **debt** ratio is high and the **overall risk** level is **low**. The implication is clear. While the manager-owner's interests are in conflict with those of the employees and of the non-control seeker shareholders, there is an alignment of interest between those of the manager of a diffused-ownership firm and the of employees, perhaps because the manager perceives the employees, who have been granted ESOs, as potential supporters, in the event of an hostile take over.

To verify this interpretation, one could analyze two important parameters of ESO plans: the exercise price of the options and the terms of payments for the exercise price granted to the firm's employees. This paper showed that, given the firm's level of risk, the lower the exercise price associated with these ESOs, the lower the immediate dilution risk, although the manager-owner can not avoid dilution in the future. This statement supports the observation that ESOs may be a mechanism of financing future wages.

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Table I

	High-risk firm			Low-risk firm		
	End-of-period outcomes		post-offer present value	End-of-period outcomes		post-offer present value
	Favorable state	Unfavorable state		Favorable state	Unfavorable state	
Value of firm's assets	572	175	356	472	300	356
Management's compensation	143	43.75	**89**	118	75	**89**
Share price	1.95	1.3125	**1.5**	1.7318	1.5852	**1.5**
Number of options granted	**520** [16]			**780**		
Exercise price of the options	1.5			1.5		
The value of a single option	0.225			0.15		
Value of options package to employees, substituting 117 of fix wages	**117**			**117**		

The number options that are granted under an ESO plan are given above for high and low-risk firms. In both cases, the firm's value, price per share, management and employees packages are assumed to remain unchanged as a result of the grant of the ESOs. Yet, the risky firm needs to grant only 520 options as opposed to 780 options of the low-risk firm. The numbers however were chosen so as to comply with Proposition 1.

[16] We solve three equations simultaneously (6),(7),(8) and the assumption that the overall value of the ESOs granted is equal to the total pre-offer fix wages (4). For example, share price of the high risk firm in the unfavorable state is (175-43.75+0)/100 and (572-143+520*1.5)/620 in the favorable one.

TABLE II

This Table presents the results regarding the issue whether firms under cash flow strains tend to grant ESO plans.

ESO plans and cash flow strains

Variables		Statistics		
Dividend yield	***(DIV.YIELD)***	Mean	1.21	%
		SD	1.72	%
Dividend payout ratio	***(DIV.PAYOUT)***	Mean	17.78	%
		SD	24.62	%
Earning per share	***(EARNING)***	Mean	1.10	
		SD	1.65	
Debt - equity ratio	***(DEBT.EQ)***	Mean	1.70	
		SD	8.47	
Regressions Results				
1	***DIV.YIELD***	= ***0.031***	+ ***1.478***	***ESO***
		(.1074)	(4.4369)	*
		F	: 19.68(0.00)	
		R	: 0.37812	
		Adjusted R	: 0.13572	
		Standard E	: 1.5801	
		Reg SumSq	: 49.151	
		Reg MeanSq	: 49.151	
		Res SumSq	: 294.6	
		Res MeanSq	: 2.496	
2	***DIV.PAYOUT***	= ***0.3332***	+ ***22.3177***	***ESO***
		(.0082)	(4.761)	*
		F	: 22.66(0.0)	
		R	: 0.4014	
		Adjusted R	: 0.1540	
		Standard E	: 22.235	
		Reg SumSq	: 11206	
		Reg MeanSq	: 11206	
		Res SumSq	: 58339	
		Res MeanSq	: 494.4	
3	***EARNING***	= ***0.3906***	+ ***0.8247***	***ESO***
		(1.324)	(2.428)	*
		F	: 5.89(.017)	
		R	: 0.2199	
		Adjusted R	: 0.0401	
		Standard E	: 1.5882	
		Reg SumSq	: 14.876	
		Reg MeanSq	: 14.876	
		Res SumSq	: 292.616	
		Res MeanSq	: 2.5222	
4	***DEBT.EQ***	= ***0.2974***	+ ***0.7837***	***ESO***
		(1.320)	(2.983)	*
		F	: 8.90(.003)	
		R	: 0.2858	
		Adjusted R	: 0.0725	
		Standard E	: 1.1705	
		Reg SumSq	: 12.196	
		Reg MeanSq	: 12.196	
		Res SumSq	: 137.01	
		Res MeanSq	: 1.3701	

* Significant at 5% or less

TABLE III

Multiple-variable Logistic Regression and Forward Stepwise (conditional).

Logistic Regression

1. Multiple variables

Classification Table

Observed		Predicted		
		0	1	
ESO P	0	14	19	42.42%
ESO P	1	4	86	95.56%
			overall	85.37%

Constant is included Cut off value - .5

Variables in the equation

		S.E.	Wald	Significance
conatant	1.386	0.354	15.374	0.00
		Score		Significance
div.yield		3.983		0.047
div.payout		4.587		0.032
control		0.870		0.351
beta		0.757		0.384
beta.ind		0.191		0.662
beta.dif		0.501		0.479
earning		3.433		0.064
employ		2.214		0.137
debt.eq		4.221		0.037

2. Forward Stepwise

Model Summary

step	-2 log likelihood	cox &Snell R square	Nagelkerke R Square
1	42.513	0.14	0.221
2	38.512	0.206	0.326
3	35.096	0.258	0.409

Variables in the equation

step	variables		SE	Wald	significance
1	constant	0.457	0.745	0.376	0.540
	div.payout	0.035		3.195	0.074
2	constant	1.085	0.859	1.594	0.207
	div.payout	0.058		5.187	0.023
	debt.eq	1.941		4.667	
3	constant	4.259	2.140	3.960	0.047
	div.payout	0.125		6.365	0.012
	debt.eq	2.140		5.976	0.015
	beta.ind	3.944		2.778	0.096

TABLE IV

This Table presents the results regarding the relationship between the grant of ESO plans, risk and debt ratio (debt.eq) for various levels of control, or the relationship between the grant of ESO plans and control for various level of relative risk (diff).

	Regressions Results						
1	***diff***	**=**	***0.00443***	**+**	***-0.35017***	***ESO***	
	(Low level of control, <15%)		(.0399)		(-2.611)		*
				F	: 6.82(.011)		
				R	: 0.3081628		
				Adjusted R	: 0.0810407		
				Standard E	: 0.5091329		
2	***diff***	**=**	***-0.3231***	**+**	***0.32713***	***ESO***	
	(High level of control,>15%)		(-2.5571)		(2.3587)		*
				F	: 5.56(.022)		
				R	: 0.3136234		
				Adjusted R	: 0.0806804		
				Standard E	: 0.3791017		
3	***beta***	**=**	***0.74143***	**+**	***-0.1723***	***ESO***	
	(Low level of control, <15%)		(6.6119)		(-1.2732)		
				F	: 1.62(.21)		
				R	: 0.1559835		
				Adjusted R	: 0.0093205		
				Standard E	: 0.5138635		
4	***beta***	**=**	***0.935***	**+**	***0.104091***	***ESO***	
	(High level of control,>15%)		(5.7296)		(0.5811)		
				F	: .337(.56)		
				R	: 0.0811149		
				Adjusted R	: 0.0065796		
				Standard E	: 0.4895569		
5	***beta.ind***	**=**	***0.66942***	**+**	***0.17448***	***ESO***	
	(Low level of control, <15%)		(6.6527)		(1.4367)		
				F	: 2.06(.15)		
				R	: 0.1754468		
				Adjusted R	: 0.0158705		
				Standard E	: 0.4611161		
6	***beta.ind***	**=**	***1.2666***	**+**	***-0.02075***	***ESO***	
	(High level of control,>15%)		(10.3410)		(-1.5435)		
				F	: 2.38(.12)		
				R	: 0.211258		
				Adjusted R	: 0.025897		
				Standard E	: 0.367466		
7	***debt.eq***	**=**	***0.29526***	**+**	***0.8696***	***ESO***	
	(Low level of control, <15%)		(1.0584)		(2.5339)		*
				F	: 6.42(.01)		
				R	: 0.3259892		
				Adjusted R	: 0.0897184		
				Standard E	: 1.2159267		
8	***debt.eq***	**=**	***0.3025***	**+**	***2.8869***	***ESO***	
	(High level of control,>15%)		(.0678)		(0.5896)		
				F	: 0.34(.55)		
				R	: 0.0875506		
				Adjusted R	: 0.0076651		

	Regressions Results						
				Standard E		:12.616449	
9		***control***	**=**	***33.4785***	**+**	***-19.0615***	***ESO***
		Low level of risk , ***diff***<0		(7.2829)		(-3.616)	*
				F		:13.07(.00)	
				R		:0.3991627	
				Adjusted R		:0.1471472	
				Standard E		:18.953375	
10		***control***	**=**	***5.3782***	**+**	***14.6373***	***ESO***
		High level of risk, ***diff***>0		(1.5243)		(3.5558)	*
				F		:12.64(.00)	
				R		:0.4604301	
				Adjusted R		:0.1952299	
				Standard E		:12.721541	

* Significant at 5% or less.