THE RISK-TAKING EFFECT OF EXECUTIVE STOCK OPTIONS ON FIRM PERFORMANCE

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ABSTRACT

This paper examines the risk-taking effect of ESOs on firm performance by taking into consideration managers' personal risk aversion. A three-stage-least-square is adopted to examine a simultaneous system consisting of three equations describing option compensation, risk-taking, and performance, respectively. Evidence confirms that ESOs increase managerial risk-taking, but such risk taking is constrained by managers' personal risk aversion. In addition, evidence indicates that managerial risk-taking induced by ESOs would increase both long-term and near-term stock returns. On the other hand, the negative impact on near-term and the positive impact on long-term returns on investment (ROI) imply that it takes time for accounting performance to reflect the risk-taking effect of ESOs.

INTRODUCTION

There exists a large amount of finance literature examining the issue of equity-based executive compensation and corporate agency problems. The theoretical rationale behind the use of equity-based executive compensation is quite straightforward. Since executives' wealth is now linked to the stock price through equity-based compensation, they are now more inclined to align their own interests with the shareholders' interests. Generally, the current literature can be categorized into the following three groups depending on the focuses of the research.

The first group of the literature studies the determinants and characteristics of equity-based compensation and its relationship with corporate policies (e.g., Jensen and Muphy, 1990a; Gaver and Gaver, 1993; Guay, 1999; Ittner et al., 2003). The second group of studies investigates the association between equity-based compensation and firm performance (e.g., Mehran, 1995; Chung and Pruitt, 1996; Hermalin and Wallace, 2001; Ang et al., 2001; Ittner, et al., 2003). The third group of the literature examines the components of equity-based compensation (e.g., Smith and Stulz, 1985; Guay, 1999; Hemmer et al., 2000; Bryan et al., 2000). The major purpose of this study is therefore to examine the risk-taking effect of ESOs on firm performance considering the endogenous relationship among the variables. The key issue here is whether ESOs provides risk-averse managers with such kind of risk-taking incentive that they would undertake enough risky investment projects to maximize firm value. Both theoretical studies of Ju et al. (2002) and Gervais et al. (2003) argue that option compensation can only increase risk-taking incentive when managers' equity holding is low and the managers' risk aversion would dominate when managerial equity holding is very high. In other words, at high level of equity holdings, managers wouldn't take enough value-maximizing risky investment projects. A similar argument has also been made in the studies by Detemple and Sundaresan (1999), and Nohel and Todd (2003).

METHODOLOGY

To examine the impact of ESOs on managerial risk-taking and the risk-taking effect of ESOs on firm performance, we have employed the three-stage-least-square methodology. We examine a system of three equations of option compensation, risk-taking, and firm performance, as shown below.

$$System \begin{cases} ESO_T = f(Prior\ \ StockRisk\ , Capital\ \ Investment_{\ t}, Managerial\ \ Ownership_{\ t-1}, \\ \qquad Unexercise\ d\ Options_{\ t-1}, Leverage_{\ t-1}, Dividend_{\ t-1}, Size_{t-1}) & (1) \\ Risk_{T1} = f(ESO_T, (ESO_T^2), Managerial\ \ Ownership_{\ t}, Unexercise\ d\ Options_{\ t}, \\ \qquad Cash\ \ Flow_{\ t}, Size_t, MB_t, Tech\ \ Industry\ \ dummy) & (2) \\ Performanc\ e_{T2} = f(Risk_{T1}, Prior\ \ Performanc\ e, Tech\ \ Industry\ \ Dummy) & (3) \end{cases}$$

In Equation (1), key relevant financial variables (mainly lagged values) are used as instrumental variables of the ESOs variable. The independent variables of *ESO* and ESO^2 in Equation (2) are the predicted value from Equation (1). In Equation (3), the independent variable, *Risk,* is the predicted value from Equation (2).

EMPIRICAL RESULTS AND ANALYSES

In this section, we will present the empirical evidence and analyze the testing results. Due to the similarity of the empirical results and the concern of space, our following presentation and discussion will be focused on the system of equations using long-term stock performance measure and the system of equations using near-term accounting performance measure. In both Equations 1 and 2, the dependent variables are measured over a four-year time period. In Equation 3, the long-term stock performance is measured over a five-year time period after the initial four years of the ESOs awards. As expected, prior stock volatility ($StockRisk_{(t-5,\ t-1)}$) is significantly positively related to option awards. Capital investment indicates a firm's future prospects and is significantly positively related to ESOs. The coefficient of managerial shareholding is negative, while that of unexercised options is positive, both of which show significance at the one percent level. When managerial ownership is high, the agency problems would be low. Thus, the option compensation is less necessary. The positive relation between unexercised options and option awards ($IR_{(t,\ t+3)}$) confirms that firms that award ESOs are likely to continuously award executive stock options. Dividend yield exhibits a significant and negative relation to ESOs. Firm size shows a significantly positive relation with ESOs. In the risk equation, the predicted incentive ratio exhibits a positive relation with future stock volatilities. In performance equation, the predicted value of stock risk is positively related to future stock performance, which demonstrates that the investment risk induced by ESO awards increases a firm's future performance. Unlike the results for long-term performance testing, the risk-taking effect of ESOs on near-term accounting performance is not similar to the risk-taking effect of ESOs on near-term stock performance. Since the explanatory power in the risk-taking effect of ESOs on near-term stock performance is similar to that on long-term stock performance, we only include the results for accounting performance measure in the paper. Overall, this near-term specification poorly explains the risk-taking effect of ESOs on near-term return on invested capital.

CONCLUSIONS

This study intends to examine the risk-taking effect of executive stock options on firm performance, taking into account the risk-aversion behavior in managerial investment decision-making. The empirical model uses a system of three regression equations of current option awards, near-term risk taking, and long-term (or near-term) firm performance. The empirical results confirm a nonlinear impact of ESOs

on risk taking. A high level of option awards has a negative effect on risk taking, while a low level of ESOs has a positive effect on risk-taking. However, managers' personal portfolio risk, with managerial ownership as the proxy, has no significant impact on the risk-taking incentive of ESOs. Although the risk-taking effect of ESOs on return on invested capital is negative in the near-term, the effect on both long-term return on invested capital and long-term stock returns are positive. Such results can imply that managers are more concerned with stock volatility and stock performance, and may also imply that the risk-taking effect of ESOs requires a certain period of time to be observable.

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