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The causal effect of option pay on corporate risk management☆

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ABSTRACT

This study provides strong evidence of a causal effect of risk-taking incentives provided by option compensation on corporate risk management. We utilize the passage of Financial Accounting Standard (FAS) 123R, which required firms to expense options, to investigate how chief executive officer option compensation affects the hedging behavior of oil and gas firms. Firms that did not expense options before FAS 123R significantly reduced option pay, which resulted in a large increase in their hedging intensity compared with firms that did not use options or expensed their options voluntarily prior to FAS 123R.

1. Introduction

The 1990s experienced an explosion in the use of stock options in executive pay packages (Murphy, 1999), and options-based pay has represented a significant proportion of executive compensation ever since. The rationale for managerial option compensation is based on the premise that an increase in convexity of the pay-to-performance relation helps overcome managerial risk aversion and align interests of executives with those of shareholders (Jensen and Meckling, 1976). Unlike diversified shareholders, the undiversified wealth portfolios and firm-specific human capital of managers can make them risk averse, leading them to forgo risky positive net present value (NPV) projects. The convex payoff of stock options purportedly provides managers with incentives to take more risk.[1] However, the extensive empirical literature on this

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[1] The theoretical literature underlying the premise that stock options enhance risk-taking incentives is not unequivocal. Option compensation can also motivate taking less risk, depending on the risk aversion coefficient of the chief executive officer and the moneyness of the option. See,

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relation has failed to settle whether and how stock option compensation alters managerial risk attitudes.[2] This study helps resolve this open research question in the managerial compensation literature while making an important contribution to the corporate risk management literature by providing strong causal evidence in support of the managerial risk aversion motive for corporate hedging (Smith and Stulz, 1985).

Establishing causality between option pay and managerial risk taking is difficult because empirical measures of executive risk-taking behavior and option pay are usually endogenously determined. For example, firms with risk-averse boards can choose to compensate managers with fewer options and simultaneously encourage the use of derivatives to mitigate risk. Alternatively, due to manager-firm matching in the labor market, more risk-averse managers who hedge more could work for firms that award fewer options to their executives. Thus, drawing a causal inference between option pay and risk-taking incentives is not straightforward, and any empirical association between option compensation and risk taking could be spurious.

To overcome these endogeneity concerns, this paper examines the relation between option compensation and risk taking (corporate hedging), utilizing the quasi-natural experiment created by the 2005 mandate that firm comply with Financial Accounting Standard (FAS) 123R. This new regulation required firms to expense executive stock options at fair value, and it resulted in a significant cutback in option pay, thereby reducing the sensitivity of chief executive officer (CEO) wealth to stock return volatility (vega). Using a difference-in-differences (DID) methodology, we find that the reduction in option pay by firms that were affected by FAS 123R results in a significant increase in their hedging intensity compared with similar firms that were unaffected by the regulation. The sharp change in compensation that arises from FAS 123R does not change the risk management incentives of shareholders but potentially changes the risk-taking incentives of executives affected by the compensation change. Therefore, this setting allows us to examine the causal relation between stock option compensation and corporate risk management.

We use a unique hand-collected data set on the hedge positions of firms from the oil and gas industry during 2003 to 2006, the years around the FAS 123R compliance date. Our sample firms are independent exploration and production firms [standard industrial classification (SIC) 1311] that are undiversified in terms of physical assets. As in Tufano (1996), we develop a firm-wide measure of the level of risk management, or hedging intensity, based on the delta of the firm's derivatives portfolio. The first advantage of this data set is that our main hypothesis is best tested in an industry, such as oil and gas, in which cash flow volatility is high enough to make risk management economically important and widespread. Second, focusing on one industry improves identification by yielding a homogenous sample with less unobservable differences in firm characteristics. Finally, oil and gas firms extensively disclose their hedging activities at a level of detail that enables rigorous empirical analysis.[3]

In our tests, we define fiscal year 2005 as the beginning of the post-123R period because FAS 123R became effective as of the first interim or annual reporting period that begins after December 15, 2005. We identify two groups of firms that are unlikely to be affected by FAS 123R. The first group contains firms that did not use options in their CEO compensation packages in 2003 and 2004. The second group consists of firms that voluntarily expensed the fair value of executive stock options starting prior to 2003. These two groups of control firms are unlikely to be affected by the new regulation on expensing option grants. Our tests compare changes in corporate hedging intensity of treated firms with those of the control firms in pre-123R and post-123R periods.

As expected, we find in DID regressions that the adoption of FAS 123R leads to a sharp reduction in CEO's compensation convexity (vega), which indicates that FAS 123R made option pay less attractive. This result also validates that our natural experiment operates primarily through a large negative shock to vega. In addition, it points to the fact that, despite the limited size of our industry-specific sample, our DID technique has enough power to uncover significant effects of the policy change.

The cutback in the use of option pay following the issuance of FAS 123R could also change the sensitivity of CEO wealth to stock price (delta). Higher delta is seen as aligning the incentives of managers with the interests of shareholders by increasing the extent to which managers share gains and losses with shareholders. However, a higher delta decreases the willingness of risk-averse managers to bear risk and, therefore, can induce them to hedge more. We find that firms in our treatment group replaced stock options with restricted stock and longer-term incentive plans, resulting in CEO deltas after FAS 123R that are larger, on average. Although in our analysis we control for changes in CEO delta, we show that the shock has an insignificant differential effect on delta, indicating that the overall changes in delta were similar for both treated and control groups and not caused by FAS 123R. This is comforting, as differential changes in delta around FAS 123R could have affected hedging behavior and contaminated our causal inference.

We find a sharp increase in corporate hedging caused by the decline in vega. In our main specification, the DID estimator is 0.27, which means that hedging more than doubled relative to the 2003–2004 (pre-treatment period)

for example, Lambert, Larcker, and Verrecchia (1991), Carpenter (2000), Ross (2004), Tian (2004), Braido and Ferreira (2006), and Ju, Leland, and Senbet (2014).

[2] See, for example, Guay (1999), Cohen, Hall, and Viceira (2000), Knopf, Nam, and Thornton (2002), Rajgopal and Shevlin (2002), Rogers (2002), Chen, Steiner, and Whyte (2006), Coles, Daniel, and Naveen (2006), Lewellen (2006), Brockman, Martin, and Unlu (2010), Dong, Wang, and Xie (2010), Chava and Purnanandam (2010), Hayes, Lemmon, and Qiu (2012) and Gormley, Matsa, and Milbourn (2013).

[3] Several prior studies of corporate hedging, including Haushalter (2000), Rajgopal and Shevlin (2002), Jin and Jorion (2006), Kumar and Rabinovitch (2013) and Acharya, Lochstoer, and Ramadorai (2013), have exploited the informativeness of oil and gas firm hedging data to test theoretical predictions, and other studies verify the validity of findings for the oil and gas industry in broader multi-industry samples [see, for example, Knopf, Nam, and Thornton (2002)].