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Call Options and Accruals Quality

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We analyze the link between financial reporting choices that affect accruals quality and firms' use of call options. We argue that call options used in compensation arrangements (employee stock options or ESOs) create countervailing incentives for managers to affect accruals quality. On the one hand, poorer accruals quality is associated with greater returns volatility (which leads to an increase in ESO value); on the other hand, better accruals quality is associated with a lower cost of capital (and, therefore, higher share price, which leads to an increase in ESO value). We confirm both effects on accruals quality, and we show that the net effect is for ESOs to worsen accruals quality. We provide additional evidence on this main result by showing that in two settings where the returns volatility incentive to worsen accruals quality is muted or absent (cases where managers hold employer shares and cases where the firm uses call options for financing purposes, such as preferred stock and convertible debt), the overall incentive is for managers to increase accruals quality.

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Call Options and Accruals Quality

1. Introduction

We examine the relation between accruals quality and the use of returns volatility sensitive and price sensitive instruments such as call options, which set up countervailing incentives with regard to accruals quality. To see these incentives, note that a call option's value is increasing in both returns volatility and stock price. Further note that prior research shows that better accruals quality is associated with decreased *priced* returns volatility (leading to lower costs of capital and therefore higher stock prices) and that poorer accruals quality is associated with greater *total* returns variability.[1] Decisions which affect accruals quality will therefore be influenced by incentives to trade off the option valuation effects of a decreased cost of capital – that is, a higher stock price – with higher returns volatility.

Our study exploits the fact that the strength of these two forces differs across call option instruments and across forms of compensation. In particular, when call options are used for compensation purposes (e.g., employee stock options or ESOs), both incentives exist and it is *ex ante* unclear which dominates. In contrast, when call options are used for financing purposes (convertible debt and convertible preferred stock), the incentive to increase returns volatility is absent because these convertible instruments provide managers with little or no opportunity to capture the valuation effects of increased returns volatility (because managers do not typically own these instruments). Within the compensation setting, managerial shareholdings of employer shares heighten the price effect (and mute the returns volatility effect) because such shareholdings create incentives for managers to increase stock price without creating incentives to increase returns volatility.

Our analyses differ from prior work on the incentive effects of call options in two ways. First, prior research focuses on compensation arrangements, particularly ESOs, and has in general not

[1] Easley and O'Hara [2004] and Leuz and Verrecchia [2004] develop theoretical models of the relation between the cost of capital and information risk; empirical research has shown that accruals quality captures elements of this risk (Francis, LaFond, Olsson and Schipper [2005, 2004a]). In addition, Francis, LaFond, Olsson and Schipper [2004b] and Rajgopal and Venkatachalam [2004] document a significant positive association between accruals quality and idiosyncratic returns volatility. We confirm that these associations exist for our samples in section 3.3.

considered financing arrangements. Second, research has tended to examine either incentives to increase risk (and therefore returns volatility) or incentives to increase performance (and therefore stock price), but not both. An exception is Hanlon, Rajgopal and Shevlin [2004] who find some evidence that ESOs are associated with increased operating performance and with increased returns volatility. Our paper is related in that we also consider an outcome measure, namely, financial reporting decisions as summarized by accruals quality. However, our outcome measure differs in that it is associated with both volatility-increasing effects and price-increasing effects. That is, ESOs create incentives *both* to increase accruals quality and thereby increase stock price *and* to decrease accruals quality and thereby increase returns volatility. If the former effect dominates, then ESOs will be associated with overall better accruals quality and if the latter effect dominates, then the opposite will be true.[2]

While our analyses focus on how accruals quality is affected by the use of call options for compensation and financing purposes, we view the use of call options and their reporting consequences as potentially endogenous and simultaneous decisions. Following prior research, we expect that accruals quality is influenced by call option incentives and vice versa (simultaneity), with a portion of both constructs driven by a set of underlying factors (endogeneity).

Our tests require data on accruals quality, and on the use of call options for compensation purposes (ESOs) and for financing purposes (convertible debt and convertible preferred stock). We measure total accruals quality (*AQ)*, following McNichols' [2002] modification of Dechow and Dichev [2002], as the standard deviation of the time-series of a firm's residuals from a regression of working capital accruals on lagged, current and future cash flows, as well as change in revenues and property, plant and equipment. Larger standard deviations indicate greater uncertainty in accruals and, therefore, poorer accruals quality. We control for the portion of total accruals quality that is driven by fundamentals associated with the business environment and its operating risks, because our predictions about managerial responses to the use of call options relate to the portion of accruals quality which managers

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[2] Because we focus on only the financial reporting effect of ESOs, we are not able to comment on whether the aggregate effect of ESOs is costly or beneficial to shareholders.

can influence by making accounting choices, judgments, estimates and implementation decisions within generally accepted accounting principles. Our tests take discretionary accruals quality as a summary indicator of the influence on financial reporting decisions of call option arrangements.

For several reasons, including the apparent sensitivity of results reported in previous research to specification and design choices, we analyze two different ESO constructs, each with its own advantages and disadvantages. Our first measures, based on *Execucomp* data, capture ESO sensitivity to returns volatility and to stock price for 1,182 firms over 1992-2002. These measures are available only for the top five executives and are not available for call options used in financing arrangements, so for these tests we are not able to make comparisons between ESOs and convertible instruments. For these tests we can, however, evaluate the effects of managerial shareholdings, which we expect to be associated with better accruals quality given that such shareholdings encourage reporting behaviors which increase share price. Our second measures, based on *Compustat* data, capture the number of call options used in both compensation and financing arrangements for 3,322 firms over 1984-1995. These usage measures permit direct comparisons between ESOs and convertible instruments, are not restricted to the top five executives (but rather include all call options outstanding to the firm), and are available for a larger sample of firms.[3] However, these data are not available after 1995 and they do not take account of the separate sensitivities of option values to stock price and to returns volatility; further, data on managerial shareholdings are not readily available over this earlier time frame.

Our results generally conform to all predictions. Analyses based on the ESO sensitivity measures indicate that greater ESO sensitivity to returns volatility is associated with poorer accruals quality, and that greater ESO sensitivity to stock price is associated with better accruals quality; both results are significant at the 0.001 level. Further tests show that the returns volatility effect of ESOs dominates the price effect, resulting in net poorer accruals quality. In addition, we find that managerial shareholdings

[3] In particular, prior studies tend to either use hand-collected data for relatively small samples of firms (Guay [1999, N=278 CEO's in 1973]; Rajgopal and Shevlin [2002, N=121 CEOs in the oil and gas industry in 1998]; Cohen, Hall and Viceira [2000, N=478 firms in 1984]) or use a sub-sample of firms with data available on *Execucomp* (Hanlon, Rajgopal and Shevlin [2003]; Coles, Daniel and Naveen [2003]; Li [2004]).

are associated with better accruals quality, consistent with such shareholdings creating incentives for managers to take financing reporting actions which improve accruals quality and thereby increase share price. Analyses based on the option usage measures indicate that greater use of ESOs is also associated with net poorer accruals quality, and that this relation is more pronounced for firms with stronger mappings of accruals quality into returns volatility; both results are significant at the 0.001 level. Results for convertible instruments show that greater use of convertible debt and convertible preferred stock is associated with better accruals quality, consistent with these instruments providing managers with no incentive to increase returns volatility and therefore to worsen accruals quality.

In summary, we find that managers trade off call option based incentives for both poorer and better accruals quality. The overall financial reporting effect of using call options in compensation arrangements is a decrease in accruals quality, while the overall financial reporting effect of using call options in financing arrangements is an increase in accruals quality. Further tests show some evidence that overall lower accruals quality elicits decreased use of call options in compensation arrangements; in contrast, we find increased use of convertible instruments in response to better accruals quality.

We also provide estimates of the benefits to the manager and the cost to the firm of the poorer accruals quality associated with ESOs. For our samples, we estimate the average top five managers' ESO portfolio value increases by about $91,000 (or about 6% of his annual total compensation and about 17% of his salary plus bonus). For the firm, the poorer accruals quality effect of ESOs translates into a cost of capital premium of about 29-210 basis points. The latter estimate does not imply that firms are destroying value by using ESOs, since the use of ESOs also likely results in benefits which are not captured by our tests (such as, for example, new products and increased profitability).

The rest of the paper is organized as follows. Section 2 motivates our hypotheses in the context of related work. Section 3 describes the data and samples, and provides evidence on a maintained assumption: that accruals quality is associated with greater returns volatility. Section 4 presents the results, and section 5 concludes.

2. *Hypothesis Development*

2.1. Association between the use of call options in compensation arrangements and accruals quality.

Our analyses build on previous research that considers volatility-based and share-price-based incentive effects associated with the use of call options in compensation arrangements. With regard to the former, researchers have taken the view that ESOs primarily induce desirable increases in volatility because they motivate risk-averse managers to choose high risk (volatility increasing) projects that presumably have positive net present values (e.g., Lambert [1986], Lambert, Larcker and Verrecchia [1991], Hemmer, Kim and Verrecchia [1999], Guay [1999] and Ittner, Lambert and Larcker [2003]). Direct tests of this proposition, focusing on project selection, are found for the oil and gas industry (Rajgopal and Shevlin [2002]), the gold industry (Tufano [1996]), merger and acquisition activity (Li [2004]; Agrawal and Mandelker [1987]) and research and development investments (Coles, Daniel and Naveen [2003]). Other tests have examined broader measures of the outcome of risky project selection, documenting positive associations between ESO risk incentives and contemporaneous returns volatility (Guay [1999]), subsequent returns volatility (Cohen, Hall and Viceria [2003]), and subsequent cash flow and earnings volatility (Hanlon, Rajgopal and Shevlin [2004]).

With regard to share-price-based incentives, research has considered whether ESOs provide incentives to increase stock price (or income, a major determinant of stock price). For example, Hanlon, Rajgopal and Shevlin [2003] report that ESOs are associated with increased operating income, although this result is sensitive to specification and other design choices (Larcker [2003]). A variant of this research takes the view that ESOs create incentives for *apparent* increased performance, that is, incentives to manage earnings so as to manipulate share prices higher (e.g., Bartov and Mohanram [2004], Cohen, Dey and Lys [2004] and Ke [2004]).

Tests of the extent to which ESOs create incentives for managers to undertake high-risk projects (or to increase share price) are predicated on the view that managers have access to mechanisms for increasing returns volatility (or for improving performance). Building on previous research that documents these associations, we posit that managers' access to financial reporting decisions is a mechanism for increasing returns volatility via poorer accruals quality, and for increasing stock price via better accruals quality through a reduction in the cost of capital. We argue that managers trade off incentives to make financial reporting decisions that decrease accruals quality (and, by implication, increase returns volatility) and increase accruals quality (and, by implication, increase share price). It is an empirical question which effect is stronger.

In addition, following Rajgopal and Shevlin's [2002] analysis of the endogenous relation between risk incentives and ESOs in oil and gas firms, we view both accruals quality and option use as choice variables, endogenously determined. In our setting, we predict that discretionary accruals quality—as a managerial choice mechanism that affects returns volatility—is affected by the use of ESOs. Because this relation is both simultaneous and endogenous with governance decisions about ESO usage, we allow for a governance response to the accruals quality effects of ESOs. By governance response we mean that accruals quality potentially affects boards of directors' decisions about ESOs. In the case of the ESO sensitivity measure, we predict either no governance response to poorer accruals quality associated with greater ESO sensitivity to returns volatility or a response that decreases ESO sensitivity to returns volatility. The latter response, which mutes the change in ESO value as a function of accruals quality, might create incentives to decrease accruals quality even further, so as to obtain the same overall effect on option values. In the case of the ESO usage measure, our review of the literature suggests two possible governance responses. On the one hand, Ittner et al.'s [2003] evaluation risk argument suggests that firms with poor accruals quality will use ESOs less intensively because, for such firms, returns are a noisy measure of performance, causing employees to resist ESOs. We would also predict diminished use of ESOs in response to the portion of the firm's accruals quality driven by managers' discretionary behavior that reduces accruals quality (since poorer accruals quality raises the cost of capital). On the other hand, Bushman, Chen, Engle and Smith [2004] argue that firms with poor information quality will use more equity-based incentives to align managers' incentives with those of shareholders; this argument suggests that firms with poorer accruals quality will use ESOs more intensively. Given these conflicting arguments, we make no prediction as to firms' ESO response to actions which worsen accruals quality.

Our hypotheses about the financial reporting incentive effects of ESOs and the governance responses, stated in null form, are as follows:

H1a: Accruals quality is unrelated to ESO sensitivity or ESO use.

H1b: There is no governance response, in the form of greater or lesser ESO sensitivity or ESO use, to accruals quality.

Based on the previous reasoning, the alternatives to the null hypotheses are two sided. The two elements of H1 are tested using the following general system of equations, where the "Accruals quality" equation models factors influencing accruals quality (H1a), and the "Governance response" equation models factors affecting the firm's response to the accruals quality implications of ESOs (H1b):

Accruals quality: $AQ_j = \gamma_0 + \gamma_1 ESO_j + \lambda_k \mathbf{Innate(k)}_j + \varepsilon_j$

Governance response:
$$\begin{aligned} ESO_j = \phi_0 + \phi_1 AQ_j + \phi_2 IOS_j + \phi_3 FCF_j + \phi_4 DivConstraint_j + \phi_5 Volatility_j \\ + \phi_6 \log(Assets)_j + \phi_7 Tax_j + \phi_8 Regulated_j + \eta_j \end{aligned}$$

where AQ_j = the firm's accruals quality, where larger values of AQ indicate poorer quality;
ESO_j = measure of the firm's ESO sensitivity or ESO usage;
Innate(k) = a vector of variables capturing economic fundamentals influencing accruals quality.

As described in the Introduction, we use two measures of the ESO construct. The first measure, following Core and Guay [2002], captures the risk sensitivity of ESOs as the change in the Black-Scholes value of the average of the top five executives ESO portfolio to a 0.01 change in returns volatility, *RiskSens*. We also calculate the price sensitivity of ESOs as the sensitivity of the top five executive ESO portfolio to a 1% change in stock price, *PriceSens*. Using separate measures of risk sensitivity and price sensitivity has the advantage of allowing us to evaluate the separate and predicted opposite effects of these sensitivity measures on accruals quality. In particular, *RiskSens* captures the positive effect on option values that comes from an increase in total volatility as a consequence of poorer accruals quality, while *PriceSens* captures the positive effect on option values that comes from an increase in stock price as a result of better accruals quality. The second measure, following Dechow, Hutton and Sloan [1996], captures ESO usage as the fraction of total shares outstanding reserved for ESO exercise, *ESO Usage*. This measure captures the *net* effect of the two countervailing forces: poorer accruals quality increases *total* returns volatility (leading to an increase in option values) and better accruals quality decreases *priced* returns volatility (leading to higher future stock prices and, therefore, higher option values).

Our main tests concern the coefficients on the endogenous variables in each equation: the *ESO* measure in the Accruals quality equation and *AQ* in the Governance response equation. H1a pertains to the relation between the ESO measure and incentives for managers to influence accruals quality; these behaviors are captured by the coefficient γ_1. For the ESO sensitivity measures, the specific system of equations that we estimate is given by equations (1) and (2):

Accruals quality:

$$AQ_j = \gamma_0 + \gamma_1 RiskSens_j + \gamma_2 log(PriceSens)_j + \gamma_3 log(MgrlHoldings)_j + \lambda_k \mathbf{Innate(k)}_j + \varepsilon_j \qquad (1)$$

Governance response:

$$\begin{aligned} RiskSens_j = \phi_0 + \phi_1 AQ_j + \phi_2 IOS_j + \phi_3 FCF_j + \phi_4 DivConstraint_j + \phi_5 Volatility_j \\ + \phi_6 log(Assets)_j + \phi_7 Tax_j + \phi_8 Regulated_j + \eta_j \end{aligned} \qquad (2)$$

We argue that managers compensated with call options have incentives to make financial reporting decisions that decrease accruals quality because poorer accruals quality translates into greater returns volatility which increases option value. Since this incentive is greater the more sensitive is option value to returns volatility (i.e., larger values of *RiskSens*), we predict $\gamma_1 > 0$. The price effect has the opposite prediction: ESOs which are more sensitive to stock price (i.e., larger values of *PriceSens*) encourage managers to make financial reporting decisions that improve accruals quality, or $\gamma_2 < 0$. Our tests use the log transformation of *PriceSens* because this variable is skewed and because the untransformed value of *PriceSens* is highly correlated with *RiskSens*;[4] transforming the variable mitigates both concerns. (We note, however, that we draw similar inferences using the untransformed variable.) We describe the prediction related to the *MgrlHoldings* variable in section 2.2.

[4] The correlation between *PriceSens* and *RiskSens* is expected, given that the two variables share several common inputs. To see this overlap, we refer the reader to Core and Guay [2002, Appendix A].

Turning to equation (2), the coefficient on *AQ*, ϕ_1, captures the board of directors' response to the accruals quality effects of ESO risk sensitivity.[5] A finding that $\phi_1 < 0$ suggests reduced ESO risk sensitivity in firms with poorer total accruals quality. On the other hand, a finding that $\phi_1 > 0$ suggests that overall poorer accruals quality elicits the use of ESOs with greater risk sensitivity.

In each equation, we include proxies for other factors believed to influence the respective dependent variable. Equation (1) includes variables capturing economic fundamentals that influence the innate or intrinsic portion of accruals quality, **Innate(k)**. By including these variables as controls, we can interpret γ_1 as capturing the ESO effect on the portion of *AQ* that is not explained by these innate factors. That is, γ_1 captures the ESO effect on financial reporting decisions that influence *discretionary* accruals quality.[6] We proxy for the innate portion of accruals quality using the variables put forward by Dechow and Dichev [2002] as capturing business and operating risk: firm size (*log(Assets)*), standard deviation of cash flow from operations and sales ($\sigma(CFO)$ and $\sigma(Sales)$), length of operating cycle (*log(OperCycle)*, measured as the log of the sum of days accounts receivable and days inventory), and incidence of negative earnings (*NegEarn*).

Equation (2) includes factors shown by previous research to affect the risk sensitivity or use of ESOs: investment opportunities, free cash flows, dividend constraints, noise in returns, size, taxes, and regulation (Smith and Watts [1992], Gaver and Gaver [1993], Sloan [1993], Matsunaga [1995], Dechow et al. [1996], Ittner et al. [2003]). Following Guay [1999], we proxy for the investment opportunity set using the common factor score obtained from factor analysis of three variables: research and development

[5] Following Hanlon et al.,we do not set up a separate equation to endogenize price sensitivity. In sensitivity tests, Hausman tests (not reported) confirm that *log(PriceSens)* is not endogenous with *RiskSens* (p-value is 0.7020) or with *AQ* (p-value is 0.9189).

[6] Ideally, the dependent variable in the Accruals quality regression would be a measure of discretionary accruals quality (rather than total accruals quality, *AQ*) and we would not include **Innate(k)** as independent variables. However, because the determinants of discretionary accruals quality are not well-understood, the explanatory power of regressions based on measures of discretionary accruals quality is low. In particular, using a measure of discretionary accruals quality, *DiscAQ*, formed by orthogonalizing *AQ* with respect to its innate factors (see Francis et al. [2005]), we are able to explain only 6.7% of the variation in *DiscAQ* in a first stage regression. (In contrast, the first-stage regression based on *AQ* has an explanatory power of 45%-65%.) In section 4.3 we describe the results of a sensitivity analysis probing this issue.

expense to total assets, book-to-market ratio, and capital investment expenditures as a percentage of total assets. We proxy for cash constraints using free cash flow, defined as cash from operations less capital expenditures scaled by total assets (*FCF*), and using Dechow et al.'s [1996] measure of the firm's closeness to dividend constraints, *DivConstraint* (equal to one if the ratio (retained earnings plus cash dividends and stock repurchases)/(cash dividends plus stock repurchases) is less than two, zero otherwise). We measure returns volatility as the annualized standard deviation of daily stock returns in year t, *Volatility*.[7] Finally, we include variables capturing firm size, tax status, and regulatory environment based on prior researchers' findings that these variables also influence ESO use.[8] Firm size is measured as the log of total assets in year t. The firm's tax position is captured by an indicator variable, equal to one if the firm has any net operating loss carry forwards in year t, and zero otherwise (*Tax*). We include a dummy variable for whether the firm operates in a regulated industry, defined as 2-digit SIC codes 49, 60, 62, 64-67 (*Regulated*).

2.2 Settings which offer no returns volatility incentives to worsen accruals quality

We calibrate our analyses of volatility incentives to worsen accruals quality by considering two settings where we expect this incentive to be muted or absent entirely. In the first setting (involving our tests of *RiskSens*), we include a measure of managerial shareholdings, *MgrlHoldings*. The argument here is that managers with more wealth concentrated in employer stock have greater incentives to increase stock price. In our setting, this incentive translates into actions which improve accruals quality, because better accruals quality reduces the cost of capital and thereby increases share price. We predict, therefore, that the coefficient on the managerial holdings variable in equation (1) is negative ($\gamma_3 < 0$).

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[7] Some prior studies measure returns variability as the proportion of the variation in the firm's daily stock returns in year t that is not attributable to market movements (e.g., Matsunaga [1995], Dechow, Hutton and Sloan [1996]). Since the explained variability from firm-specific market model (CAPM) estimations on daily returns data tends to be low, this measure tends to be close to one for most firms.

[8] Matsunaga [1995] also reports that financial leverage is positively associated with options use (where the latter is measured by an indicator variable, equal to one if the firm granted stock options in year t, and zero otherwise). However, using the same measure of stock option usage that we use, Dechow et al. [1996] find no significant relation between *ESO* and leverage. Rajgopal and Shevlin do not include leverage in the regression capturing the use of risk-based incentives. In unreported tests, we find that the inclusion of financial leverage results in statistically insignificant leverage coefficients and has no effect on our inferences.

In the second setting (involving our tests of *ESO Usage*), we include two measures of call option usage in financing arrangements: convertible debt and convertible preferred stock.[9] For these convertible instruments, the benefit of returns volatility is the premium received by the firm at issuance in the form of a lower required yield on the host instrument (Billingsley, Lamy, Marr and Thompson [1985]). After issuance, convertible instruments do not provide incentives for managers to increase volatility, because all the benefits of doing so accrue to the holders of the instruments who are not, by and large, managers. Consequently, we expect that greater use of convertible debt and convertible preferred stock will *not* be associated with poorer accruals quality. Moreover, to the extent managers are concerned about the cost of capital, and perhaps specifically about the costs of subsequent capital-raising, the use of convertible instruments will encourage improvements in accruals quality. The same prediction is generated by an argument that managers have post-issuance incentives to expropriate wealth from convertible debt and preferred stock holders in ways that benefit shareholders (e.g., Jensen and Meckling [1976]).

Because firms that use call options in compensation arrangements are likely to use them in financing arrangements (and vice versa), and firms that use convertible debt are likely to use convertible preferred stock (and vice versa), our tests of option usage measures simultaneously examine the effects of the three option instruments, by estimating the following system of four equations:

Accruals quality:

$$AQ_j = \gamma_0 + \gamma_1 ESO\ Usage_j + \gamma_2 ConvDebt\ Usage_j + \gamma_3 ConvPref\ \ Usage_j + \lambda_k \mathbf{Innate(k)}_j + \varepsilon_j \qquad (3)$$

ESO usage governance response:

$$\begin{aligned} ESO\ Usage_j = {} & \phi_0 + \phi_1 AQ_j + \phi_2 IOS_j + \phi_3 FCF_j + \phi_4 DivConstraint_j + \phi_5 Volatility_j \\ & + \phi_6 \log(Assets)_j + \phi_7 Tax_j + \phi_8 Regulated_j + \eta_j^{(4a)} \end{aligned} \qquad (4a)$$

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[9] Finance research has examined determinants of the choice between convertible instruments and nonconvertible debt or equity, as opposed to the incentive properties of these instruments. For example, Green [1984] argues that convertible debt is a substitute for straight debt that reduces costs associated with bondholder-stockholder conflicts. In contrast, Stein [1992] argues that convertible debt is a substitute for equity because the conversion option provides indirect equity financing without the adverse selection costs of equity. Mayers [1998] also argues that convertible debt economizes on issuance costs and solves the over-investment problem when a firm needs financing for both an initial project in place and a follow-on project whose payoff is uncertain.

Convertible debt usage governance response:

$$ConvDebt\ Usage_j = \rho_0 + \rho_1 AQ_j + \rho_2 IOS_j + \rho_3 FCF_j + \rho_4 DivConstraint_j + \rho_5 Volatility_j + \rho_6 \log(Assets)_j + \rho_7 Tax_j + \rho_8 Regulated_j + \eta_j^{(4b)} \quad (4b)$$

Convertible preferred stock usage governance response:

$$ConvPref\ Usage_j = \theta_0 + \theta_1 AQ_j + \theta_2 IOS_j + \theta_3 FCF_j + \theta_4 DivConstraint_j + \theta_5 Volatility_j + \theta_6 \log(Assets)_j + \theta_7 Tax_j + \theta_8 Regulated_j + \eta_j^{(4c)} \quad (4c)$$

Equation (3) examines the marginal effects on accruals quality of each instrument, controlling for the effects of the others. If ESOs encourage poor (good) accruals quality, the coefficient on *ESO Usage*, γ_1, is expected to be positive (negative); note that γ_1 captures the combined effect of managerial incentives to increase and decrease accruals quality. In contrast, we expect that call options in convertible instruments offer no incentive to worsen accruals quality and hence, predict zero or negative coefficients on *ConvDebt Usage* and *ConvPref Usage* ($\gamma_2 \leq 0$ and $\gamma_3 \leq 0$). The response equations (4a)-(4c) assume that the determinants of ESO use are the same as the determinants of convertible instrument use; these equations also allow for convertible instruments and accruals quality to be endogenously determined. Concerning the first point, our reading of the literature suggests that the determinants of *ESO Usage* are broadly consistent with those explaining convertible debt usage.[10] Concerning the second point, it is not obvious whether an endogenous relation exists between convertible instruments and accruals quality, or if one exists, whether it is similar to that between *ESO Usage* and *AQ*. On the one hand, poorer total accruals quality will increase returns volatility and therefore the premium on call options embedded in debt and preferred stock, so serial issuers of these instruments have incentives to decrease accruals quality. On the other hand, better total accruals quality will decrease the overall costs of debt and equity

[10] In particular, Essig [1991] documents that convertible debt use is positively related to R&D spending and market to book ratios (consistent with greater use of convertible debt by firms with larger investment opportunities) and Essig [1991] and Brennan and Schwartz [1988] find that convertible debt use is increasing in risk (consistent with convertible debt being used more by firms with noisier and more volatile returns). Other studies also investigate whether variables related to cash constraints, firm size, tax position and dividend payouts affect convertible debt use (e.g., Billingsley, Lamy and Thompson [1988]; Lewis, Rogalski and Seward [1999]; Lee and Figlewicz [1999]).

capital. Given these conflicting arguments, we do not predict the direction of any governance response to differences in accruals quality associated with convertible instruments.

3. *Sample and Descriptive Data*

3.1 Variable definitions and measurement. Our tests require measures of accruals quality, ESO risk and price sensitivity, managerial shareholdings, and ESO, convertible debt and convertible preferred stock usage. These measures are described below.

Accruals quality. We measure accruals quality based on McNichols' [2002] modification of Dechow and Dichev's [2002] model which separates accruals based on their association with cash flows by regressing working capital accruals on cash from operations in the current, prior, and future periods, as well as the change in revenues and property, plant and equipment (*Compustat* data item numbers are reported in parentheses):

$$\frac{TCA_{j,t}}{Assets_{j,t}} = \kappa_{0,j} + \kappa_{1,j}\frac{CFO_{j,t-1}}{Assets_{j,t}} + \kappa_{2,j}\frac{CFO_{j,t}}{Assets_{j,t}} + \kappa_{3,j}\frac{CFO_{j,t+1}}{Assets_{j,t}} + \kappa_{4,j}\frac{\Delta Rev_{j,t}}{Assets_{j,t}} + \kappa_{5,j}\frac{PPE_{j,t}}{Assets_{j,t}} + \nu_{j,t} \qquad (5)$$

where $TCA_{j,t}$ = firm j's total current accruals in year t, $= (\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t})$; $Assets_{j,t}$ = firm j's average total assets (#6) in year t and t-1; $CFO_{j,t}$ = firm j's cash flow from operations in year t; $CFO_{j,t} = NIBE_{j,t} - TA_{j,t}$; $TA_{j,t}$ = firm j's total accruals in year t, measured as $(\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t} - DEPN_{j,t})$; $\Delta CA_{j,t}$ = firm j's change in current assets (#4) between year t-1 and year t; $\Delta CL_{j,t}$ = firm j's change in current liabilities (#5) between year t-1 and year t; $\Delta Cash_{j,t}$ = firm j's change in cash (#1) between year t-1 and year t; $\Delta STDEBT_{j,t}$ = firm j's change in debt included in current liabilities (#34) between year t-1 and year t; $DEPN_{j,t}$ = firm j's depreciation and amortization expense (#14) in year t; $NIBE_{j,t}$ = firm j's net income before extraordinary items (#18) in year t; $\Delta Rev_{j,t}$ = firm j's change in revenues (#12) between year t-1 and year t; $PPE_{j,t}$ = firm j's gross value of property, plant and equipment (#7) in year t.

The unexplained portion of the variation in working capital accruals is an inverse measure of accruals quality; that is, a greater unexplained portion implies lower quality. Our measure of this unexplained variation is $AQ_j = \sigma(\hat{v}_{j,t})$. We estimate (5) for each firm to yield a series of firm- and year-specific residuals. We require a firm to have at least five residuals to calculate the standard deviation; this requirement implicitly constrains the sample to firms with at least seven yearly observations. The estimation periods are aligned with the time periods covered by our two samples; that is, we estimate separate *AQ* measures for the 1992-2002 period (for tests that use *RiskSens*) and for the 1984-1995 period (for tests that use *ESO Usage*), allowing for a one year lead and lag for both estimations.

Risk sensitivity and price sensitivity. We collect data from *Execucomp* for new option grants, unexercisable options, exercisable options, and returns volatility for all covered firms over the period 1992-2002. We follow Core and Guay's [2002] procedures to calculate *RiskSens* (the sensitivity of the Black-Scholes value of an executive's option portfolio to a 0.01 change in stock return volatility) and *PriceSens* (the sensitivity of the value of an ESO portfolio to a 1% change in stock price). We average the sensitivity measures across the top five executives in each firm, to yield firm- and year-specific measures of option sensitivity. (In unreported tests, we find similar results if we restrict attention to the chief executive officer's ESOs). To avoid overstating significance levels from pooling dependent observations across years, we calculate the average value of the annual sensitivity measures over 1992-2002, yielding firm-specific measures. The ESO sensitivity sample contains 1,182 firms with data on *RiskSens*, *PriceSens*, *AQ* and all control variables.

Managerial shareholdings. Our measure of managerial shareholdings, *MgrlHoldings*, is the ratio of the market value of total employer shareholdings (valued at end of year share price) for the top five executives to their total current compensation (including salary, bonus, and the fair value of option or stock grants during the year). This ratio indicates how much of top managers' wealth is concentrated in the employer's shares, which we interpret as a measure of the importance to the manager of his employer shareholdings. Our tests use the log transformation of *MgrlHoldings* because this variable is highly skewed; because some managers in our sample have zero holdings, we add one to *MgrlHoldings* before calculating the log of this variable. Data are obtained from *Execucomp* and, similar to the sensitivity measures, are averaged over 1992-2002 to yield a firm-specific measure of managerial holdings.

Call option usage. Our measure of ESO usage is based on *Compustat* data on common shares reserved for exercise of stock options (#215) and includes shares reserved for stock options outstanding and options available for future grants. These data are reported for fiscal years ending prior to August 22, 1996. We begin the sample in 1984 when a sufficient number of firms provided information on the common share conversion of their convertible instruments. Following Dechow, Hutton and Sloan [1996], we scale the number of common shares reserved for conversion by the total common shares outstanding at year end to obtain our measure of ESO usage (*ESO Usage*). Because this measure is not denominated in dollars or as a percentage of market value, any association we detect between it and risk-taking behaviors (such as actions taken to reduce accruals quality) cannot be driven by returns volatility mechanically affecting the fair value of ESOs. To measure convertible debt and convertible preferred stock usage we use common shares reserved for the conversion of convertible preferred stock (#203) and convertible debt (#200), respectively. These data indicate the maximum number of common shares that would be issued if all convertible preferred stock (convertible debt) were converted into common stock. As with *ESO Usage*, we standardize by the number of common shares outstanding to obtain our measures of convertible debt usage (*ConvDebt Usage)* and convertible preferred stock usage (*ConvPref Usage)*.

For the option usage tests, we exclude observations where values of all of the call option instruments are reported as missing on *Compustat*; that is, we require firms to have non-missing values of at least one of the instruments. Only 159 firms have missing values for all instruments; including these firms in our tests and setting their missing values to zero has no affect on our inferences. Similar to our tests of *RiskSens*, we collapse our panel data for 1984-1995 into a single (average) observation for each firm. The option usage sample consists of 3,322 firms with data on the usage measures, *AQ*, and all control variables.

3.2. Sample and descriptive statistics

Descriptive data about the ESO sensitivity sample and the option usage sample are reported in Table 1, panels A and B, respectively. As shown in panel A, the mean [median] *RiskSens* for the option sensitivity sample is 0.0293 [0.0145] and the mean [median] *PriceSens* is 0.0655 [0.0282]. In dollar terms, these sensitivities imply returns volatility incentives of $29,300 [$14,500] and share price incentives of $65,500 [$28,200]. These incentive effects are similar to those documented by Hanlon et al., who report returns volatility incentives for their sample of $32,000 [$14,000] and share price incentives of $81,000 [$29,000]. Data on *MgrlHoldings* indicate that managerial holdings represent 39.5 times [2.1 times] the manager's annual compensation. As shown in panel B, firms in the usage sample have stock options which, if exercised, would amount to 8.51% [6.97%] of total shares outstanding; comparable measures for convertible debt and convertible preferred are 2.39% [0%] and 2.10% [0%], respectively.[11] Table 1 also provides information on control variables. Given that *Execucomp*'s coverage is tilted toward larger firms, it is not surprising that the ESO sensitivity sample firms are larger (as measured by total assets), less volatile (as measured by returns volatility and by the standard deviations of cash flows and sales), and more profitable (as indicated by fewer loss realizations, larger free cash flows, and a smaller incidence of dividend constraints) than firms in the option usage sample.

We also report summary information about the *AQ* distribution. The ESO sensitivity sample firms have, on average, better accruals quality than the usage sample firms, as indicated by a mean [median] value of *AQ* of 0.0177 [0.0132] versus 0.0346 [0.0225] for the options usage sample. This result is to be expected, given that the ESO sensitivity sample firms are larger, less volatile,and have shorter operating cycles than the option usage sample firms, and Dechow and Dichev show that these factors are associated with smaller values of *AQ* (i.e., higher accruals quality). As benchmarks, Francis et al. [2005] report a mean value of *AQ* of 0.0442 and Rajgopal and Venkatachalam [2004] report 0.0447.

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[11] A few Compustat observations show extreme values of ESO's, convertible debt and convertible preferred stock (up to 293 times the number of shares of outstanding common stock). To mitigate the effects of extreme values, we winsorize these variables at the 99th percentile.

In unreported analyses, we examine the industry distributions of both samples. Neither sample displays any meaningful clustering (the largest industry comprises only 7% of one of the samples). As we report in sensitivity tests (section 4.3), our findings are also unaffected by including industry dummy variables in all regressions.

3.3. The relation between accrual quality and returns volatility, and between accruals quality and managerial incentives

Our hypotheses are predicated on two assumptions. The first is that accruals quality is positively correlated with returns volatility. The second is that the incentives we hypothesize to affect managers' ESO portfolios are sufficiently strong such they can reasonably be expected to influence managers' reporting behaviors. In this section, we provide evidence on the validity of both assumptions.

In terms of the first assumption, recall that our predictions require that actions taken to reduce (increase) accruals quality lead to increases (decreases) in returns volatility. Support for a relation between accruals quality and *priced* returns volatility for broad samples of firms is provided by Francis, LaFond, Olsson and Schipper [2005], who find that accruals quality is priced separately from other factors known to be associated with the variance of returns: beta, book-to-market and size. Support for a relation between accruals quality and *total* returns volatility for broad samples of firms is reported by Rajgopal and Venkatachlam [2004] and by Francis et al. [2004b]. Both relations also hold for our two samples: for the ESO sensitivity sample (n=1,182 firms), the correlation between *Volatility* and *AQ* is 0.5457 (Pearson) and 0.5269 (Spearman); for the option usage sample (n=3,322 firms), the correlations are 0.4340 and 0.5854. All correlations are significant at the 0.0001 level. To assess whether accruals quality is associated with returns volatility conditional on the presence of known risk factors, we regress *Volatility* on *AQ*, controlling for beta, size, and book-to-market. We measure systematic risk as the slope coefficient from firm-specific CAPM regressions ($Beta_{j,t}$), size is the year-end market value of equity ($MVE_{j,t}$), and the book-to-market ratio ($BM_{j,t}$) is the ratio of the firm's year-end book value of equity to its year-end market value of equity, and. Results (not reported) show that *Volatility* is positively correlated with beta, negatively correlated with size and insignificantly associated with book-to-market. Controlling for these factors, *AQ* is highly significant, with t-statistics of 10 or higher. Together, these results demonstrate that accruals quality has a meaningful relation with returns volatility that is distinct from the link between volatility and other priced factors.

In terms of the second assumption, we use information about the distributions of our variables to calculate estimates of the wealth effect, to the manager, of taking actions to influence accruals quality. We begin by noting that Francis et al. [2004, Table 3, Panel A] report that the 10^{th} (90^{th}) percentile values of their *AQ* distribution is 0.006 (0.055); we infer from these data that each decile adds an average of about 0.0061 [or (0.055-0.006)/8 deciles] in terms of *AQ*. Because their findings are calibrated in terms of decile effects, we ask what happens to the manager's ESO value from taking financial reporting actions which worsen *AQ* by 0.0061 (i.e., by one decile)?

The effect on ESO value is a function of both the price effect and the returns volatility effect. For the price effect, we know from Francis et al. [2004, Table 5] that a one decile change in *AQ* is associated with an (annualized) cost of capital increment of 29 basis points, or a decrease in price of 0.29%. We also know that the average effect on ESO value of a 1% decrease in price for our sample is \$65,500 (mean value of *PriceSens* from Table 1, Panel A). The average price sensitivity effect on ESO value of a 0.0061 increment in *AQ* is, therefore, $-\$19,000 = 0.29 \times (-\$65,500)$. To calculate the risk sensitivity effect on ESO value from a 0.0061 increase in *AQ*, we require a measure of the volatility effect of a change in *AQ*, which we estimate by regressing *Volatility* on *AQ*. The slope coefficient from this regression is 6.1536 (t-statistic = 22.87), and implies that a one unit change in *AQ* yields a 6.1536 unit change in returns volatility. An increase in *AQ* of 0.0061 would, therefore, result in an increase in returns volatility of 0.0375 = 6.1536*0.0061. To determine the dollar effect of an increase of 0.0375 in returns volatility, note that Core and Guay [2002] define *RiskSens* as $(\partial ESO\ Value / \partial Volatility) * 0.01$. Given that the average value of *RiskSens* in our sample is \$29,300 (Table 1, Panel A), 0.0375 units of returns volatility translate into an average effect of $110,000 on ESO value. The overall effect of a 0.0061 change in *AQ* is the net of the returns volatility and share price effects, or approximately $91,000 = $110,000 - $19,000.

The $91,000 estimate is conditional on a change in *AQ* of 0.0061. The actual change in *AQ* resulting from ESO incentives could be higher or lower than 0.0061; if higher (lower), the $91,000 estimate is too low (too high). Because the actual change in *AQ* from ESO sensitivity is estimated by equation (1), we defer discussion of the actual effect on managerial wealth until we discuss those results.

4. *Empirical Results*

4.1. Tests of ESO sensitivity measures

Results of estimating equations (1) and (2) using two stage least squares (2SLS) are reported in Table 2, Panel A. All tests control for outliers by deleting observations with studentized residuals greater than three in absolute value; inferences are not sensitive to whether or how we treat extreme observations. The first-stage R^2s from both the *AQ* regression and the *RiskSens* regression are 0.4487 and 0.6575, respectively, indicating that the estimates used in the second stage are reasonable proxies for the original values of the dependent variables. Hausman [1978] tests indicate that while *RiskSens* is endogenous to *AQ* (p-value = 0.0000), the opposite is not true (p-value = 0.8523). The main results show: (i) a positive coefficient on *RiskSens* ($\gamma_1 = 0.7442$, t-statistic = 6.02) consistent with the prediction that increased ESO sensitivity to returns volatility is associated with financial reporting choices that reduce accruals quality; and (ii) a negative coefficient on *log(PriceSens)* ($\gamma_2 = -0.0096$, t-statistic = -5.21) consistent with increased ESO sensitivity to share price being associated with financial reporting choices that improve accruals quality. We also find a negative coefficient on *log(MgrlHoldings)* ($\gamma_3 = -0.0006$, t-statistic = -2.47), consistent with the prediction that compensation arrangements that provide incentives to increase share price but not returns volatility are associated with better accruals quality. Finally, results of estimating equation (2) show no reliable evidence of a governance response to the poor accruals quality associated with greater option sensitivity ($\phi_1 = 0.1599$, t-statistic = 1.46).

Given the dependence between risk sensitivity and price sensitivity (see footnote 4), we also estimate equations (1) and (2) excluding *log(PriceSens)*;[12] results are shown in Table 2, Panel B. As expected, the coefficient estimate on *RiskSens* ($\gamma_1 = 0.2055$, t-statistic = 7.93) declines in magnitude because it now captures the net effect of both risk sensitivity and price sensitivity. The smaller but still positive point estimate for γ_1 is consistent with the returns-volatility effect dominating the price effect, such that poorer accruals quality prevails. The coefficient on *log(MgrlHoldings)* remains reliably negative ($\gamma_3 = -0.0005$, t-statistic = -2.43).

Using these results, we can now compute the change in *AQ* associated with the risk sensitivity and price sensitivity effects. Recall that our analysis showed that managers' ESO values increased by about $91,000 from reducing accruals quality by 0.0061. We extend this analysis by noting that the product of the mean value of *RiskSens* (0.0293, Table 1, panel A) and the coefficient estimate on *RiskSens*, $\gamma_1 = 0.2055$ (which captures the net effect as reported in Table 2, Panel B), provides an estimate of the total change in discretionary *AQ*. Multiplying these figures indicates that the average effect of ESO incentives is to increase *AQ* by 0.0060, or roughly the same magnitude as a one decile change in *AQ* (of 0.0061) which we showed in section 3.3 is associated with about a $91,000 increase in ESO value. To put this figure in perspective, for the average manager in our sample, $91,000 represents 17% of his average annual salary and bonus, and 6% of his average annual total compensation (including salary, bonus, options and stock).

The coefficients on the innate control variables in equation (1) are all reliably different from zero (at the 0.001 level) in the predicted directions. Results for the control variables in equation (2) are generally consistent with prior research, although the significance levels of many of the variables are low. We note, however, that most prior research does not include price sensitivity in examining the

[12] In the presence of multi-collinearity, point estimates are still unbiased and consistent, and standard errors are still correctly estimated (though they may be large). The problem with multi-collinearity is that it may be hard to get coefficient estimates that are statistically significant. But as our results show, we find highly significant t-statistics for both of the sensitivity measures. Given that the presence of multi-collinearity can not lead to over-stated significance levels (only under-stated), our findings, if anything, understate the importance of the two sensitivities in explaining variation in accruals quality.

determinants of risk sensitivity. In the Panel B tests which exclude price sensitivity, we find, for example, the predicted relations between *RiskSens* and firm size (positive, t-statistic = 27.84), volatility (positive, t-statistic = 6.34), investment opportunity set (positive, t-statistic = 8.05), and regulatory status (negative, t-statistic = –7.99).

Overall, we interpret the results in Table 2 as indicating that poorer accruals quality is associated with greater ESO sensitivity to returns volatility and with less ESO sensitivity to share price. We also find that arrangements, such as direct shareholdings, that provide managers with incentives to increase rather than decrease accruals quality are associated with better accruals quality. Finally, we note that the results show no indication of a governance response (either to increase or reduce risk sensitivity in response to changes in accruals quality).

4.2. Tests of option usage measures

Our tests based on option usage measures estimate equations (3) and (4a, 4b, 4c) as a 2SLS system of equations. Because the option usage measures are bounded below by zero (firms cannot issue negative amounts of these instruments) and because of the large percentage of sample firms that report zero values for *ConvDebt Usage* and *ConvPref Usage*, we estimate equations (4a)-(4c) as Tobit models in the first stage of the 2SLS procedure. Results, reported in Table 3, panel A, indicate that most of the test variables are endogeneous, with p-values for the Hausman tests of 0.0235 or less, except for the convertible debt regression where accruals quality is not found to be endogenous (p-value=0.2084).

Consistent with H1a, the main results show a reliably positive association between *AQ* and *ESO Usage* in equation (3) ($\gamma_1 = 0.5179$, t-statistic = 11.80). This result means that, controlling for factors known to influence innate accruals quality, greater use of ESOs is associated with reporting choices that decrease accruals quality. Turning to tests of H1b, the coefficient on *AQ* in equation (4a) is reliably negative ($\phi_1 = -0.3368$, t-statistic = -3.53). This result, which suggests less use of ESOs when accruals quality is poor, is consistent with an evaluation risk argument that poorer accruals quality leads boards of directors to reduce use of ESOs.

When call options are used for financing we predict either no relation between accruals quality and the use of convertible instruments, or one where the use of these instruments is associated with better accruals quality. The results are consistent with the latter relation. Specifically, the negative point estimates on *ConvDebt Usage* ($\gamma_2 = -0.2275$, t-statistic = -2.10) and *ConvPref Usage* ($\gamma_3 = -0.1767$, t-statistic = -2.93) indicate that greater use of these instruments is associated with better accruals quality. For both instruments, tests of H1b reveal significantly positive governance responses as modeled by equations (4b) and (4c): for *ConvDebt Usage* the point estimate is ρ_1 = 0.1296 (t-statistic = 2.25) and for *ConvPref Usage* the point estimate is θ_1 = 0.2541 (t-statistic = 5.03). These results suggest that better accruals quality is associated with greater use of convertible debt and convertible preferred stock.[13]

Other variables in the equations generally enter with the predicted signs or are insignificant at conventional levels. On the whole, our findings concerning the determinants of ESO (equation 4a) use are similar to those reported by prior studies.[14] In the convertible instrument regressions (equations 4b and 4c), the signs of the coefficients on the control variables are similar to those found for the ESO usage regression. Finally, the control variables in equation (3) also generally have the predicted signs.[15]

The results in panel A of Table 3 are predicated on a link, demonstrated in prior research and verified in section 3.3 for our samples, that deterioration in *AQ* leads to higher returns volatility. In our next test, we probe the implications of cross-sectional variation in the strength of the *AQ*-returns volatility link. Specifically, we expect firms whose stock return volatility is more (less) sensitive to accruals quality to have a higher (lower) accruals quality response to *ESO Usage*. We measure the firm-specific

[13] The coefficients on *ConvDebt Usage* and *ConvPref Usage*, are statistically indistinguishable from each other, suggesting that these instruments have similar effects on accruals quality.

[14] In particular, in regressions including all control variables, Dechow et al. find significant positive associations between *ESO Usage* and R&D (their proxy for investment opportunities), returns variability, and tax status; and they find significant negative associations between *ESO Usage* and regulatory status and firm size. They find a significant negative association between *ESO Usage* and dividend constraints (inconsistent with their predictions); in contrast, we find a significant positive relation between these variables.

[15] The exception is the positive relation between *AQ* and firm size, which contrasts with prior research, e.g., Dechow and Dichev [2002], which finds that poor accruals quality is negatively associated with firm size. We ascribe this *conditional* positive association to the presence of additional, correlated variables in our regressions (such as *ESO Usage*, *ConvDebt Usage* and *ConvPref Usage*). As a check, we estimated a regression of *AQ* on just the innate factors; results show the expected positive signs with the volatility of cash flows and sales, operating cycle and negative earnings realizations, and the expected negative (and significant) association with firm size.

strength of the association between returns volatility and accruals quality as the Spearman correlation (ρ_j) between firm j's monthly volatility of returns and the monthly returns to an accrual quality factor mimicking portfolio (*AQfactor*), constructed as in Francis et al. [2005].[16] We re-estimate equations (3) and (4a) adding $ESO_j \times \rho_j$ to equation (3) and $AQ_j \times \rho_j$ to equation (4a).[17] Results, reported in panel B of Table 3, show the expected positive coefficient on the $ESO_j \times \rho_j$ interaction term (t-statistic = 3.82). The significance level on the main *ESO Usage* variable, as well as on the exogenous variables, are similar to those reported in panel A. We find no significant coefficient on the $AQ_j \times \rho_j$ term in equation (4a). Based on these results, we conclude that the more important is accruals quality for returns volatility, the more ESO use influences discretionary accruals quality.

4.3. <u>Sensitivity tests</u>

In addition to the tests described previously, we performed several robustness checks. First, we assess the sensitivity of all results to industry effects by including industry dummies (based on Fama-French's [1997] 17-industry code classification) as control variables in all equations. While the industry variables themselves are in a few cases reliably different from zero, their inclusion has no effect on the main results, and the effect on explanatory power is miniscule.

Second, to mitigate concerns that the significant positive relation found between *AQ* and each ESO construct (*RiskSens* and *ESO Usage*) is driven by potential incompleteness of the set of **Innate(k)** factors, we performed two additional tests. In the first, we investigate whether our results are due to the possibility that the innate factors capture less variation in *AQ* in settings where greater sensitivity or use of ESOs is expected. Our tests of this conjecture compare the ability of **Innate(k)** to explain *AQ* between high versus low tech industries (as defined by Francis and Schipper [1999]), and across portfolio deciles

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[16] Briefly, in calendar month *m*, the *AQ*-portfolio is long in the 40 percent of firms with the poorest *AQ* and short in the 40 percent of firms with the best *AQ*. *AQfactor* is the return of this portfolio in month *m*, and is a returns-based representation of *AQ*. Returns-based representations of underlying factors have been validated in numerous research settings (e.g., Fama and French [1993] examine size and book to market, Carhart [1997] examines price momentum, and Francis et al. [2005] use and validate *AQfactor*).

[17] We do not include equations (4b) and (4c), or include *ConvDebt Usage* or *ConvPref Usage* in (3), because we have no reason to believe that either of these convertible instruments is affected by variation in the strength of the relation between accruals quality and returns volatility.

formed by ranking firms based on R&D spending, book-to-market ratios, and, separately, on each of the ESO constructs (*RiskSens* and *ESO Usage*). In no case do we find meaningful differences or any systematic pattern in the explanatory power of **Innate(k)** across the partitions. In the second test, we expand the set of innate factors to include variables that might plausibly be related to the ESO constructs: book-to-market ratio and R&D spending as a percentage of total assets. Results show that neither variable is significant in explaining *AQ*, nor does the inclusion of these variables affect the previously documented results.

We also believe that our findings concerning the accruals quality effects of managerial shareholdings and convertible financing arrangements provide additional evidence that **Innate(k)** is not mis-specified in some important way. In particular, for an omitted **Innate(k)** variable to explain the poorer accruals quality effects found for ESO sensitivity and ESO usage, it would also have to explain the better accruals quality effects found for managerial holdings and for convertible debt and convertible preferred stock. We can think of no variable which would have such a different influence on ESOs than it would have on these other variables.

Our third sensitivity test replaces *AQ* with a measure of discretionary accruals quality, *DiscAQ*, formed by orthogonalizing *AQ* with respect to its innate factors. Results pertaining to hypotheses H1a are similar using *DiscAQ*: greater ESO returns sensitivity and greater ESO usage is associated with poorer discretionary accruals quality while greater use of *ConvDebt Usage* and *ConvPref Usage* is associated with better discretionary accruals quality (p-values are 0.05 or better). However, because of the low explanatory power of the first stage regression, the instrument for *DiscAQ* used in the second stage regression is quite noisy; not surprisingly, we find no significant coefficients on *DiscAQ* (our tests of H1b) in any of the governance response regressions.[18] Since a well-specified first-stage regression is crucial for interpreting results of a system of equations such as those we estimate, we have more

[18] If the first-stage R^2 is low, the first-stage estimates will be noisy and will be poor proxies for the dependent variables they replace in the second-stage regression (Gujarati [1988]).

confidence in results that use *AQ* as the measure of accruals quality and condition on innate factors influencing accruals quality.

Finally, we note that the Tobit analyses used in the option usage regressions do not produce comparable goodness-of-fit statistics. As Veall and Zimmerman [1994] discuss, there are several, largely ad hoc, goodness-of-fit measures, but none of them has the properties of an OLS R^2. Along these lines, we provide informal evidence on the strength of the associations for equations (4a), (4b) and (4c) by documenting the Pearson correlations between the predicted Tobit values for each dependent variable and the corresponding actual values. The correlations are 0.33, 0.16 and 0.32 for *ESO Usage*, *ConvDebt Usage*, and *ConvPref Usage*, respectively. Based on the results in Veall and Zimmerman, these correlations likely understate the underlying OLS R^2 by a factor of about two; even with such an adjustment, however, these associations are low enough to raise the concern that the predicted values of the usage measures in equation (3) are weak instruments. As a sensitivity analysis, we re-estimate equation (3) as an OLS regression, using the actual values of *ESO Usage*, *ConvDebt Usage* and *ConvPref Usage*. While weak instruments are not allowed to influence the OLS analysis, this approach ignores simultaneity, and thus runs the risk of misspecification. The results (not tabulated) show that *ESO Usage* continues to be significantly positively associated with accruals quality (t-statistic = 2.97), whereas *ConvDebt Usage* and *ConvPref Usage* are not significant. We interpret this evidence as indicating that our main result concerning ESO usage and accruals quality is robust, and our result concerning convertible instrument usage and accruals quality is sensitive to specification choices.

4.4. <u>Estimated cost to the firm of the *AQ* effects of ESOs</u>

Both the ESO sensitivity tests and the option usage tests point to ESOs having a net effect of worsening accruals quality. From the firm’s perspective, this reduction of accruals quality is manifest in a higher cost of capital. For the ESO sensitivity tests, our analysis in section 4.1 showed that the net effect of ESOs was to worsen accruals quality by about 0.0060, or roughly one *AQ* decile. Given Francis et al.’s [2004, table 5, panel C] finding that moving one *AQ* decile corresponds to about 29 basis points in cost of capital terms, we estimate that the average firm in the ESO sensitivity sample pays a cost of capital premium of about 29 basis points for the accruals quality effects of ESOs.

The preceding analysis likely understates the effect of ESOs because *RiskSens* is based on the average top five executives' ESO portfolios, not the portfolio of ESOs for all employees of the firm. To gauge the cost of capital effect if a measure of total firm ESOs is used, we turn to the ESO usage tests, where the usage measure represents firm-wide ESOs. In Table 3, Panel A, we see that one unit of *ESO Usage* corresponds to a 0.5179 effect on *AQ*. From Table 1, Panel B we know that the average value of *ESO Usage* in our sample is 0.0851. Multiplying the two figures gives the average *AQ* effect of *ESO Usage* in our sample, or 0.0441. Using the conversion of 0.0061 per *AQ* decile, this figure corresponds to an average cost of capital effect of about 210 basis points (0.0441 divided by 0.0061 = 7.3 decile effect, multiplied by 29 basis points per decile).

We emphasize that the 29-210 basis point range indicated by these calculations is likely a noisy estimate of the cost of capital effects. These estimates do show, however, that the *AQ*-related effects of ESOs are non-trivial, even if one restricts attention to the cost of capital effects associated with the ESOs given to the top five executives only. It is also worth noting that these cost of capital effects do not imply that firms lose economic value because of ESOs: there may very well be (and presumably are) increased profits that more than offset the higher cost of capital effects. On this point, we note that Hanlon et al. show some evidence of increased operating income associated with ESOs.

5. Summary and Conclusion

We hypothesize that the use of call options in both compensation and financing arrangements is associated with discernible effects on financial reporting quality. We find that managers trade off incentives for both poorer and better accruals quality, and that the overall financial reporting outcome of using call options in compensation arrangements is a decrease in accruals quality, while the overall financial reporting effect of using call options in financing arrangements is an increase in accruals quality. While our primary goal is to investigate the financial reporting effects of using call options in these two settings, we also comment on the governance responses to these financial reporting outcomes. Specifically, we show that overall lower accruals quality generally elicits decreased use of call options in compensation arrangements; in contrast, we generally find increased use of convertible instruments in response to better accruals quality.

These results contribute to at least two literatures. First is the literature examining the consequences of using ESOs in compensation arrangements. For example, DeFusco, Johnson and Zorn [1990] find that stock return volatility (as well as the volatility of earnings-based performance measures) increases significantly following announcements of ESO plans, and both Guay [1999] and Cohen, Hall and Viceria [2000] document significant positive associations between ESO incentives and returns volatility. Our finding of a positive association between accruals quality and both ESO usage and ESO sensitivity suggests one mechanism through which the increased returns volatility found by these studies comes about: by managers engaging in reporting behaviors that reduce accruals quality and thereby increase returns volatility. Second is the body of work which points to non-benign effects of ESOs on financial reporting outcomes. Research here shows that firms with higher levels of ESOs have a higher incidence of shareholder litigation (Peng and Roell [2003]), restatements (Burns and Kedia [2003]), and SEC enforcement actions (Johnson, Ryan and Tian [2003]). Other studies show that greater use of equity-based incentives (especially ESOs) encourages managers to manipulate earnings (see, for example, Bartov and Mohanram [2004], Ke [2004], and Cohen, Dey and Lys [2004]). Our findings suggest an additional consequence of ESOs – higher costs of capital – deriving from returns-volatility incentives of managers to choose reporting decisions which worsen accruals quality.

Table 1
Descriptive Information On the Variables Used in the Option Risk Sensitivity and Call Option Usage Tests

Panel A: Descriptive data on variables used in the option risk sensitivity tests[a]

Variable	mean	std dev.	10%	25%	median	75%	90%
RiskSens	0.0293	0.0414	0.0027	0.0062	0.0145	0.0324	0.0724
AQ	0.0177	0.0163	0.0041	0.0071	0.0132	0.0225	0.0375
PriceSens	0.0655	0.1048	0.0042	0.0123	0.0282	0.0666	0.1597
log(PriceSens)	-3.5590	1.3769	-5.3190	-4.3440	-3.5465	-2.6875	-1.8157
MgrlHoldings	39.5091	555.1882	0.3936	0.7909	2.1107	6.5107	27.5335
log(MgrlHoldings)	1.5024	1.2884	0.3319	0.5827	1.1349	2.0163	3.3511
Volatility	0.4618	0.1855	0.2619	0.3152	0.4222	0.5811	0.7266
IOS	-0.0020	0.0022	-0.0042	-0.0034	-0.0024	-0.0011	0.0006
FCF	0.0088	0.1012	-0.0698	-0.0199	0.0188	0.0538	0.0900
DivConstraint	0.2865	0.3223	0.0000	0.0000	0.1818	0.5455	0.8182
Tax	0.2222	0.3307	0.0000	0.0000	0.0000	0.3636	0.8182
Regulated	0.0980	0.2971	0.0000	0.0000	0.0000	0.0000	0.0000
σ(CFO)	0.0806	0.0645	0.0264	0.0402	0.0642	0.0964	0.1553
σ(Sales)	0.2385	0.1919	0.0746	0.1185	0.1852	0.3031	0.4507
log(Assets)	6.7800	1.5685	4.8970	5.6448	6.6261	7.8700	8.9931
log(OperCycle)	4.4879	1.4606	3.8332	4.2288	4.6409	5.0024	5.3010
NegEarn	0.1673	0.2125	0.0000	0.0000	0.0909	0.2727	0.4545

Panel B: Descriptive data on variables used in the call option usage tests[b]

Test variables:	mean	std dev.	10%	25%	median	75%	90%
ESO Usage	0.0851	0.0720	0.0076	0.0341	0.0697	0.1179	0.1765
ConvDebt Usage	0.0239	0.0602	0.0000	0.0000	0.0000	0.0141	0.0783
ConvPref Usage	0.0210	0.0638	0.0000	0.0000	0.0000	0.0000	0.0615
AQ	0.0346	0.0353	0.0074	0.0123	0.0225	0.0444	0.0756
Control variables:							
Volatility	0.6196	0.3307	0.2756	0.3564	0.5515	0.7986	1.0551
IOS	-0.0044	0.0713	-0.0268	-0.0244	-0.0197	-0.0036	0.0297
FCF	-0.0989	1.0113	-0.2166	-0.0810	-0.0218	0.0182	0.0560
DivConstraint	0.4511	0.3573	0.0000	0.0833	0.4495	0.7500	1.0000
Tax	0.3201	0.3417	0.0000	0.0000	0.2000	0.5833	0.8889
Regulated	0.0253	0.1567	0.0000	0.0000	0.0000	0.0000	0.0000
σ(CFO)	0.1309	0.1126	0.0375	0.0578	0.0960	0.1613	0.2637
σ(Sales)	0.3104	0.2651	0.0891	0.1410	0.2393	0.3854	0.6157
log(Assets)	4.2599	2.2618	1.4010	2.6162	4.0834	5.6822	7.3888
log(OperCycle)	4.7126	1.3607	3.9148	4.4393	4.8645	5.2215	5.5348
NegEarn	0.3166	0.2948	0.0000	0.0833	0.2500	0.5000	0.7500

Variable definitions: *RiskSens* = the average sensitivity of the firm's ESO grants (to the top five executives) to returns volatility; *PriceSens* = the average sensitivity of the firm's ESO grants (to the top five executives) to stock price; *MgrlHoldings* = the ratio of the market value of the top five executives shareholdings to their average yearly total compensation; *ESO Usage* = the number of common shares reserved for conversion of employee stock options, divided by total common shares outstanding; *ConvDebt Usage* = the number of common shares reserved for conversion of convertible debt, divided by total common shares outstanding; *ConvPref Usage* = the number of common shares reserved for conversion of preferred stock, divided by total common shares outstanding; *AQ* = measure of the firm's accruals quality, equal to the standard deviation of the residuals from firm-specific regressions of current accruals on current, future and lagged cash flows, change in revenues and PPE; *Volatility* = annualized standard deviation of the firm's daily stock returns; *IOS* = measure of the firm's investment opportunity set, equal to the common factor obtained from a factor analysis of research and development expense, book to market ratio, and capital expenditures as a percentage of the firm's assets; *FCF* = measure of the firm's free cash flows, equal to the sum of cash from operations and cash from investment, scaled by total assets; *DivConstraint* = measure of the firm's closeness to dividend constraints, equal to 1 if the ratio (retained earnings plus cash dividends and stock repurchases)/(cash dividends plus stock repurchases) is less than two, zero otherwise; *Tax* = 1 if the firm has net operating loss carry forwards, zero otherwise; *Regulated* = 1 if the firm operates in a regulated industry (SIC codes 49, 60, 62, 64-67), zero otherwise; *log(Assets)* = log of total assets, our measure of firm size; $\sigma(CFO)$ = standard deviation of the firm's cash flow from operations; $\sigma(Sales)$ = standard deviation of sales revenues; $\log(OperCycle)$ = log of the length of the firm's operating cycle, measured as the sum of days accounts receivable and days inventory; and $NegEarn$ = incidence of negative earnings realizations.

[a] Panel A reports summary information on the test and control variables for the 1,182 firms used in the option risk sensitivity tests. These data are from *Execucomp* and cover the period 1992-2002.

[b] Panel B reports summary information on the test and control variables for the 3,322 firms used in the option usage tests. These data are from *Compustat* and cover the period 1984-1995.
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Table 2

Tests of the Relation Between Option Risk Sensitivity, Option Price Sensitivity and Accruals Quality[a]

Panel A: Tests including price sensitivity measure

	AQ regression			*RiskSens* Regression		
Endogenous variables:	Pred.Sign	coef. est.	t-stat.	Pred.Sign	coef. est.	t-stat.
RiskSens	+	0.7442	6.02		--	--
AQ		--	--	-	0.1599	1.46
Exogenous variables:						
σ(CFO)	+	0.0583	8.08		--	--
σ(Sales)	+	0.0114	6.54		--	--
log (Assets)	-	-0.0065	-7.74	+	0.0074	13.61
log (OperCycle)	+	0.0008	3.91		--	--
NegEarn	+	0.0128	7.36		--	--
log(MgrlHoldings)	-	-0.0006	-2.47		--	--
log(PriceSens)	-	-0.0096	-5.21		0.0143	26.95
Volatility		--	--	+	0.0074	1.21
IOS		--	--	+	0.2416	0.76
FCF		--	--	-	0.0136	1.73
DivConstraint		--	--	+	-0.0052	-2.45
Tax		--	--	+	-0.0018	-1.02
Regulated		--	--	-	-0.0034	-1.59
Adjusted R^2		0.4353			0.6605	
p-value Hausman test		0.0000			0.8523	
First-stage R^2		0.4487			0.6575	

Panel B: Tests excluding price sensitivity measure

	AQ regression			*RiskSens* Regression		
Endogenous variables:	Pred.Sign	coef. est.	t-stat.	Pred.Sign	coef. est.	t-stat.
RiskSens	+	0.2055	7.93		--	--
AQ			--	-	-0.0683	-0.49
Exogenous variables:						
σ(CFO)	+	0.0605	8.35		--	--
σ(Sales)	+	0.0081	5.00		--	--
log (Assets)	-	-0.0036	-9.41	+	0.0157	27.84
log (OperCycle)	+	0.0011	5.62		--	--
NegEarn	+	0.0142	8.13		--	--
log(MgrlHoldings)	-	-0.0005	-2.43		--	--
Volatility		--	--	+	0.0482	6.34
IOS		--	--	+	3.1885	8.05
FCF		--	--	-	0.0815	7.98
DivConstraint		--	--	+	-0.0001	-0.05
Tax		--	--	+	-0.0019	-0.85
Regulated		--	--	-	-0.0204	-7.99
Adjusted R^2		0.4360			0.4596	

Sample description and variable definitions: The sample used in the tests in this table is the ESO risk sensitivity sample (N=1,181 firms for the period 1992-2002) described in Panel A, Table 1. See Table 1 for variable definitions.

[a] Panel A reports the coefficient estimates and t-statistics for the 2SLS estimation of equations (1) and (2). Panel B data are similar, except we exclude *log(PriceSens)* from both equations.

Table 3

Tests of the Association Between Call Option Usage and Accruals Quality[a]

Panel A: Simultaneous equations system of the association between call option usage and accruals quality

	AQ regression, eq. (1)			*ESO* regression, eq. (2a)			*ConvDebt* regression, eq. (2b)			*ConvPref* regression, eq. (2c)		
Endogenous variables:	Pred.Sign	coef. est.	t-stat.	Pred.Sign	coef. est.	t-stat.	Pred.Sign	coef. est.	t-stat.	Pred.Sign	coef. est.	t-stat.
ESO Usage	+	0.5179	11.80		--	--		--	--		--	--
ConvDebt Usage	0 / -	-0.2275	-2.10		--	--		--	--		--	--
ConvPref Usage	0 / -	-0.1767	-2.93		--	--		--	--		--	--
AQ			--	-	-0.3368	-3.53	0 / +	0.1296	2.25	0 / +	0.2541	5.03
Exogenous variables:												
σ(CFO)	+	0.1231	25.23		--	--		--	--		--	--
σ(Sales)	+	0.0187	11.50		--	--		--	--		--	--
log (Assets)	-	0.0041	6.69	-	-0.0051	-7.28	+ ?	0.0035	8.41	+ ?	0.0041	11.23
log (OperCycle)	+	0.0007	2.69		--	--		--	--		--	--
NegEarn	+	0.0320	12.04		--	--		--	--		--	--
Volatility		--	--	+	0.0175	3.91	+	0.0006	0.23	+	0.0040	1.63
IOS		--	--	+	0.2476	9.28	+	-0.0258	-1.61	+	-0.0065	-0.47
FCF		--	--	-	0.0016	1.40	-	-0.0006	-0.86	-	-0.0015	-2.44
DivConstraint		--	--	+	0.0194	4.76	+	0.0117	4.74	+	0.0110	5.07
Tax		--	--	+	0.0077	2.00	+	0.0034	1.48	+	0.0081	3.96
Regulated		--	--	-	-0.0054	-0.83	-	0.0036	0.90	-	0.0100	2.91
Adjusted R^2		0.5456			0.1187			0.0282			0.0703	
p-value Hausman test					0.0000			0.2084			0.0000	
Options		0.0000			--							
ConvDebt		0.0235			--							
ConvPref		0.0034			--							
First-stage R^2		0.5483			n/a			n/a			n/a	

Panel B: Tests of the association between stock option usage and accruals quality, controlling for the sensitivity of firm's returns to accruals quality

	AQ regression, eq. (1)			*ESO* regression, eq. (2a)		
Endogenous variables:	Pred.Sign	coef. est.	t-stat.	Pred.Sign	coef. est.	t-stat.
ESO Usage	+	0.2157	9.03		--	--
ESO Usage $\times\rho$	+	0.1237	3.82		--	--
AQ			--	-	-0.3529	-3.39
AQ $\times\rho$			--	0/-	-0.1084	-0.48
Exogenous variables:						
σ*(CFO)*	+	0.1006	22.54		--	--
σ*(Sales)*	+	0.0162	10.71		--	--
log (Assets)	-	0.0000	-0.07	-	-0.0056	-8.10
log (OperCycle)	+	0.0010	4.16		--	--
NegEarn	+	0.0186	12.08		--	--
Volatility		--	--	+	0.0151	3.22
IOS		--	--	+	0.3544	11.59
FCF		--	--	-	0.0029	1.25
DivConstraint		--	--	+	0.0202	4.95
Tax		--	--	+	0.0068	1.75
Regulated		--	--	-	-0.0053	-0.82
Adjusted R^2		0.5238			0.1424	

[a] Panel A reports the coefficient estimates and t-statistics of Tobit 2SLS estimation of equations (3), (4a), (4b), and (4c). We also report the explained variation from the first-stage (and second-stage) regressions, as well as Hausman tests of the endogeneity of the variables.

[b] Panel B reports results of estimating equations (3) and (4a) where we include variables interacting *ESO Usage* (in the *AQ* regression) and *AQ* (in the *ESO Usage* regression) with the correlation between each firm's monthly returns volatility and *AQfactor*, ρ_j. *AQfactor* is the monthly return to a portfolio that takes a long (short) position in the 40% of firms with the worst (best) accruals quality. Larger values of ρ_j mean the firm's returns volatility is more sensitive to accruals quality.

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