ADVANCES IN MANAGEMENT ACCOUNTING

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ADVANCES IN MANAGEMENT ACCOUNTING VOLUME 36

ADVANCES IN MANAGEMENT ACCOUNTING

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Advances in Management Accounting is a publication of quality, theoretical, and applied research in management accounting. The journal's purpose is to publish thought-provoking articles that advance knowledge in the management accounting discipline and are of interest to both academics and practitioners. The journal seeks thoughtful, well-developed articles on a variety of current topics in management accounting, broadly defined. All research methods including survey research, field tests, case studies, experiments, meta-analyses, and modelling are welcome. Some commentaries, research notes, and critiques will be included where appropriate.

Articles may range from purely empirical to purely theoretical, from practice-based applications to speculation on the development of new techniques and frameworks. Empirical articles must present sound research designs and well-explained execution. Theoretical articles must present reasonable assumptions and logical development of ideas. All articles should include well-defined problems, concise presentations, and succinct conclusions that follow logically from the data.

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INTRODUCTION

This volume of *Advances in Management Accounting (AIMA)* presents a diversity of management accounting topics, methods, and author affiliations, which form the basic tenets of *AIMA*. Included are articles on management control systems, CEO compensation, employee inventive schemes, performance management, the delegation of decision rights, and managing cost reduction decisions. The articles in this volume employ a variety of methods from archival to experiments and surveys and a diversity in authorship with affiliations from Australia, Germany, Qatar, and the United States of America.

This volume begins with two articles that examine management accounting issues around compensation. Ekici and Ruseva's study investigates the impact of stock liquidity on the design of CEO equity compensation. Their findings indicate that greater stock liquidity correlates with a higher allocation of stock awards in compensation packages. This suggests that stock liquidity, as an indicator of the informativeness of stock prices, plays a significant role in shaping CEO equity compensation strategies. Reichert's article, on the other hand, analyses the effects of involving employees in self-assessing their performance as part of the compensation setting process on employer welfare. The evidence suggests that incorporating employee self-assessments into the compensation process tends to decrease employer welfare. This suggests that companies should disentangle employee performance assessments from the compensation setting process.

The third article by Chambers, Johnson, Fleischman, and Zheng examines how organisational culture and managerial tendencies towards communion affect decisions regarding discretionary labour cost cuts. The study finds that managers with a communal orientation are less likely to implement layoffs, and a cohesive organisational culture tends to mitigate layoffs in response to short-term sales declines. However, the protective effect of culture diminishes with prolonged sales downturns. These findings highlight how economic conditions, organisational dynamics, and managerial dispositions collectively influence decisions on the scope and nature of labour cost reductions during periods of declining sales.

The fourth article by Maske, Sohn, and Hirsch explores how manager narcissism and the framing of incentive schemes interact to influence employee effort. The authors discover that high levels of manager narcissism lead to reduced employee effort, whereas low levels increase it. This relationship is mediated by the employees' feelings of envy towards the manager. Additionally, consistent with recent studies on the impact of management compensation structures, the research finds that when manager narcissism is high, a penalty-based contract further decreases employee effort.

The fifth article by Chong, Wang, and Monroe investigates the impact of delegation, moral justification, and ethical climate on misreporting within the

financial services sector. They find that moral justification mediates the relationship between delegation and misreporting, indicating that delegation of decision rights indirectly increases misreporting by enhancing moral justification. Additionally, the study reveals that an ethical climate significantly moderates the influence of moral justification on misreporting. These insights are crucial for developing effective monitoring controls and de-biasing strategies to prevent misreporting by employees.

The sixth and final article by Ammar and Hassan explores the relationship between entrepreneurial cognitive styles and management control system (MCS) configurations within small- and medium-sized enterprises (SMEs). The authors identify three distinct cognitive styles – knowing, planning, and creativity – and five specific MCS configurations utilised by SMEs. Through their analysis, they reveal three significant associations between the identified cognitive styles and MCS configurations. This study highlights the intricate interplay between entrepreneurial cognitive styles and MCS configurations, underscoring their mutual dependence within the institutional framework of SMEs.

The six articles in Volume 36 represent relevant, theoretically sound, and practical studies that extend our knowledge within the management accounting discipline. These articles manifest the book's commitment to providing a high level of contribution to management accounting research and practice.

Chris Akroyd
Editor

EXPLORING THE ROLE OF STOCK LIQUIDITY IN CEO EQUITY COMPENSATION DESIGN

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ABSTRACT

The authors examine the role of stock liquidity in CEO equity compensation design. For a sample of publicly traded firms from 2007 to 2020, the authors find that greater stock liquidity is associated with a higher proportion of stock awards relative to the proportion of options in CEO equity compensation. The results of this study suggest that stock price informativeness on the grant date has a differential effect on the preference for the type of equity compensation awarded to CEOs. The empirical results are supported by multivariate analyses using alternative measures of stock liquidity and a two-stage least squares (2SLS) specification that alleviates endogeneity concerns. Furthermore, the authors document that the firm-specific increase in the proportion of stock awards compared to the proportion of stock options is associated with a firm-specific increase in stock liquidity. Collectively, the analyses suggest that stock liquidity as a measure of stock price informativeness contributes to the choice of CEO equity compensation design.

Keywords: Stock market liquidity; CEO compensation; equity compensation; stock options; stock awards; Equilar

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1. INTRODUCTION

An important debate in the accounting literature concerns the determinants of executive compensation. Part of this debate centers on how firm compensation design incentivizes executives. Mehran (1995) documents that the structure of – rather than the level of – compensation motivates managers to increase firm value. The results of that study attribute the positive effect on firm value to equity compensation (Mehran, 1995). Over time, equity compensation, or compensation in the form of company stock, has become the main driver behind the surge in executive compensation (Cadman et al., 2021; Murphy, 2013).

Research on the determinants of executive compensation suggests that stock liquidity affects the composition of executive compensation. As a measure of stock price informativeness, stock liquidity is positively associated with equity compensation and negatively associated with cash compensation (Garvey, 1997; Jayaraman & Milbourn, 2012). Executive equity compensation is comprised of two main components – options and stock, which differ in their payout functions and risk properties. Considering this difference between options and stock awards, we take a granular approach to examine whether stock liquidity plays a role in determining the structure of CEO equity compensation. Empirically, we find that greater stock liquidity is associated with a greater proportion of stock awards relative to stock options in CEO equity compensation packages.

We draw on a sample of 5,064 publicly traded firms over the period 2007–2020. An examination of the sample indicates that, in 2007, 26% of sample firms compensated CEOs solely with stock options, and 33% granted only stock awards. By 2020, firms using only stock awards as a form of equity compensation doubled to 58%, whereas firms using only stock options decreased to 8%. Firms awarding both types of equity compensation fell from 41% in 2007 to 34% in 2020. Murphy (2013) asserts that regulatory changes affect executive equity compensation. The adoption of SFAS 123(R) in 2005 is one such change in the financial reporting environment which precedes our sample period. Carter et al. (2007) document that in anticipation of the required expensing of equity compensation under SFAS 123(R), firms choosing to voluntary expense equity compensation increase the use of stock awards and reduce stock options. Notably, there are two major accounting regulations that came into effect in 2006 and are still in effect today: (1) SFAS 123(R), which requires firms to expense executive equity compensation, and (2) the Securities and Exchange Commission's mandate for firms to disclose details about compensation awarded to executives in their proxy statements.

We build on the theoretical work and empirical findings of Holmstrom and Tirole (1993), Garvey (1997), and Jayaraman and Milbourn (2012) that stock price informativeness is a determining factor in executive compensation. We posit that because of the difference in payout functions, stock price informativeness has a differential effect on the relative proportions of options and stock awards in CEO compensation packages. Options are riskier than stock awards because they exhibit a convex payout function while stock awards are characterized by a linear one. The payout from stock awards is a function of the future stock price. For options, the payout depends on the difference between the future stock price

and the stock price on the grant date, which is also known as the strike price. This suggests that stock liquidity, as a measure of stock price informativeness, on the date of grant has a differential effect on the payout from the two equity compensation awards. High stock liquidity is associated with higher future stock return synchronicity and, thus, a smaller variation in the firm-specific stock price in the future (Dasgupta et al., 2010). As a result, high stock price informativeness on the grant date translates into a diminished payout for options compared to stock awards. Following this argument, low stock liquidity at the time of the grant would suggest a greater firm-specific variation in the stock price in the future and, thus, a larger payout from options relative to stock awards. Therefore, we expect that stock liquidity on the grant date is associated with preferential differences over the structure of CEO equity compensation. Specifically, we predict that greater stock liquidity on the grant date is associated with a higher proportion of stock awards relative to stock options granted for firm CEOs.

To conduct our empirical analyses, we examine a sample of 32,129 firm-year observations from Equilar over the period 2007−2020. We select this sample period to ensure consistent financial reporting and disclosure requirements. To test the effect of stock liquidity, we employ a measure based on the price impact ratio developed by Amihud (2002). To ease the interpretation of the results, we modify it following Edmans et al. (2013) and Pham (2020) so that this "inverse" of the Amihud's price impact ratio increases in stock liquidity. We capture the relative proportions of stock awards and options granted to CEOs, and we calculate *StockComp*[1] as the ratio of the fair market value of stock awards to the sum of the fair value of stock awards and options. As defined, *StockComp* varies between zero and one as the proportion of stock awards increases and vice versa. Using the empirical model by Jayaraman and Milbourn (2012), we regress *StockComp* on our stock liquidity measure, a set of firm controls, and fixed effects. Consistent with our expectations, we find that firms with greater stock liquidity award CEOs with a greater proportion of stock awards relative to stock options in their equity compensation. These results are economically significant as a 1% increase in *Liquidity* results in a 5.6% standard deviation increase in *StockComp*.

We complement our findings by incorporating alternative measures of stock liquidity, namely, liquidity measures developed by Gopalan et al. (2012), Lesmond et al. (1999), the bid-ask spread, and the stock turnover ratio. The results of these additional tests corroborate our main findings. We further examine whether our results are robust to correcting the possible endogeneity of stock liquidity by estimating a 2SLS regression. To mitigate concerns that an unobservable variable could affect our dependent variable as well as our variable of interest, we use the framework of Fang et al. (2009) as implemented by Jayaraman and Milbourn (2012). We find that the predicted value of stock liquidity is associated with more stock awards and fewer options. Also, we examine the relation between changes in *StockComp* in response to changes in *Liquidity*. This analysis of this intertemporal relation addresses the concern that both measures increase over time. Our results suggest that the increase in the proportion of stock awards relative to stock options as part of CEO equity compensation is associated with an increase in stock liquidity.

We also examine whether corporate governance, and CEO characteristics and firm asset liquidity could offer alternative explanations for our results. Prior work by Chung et al. (2010) and Ferreira et al. (2011) has suggested a relation between stock liquidity and corporate governance. Research to date has also documented the effect of powerful CEOs on executive compensation (Armstrong et al., 2015; Borokhovich et al., 1997; Conyon & Peck, 1998; Core et al., 1999; Cyert et al., 2002; Daily et al., 1998; Faleye, 2007; Lambert et al., 1993). Gopalan et al. (2012) study the relation between stock liquidity and asset liquidity and find a positive relation between firm asset liquidity and stock liquidity. We find that corporate governance, CEO characteristics, as well as firm asset liquidity influence the choice of CEO equity compensation design; however, our inferences on the relation between stock liquidity and equity compensation design remain unchanged. Finally, we estimate our model over alternative sample selections and find consistent results.

Our study contributes to the stream of literature on the determinants of executive equity compensation. Specifically, we shed light on the role of stock liquidity in CEO equity compensation design. Collectively, our results suggest that stock liquidity as a measure of stock price informativeness has a differential effect on the preference for the type of equity compensation awarded to firm CEOs. We rely on the differences in the payout functions of stock options and stock awards and the association of stock price informativeness on the grant date with the variation in the firm-specific stock price in the future. Our findings indicate that as stock liquidity goes up, the proportion of options in CEO equity compensation packages decreases, whereas the proportion of stock awards increases. To our knowledge, this is the first empirical study to examine the effect of stock liquidity on CEO equity compensation design.

The rest of the Paper is organized as follows. Section 2 provides background on executive equity compensation and presents the hypothesis development. Section 3 describes the data, methodology, and sample selection. Section 4 presents our main empirical findings. Section 5 presents additional analyses and supplemental tests. Section 6 offers cross-sectional analyses, and Section 7 concludes.

2. BACKGROUND AND HYPOTHESIS DEVELOPMENT

In this study, we examine the role of stock liquidity in the design of CEO equity compensation. Firms grant different proportions of options and stock awards, the two main types of equity compensation, to incentivize, attract, or retain certain types of managers. Murphy (2013) asserts that the incentives created by equity compensation are based on two factors: (1) how performance is measured and (2) how compensation varies with performance. Research to date has examined the role of accounting numbers (Carter et al., 2007), as well as the role of stock prices (Bushman et al., 1998; Jayaraman & Milbourn, 2012). A recent study by Cadman et al. (2021) documents that the compensation firms award to their CEOs depends on the compensation packages offered by peer firms to their respective CEOs.

Carter et al. (2007) examine how equity compensation in the form of options and stock awards varies with firm performance based on accounting numbers. Over the period 1995–2001, the authors provide compelling empirical evidence that financial reporting concerns are positively associated with stock options and negatively associated with stock awards. The preference for options over stock awards can be explained by the favorable accounting treatment options received under SFAS 123.[2] The role of accounting performance measures in equity compensation design is also supported by the fact that firms that began to voluntarily expense equity compensation before the adoption of SFAS 123(R) increased their use of stock awards and reduced stock options while total compensation levels remained unchanged (Carter et al., 2007).

For fiscal years beginning after June 15, 2005, SFAS 123(R) requires firms to expense equity compensation based on the grant-date fair value over the vesting period.[3] For options, this revision in the financial reporting standard resulted in expensing of the fair value instead of disclosing it in the notes to their financial statements. Starting in 2006, the SEC introduced another regulation related to executive equity compensation which stipulates that firms have to supply compensation information in the "Compensation Discussion and Analysis" (CD&A) section of their proxy statements. Given the consistency in financial reporting and disclosure requirements since 2006, along with the empirical findings by Carter et al. (2007), the role of accounting in the design of equity compensation design appears to be settled.

Holmstrom and Tirole (1993) posit that executive compensation depends on firms' current and future return streams. They state that "Stock prices are uniquely suited for compensation purposes, not so much because they are accurate, but because they are objective, third-party assessments." Thus, stock prices play an important role in managerial incentives. Garvey (1997) models the role of stock liquidity in executive compensation and suggests that greater stock liquidity reduces executives' trading costs. Since risk-averse agents prefer higher liquidity, greater stock liquidity increases their preference for equity compensation over cash compensation. Assuming managers have incentives to reduce information asymmetry, a large body of research suggests a positive relation between executive equity compensation and stock liquidity (Feng & Shu, 2019; Healy & Palepu, 2001; Holmstrom & Tirole, 1993). Following the theoretical work of Garvey (1997), Jayaraman and Milbourn (2012) offer empirical evidence that stock liquidity, as a measure of stock price informativeness, affects the composition of executive compensation. As firm stock liquidity goes up, the proportion of equity compensation increases, whereas the proportion of cash compensation declines.

We build on the theoretical framework of Garvey (1997) and the empirical work of Jayaraman and Milbourn (2012) as we consider the role of stock liquidity as a measure of stock price informativeness in firms' choice of executive equity compensation design. The empirical results of Jayaraman and Milbourn (2012) are consistent with the theory that firms with higher stock liquidity rely more on stock prices when designing executives' compensation (Garvey, 1997). In their research design, Jayaraman and Milbourn (2012) aggregate options and

stock awards which prompts our research question on whether stock liquidity affects executive equity compensation design in terms of the relative proportions of the two main components of equity compensation – stock options and stock awards.

In various settings, empirical research to date has documented a positive relation between executive compensation and risk-taking activities (Coles et al., 2006; Feltham & Wu, 2001; Guay, 1999; Rajgopal & Shevlin, 2002; Rego & Wilson, 2012; Rose et al., 2017; Williams & Rao, 2006). When we compare options and stock awards, options are riskier because they exhibit a convex payout function, whereas stock awards exhibit a linear one. Notably, the value of both equity compensation types depends on the stock price. Holmstrom and Tirole (1993) suggest that with higher stock price informativeness firms can offer steeper stock-based incentives to executives. The convex payout function of options offers executives steeper incentives relative to stock awards because the value of options increases with stock price as well as with the stock return volatility (Rego & Wilson, 2012).[4] Following Holmstrom and Tirole (1993), stock liquidity as a measure of stock price informativeness is expected to be associated with a greater proportion of options relative to stock awards.

A comparison between the payout functions of options and stock awards offers an alternative prediction about the relation between stock price informativeness and the design of equity compensation. On the date of the grant (t), stock awards are valued based on the number of shares granted times the firm stock price at time t. Once the vesting provisions are satisfied, the payout from stock awards is determined based on the number of shares vested times the future stock price at time $t + 1$. In turn, the payout function of options has a unique feature called the strike or exercise price. On the date of the grant (t), the strike price is set equal to firm stock price at time t. Once the vesting provisions are met, the payout of options granted at time t depends on the difference between the future firm stock price at time $t + 1$ and the firm stock price at time t. If the stock price increases, the options are in the money, and a larger difference between the future stock price and the strike price suggests a greater payout. In turn, the payout from options is diminished if the future stock price is only marginally higher than the strike price. Also, options are deemed to be worthless when the stock price falls below the strike price. In summary, the payout from stock awards depends on the future firm stock price at time $t + 1$ and the payout from options depends on both the stock price at time t and the future stock price at time $t + 1$.

Following prior research, stock liquidity at the time of the equity compensation grant serves as a measure of stock price informativeness (Chordia et al., 2008; Easley & O'Hara, 2004; Grossman & Stiglitz, 1980; Holmstrom & Tirole, 1993; Kyle, 1985). Dasgupta et al. (2010) examine stock price informativeness and stock return synchronicity. They posit that high stock price informativeness is associated with higher return synchronicity in the future. In other words, higher stock price informativeness at time t is expected to be associated with less new information impounded into the stock price at time $t + 1$. If more informative stock prices at time t are associated with less firm-specific variation in the firm

stock price at time $t + 1$, then higher stock liquidity at the time of the equity compensation grant will be associated with a diminished payout from stock options relative to stock awards. In reverse, a lower stock price informativeness at time of the grant would suggest a greater firm-specific variation in the stock price in the future and, thus, a larger payout from options relative to stock awards. Thus, we expect firms with higher stock liquidity to award CEOs with equity compensation comprising more stock awards and fewer stock options. We state our main hypothesis as follows:

Hypothesis. Firms with greater stock liquidity award CEOs with a greater proportion of stock awards relative to stock options in their equity compensation.

3. DATA AND METHODOLOGY

In this section, we describe our sample and define our dependent and independent variables. Next, we specify the empirical model along with control variables. Lastly, we discuss the descriptive statistics, the correlations among the variables, and the industry distribution of the sample.

3.1. Sample Selection

Our sample consists of 32,129 firm-year observations and 5,064 unique firms over the period 2007−2020. This sample period allows us to examine the relation between stock liquidity and the structure of executive equity compensation after the adoption of SFAS 123(R) and the SEC requirement for firms to supply compensation information in the CD&A section of their proxy statements. We obtain data from several different sources: CEO compensation is from Equilar; stock price data are from CRSP; and firm-specific control data are from Compustat and CRSP. Equilar provides executive compensation for publicly traded firms disclosed in the CD&A. We keep firm-year observations for which we have the necessary information to calculate CEO compensation, stock liquidity measures, and firm controls. All analyses were conducted using Stata (StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP).

3.2. Equity Compensation Design (StockComp)

We define *StockComp* for firm i and year t as the proportion of the fair value of stock awards (*STOCK AWARDS*) to the fair value of equity compensation granted to the CEO following Equation (1). Equity compensation is calculated as the sum of stock awards (*STOCK AWARDS*) and options (*OPTION AWARDS*). As calculated, *StockComp* is equal to zero if a firm awards only options to its CEO, and the variable is equal to one if only stock awards are granted. For firms that offer both options and stock awards as part of their equity compensation package, *StockComp* varies between zero and one. As defined, *StockComp* weights the relative proportions of options and stock awards and captures firms'

equity compensation design. The measure decreases in options, and it increases in stock awards.

$$StockComp_{i,t} = \frac{STOCK\ AWARDS_{i,t}}{STOCK\ AWARDS_{i,t} + OPTION\ AWARDS_{i,t}} \quad (1)$$

3.3. Stock Liquidity (*Liquidity*)

Our main measure of stock liquidity (*Liquidity*) is based on the annual price impact ratio developed by Amihud (2002). Following the suggestion by Fong et al. (2017) that Amihud's ratio is one of the best cost-per-dollar volume proxies, we employed it as our main measure of stock liquidity. Since firms disclose executive compensation on an annual basis, employing an annual stock liquidity measure is suitable in this setting as both the dependent variable (*StockComp*) and independent variable of interest (*Liquidity*) are calculated over year t. Amihud's price impact ratio of stock i in year t is calculated as based on Equation (2):

$$\text{Amihud's ratio}_{i,d,t} = T_t^{-1} \sum \frac{|r_{i,d,t}|}{\text{vol}_{i,d,t}}, \quad (2)$$

where r denotes the return and vol denotes the dollar value of stock i on day d in year t.

The summation is over T, the number of days in year t for which the ratio $\frac{|a_{i,d,t}|}{\text{vol}_{i,d,t}}$ is defined as $(\text{vol}_{i,d,t} \neq 0)$. Following Hasbrouck (2009), we multiply the value by 10^6. We normalize Amihud's ratio by taking the natural logarithm (Edmans et al., 2013; Pham, 2020), and then, we multiply it by -1. This modification eases the interpretations of our results as higher values of *Liquidity*[5] are indicative of greater stock liquidity, and vice versa.

3.4. Empirical Model and Control Variables

To test our hypothesis, we employ the empirical specification of Jayaraman and Milbourn (2012). We include the following firm-specific control variables: *Tobin's Q*, *ROA*, operating cash flow (*Cash Flow*), and stock return (*Return*). In addition, we control for the volatility of *ROA* (*ROA Volatility*), operating cash flow (*Cash Flow Volatility*), and stock return (*Return Volatility*). We control for firm size using the logarithm of sales (*LogSales*). Finally, we include year- and industry-fixed effects defined by two-digit SIC codes. The table in the appendix defines all variables in detail.

We estimate the following ordinary least squares regression:

$$\begin{aligned} StockComp_t = {} & \alpha_0 + \alpha_1 Liquidity_t + \alpha_2 Tobin's\ Q_t + \alpha_3 ROA_t + \alpha_4 Cash\ Flow_t \\ & + \alpha_5 Return_t + \alpha_6 ROA\ Volatility_t + \alpha_7 Cash\ Flow\ Volatility_t \\ & + \alpha_8 Return\ Volatility_t + \alpha_9 LogSales_t + \alpha_j\ Fixed\ effects + \varepsilon \end{aligned} \quad (3)$$