THE USE OF STOCK OPTIONS AND RETIREMENT PLANS TO RETAIN NON-EXECUTIVE EMPLOYEES

Kathleen M. Weiden*, Jane Mooney**

Abstract

Firms expend significant resources to retain employees. In this paper, we examine how firms that use stock options grant them differently when they also utilize retirement plans in non-executive employee compensation contracts. Using a large sample of US firms, we examine the relation between the stock option proportion of pay of non-executive employees and firms' use of a retirement plan of any type. We then examine how firms' use of stock options is affected by the type of plan (defined benefit or defined contribution) used by the firm. We find that firms reduce their use of stock options when there are other deferred pay mechanisms in place, suggesting they act as substitutes. We also find that firms with defined benefit retirement plans reduce their use of stock options for non-executives to a greater extent than firms with defined contribution plans, suggesting a greater degree of substitutability between defined benefit plans and stock options than between defined contribution plans and stock options.

Keywords: non-executives, retention, stock options, retirement plans

**Director of Tax, LeFrak Organization, 40 West 57th Street, New York, NY*
kweiden@lefrak.com
***Simmons College, School of Management, 300 The Fenway, Boston MA*
jane.mooney@simmons.edu
We appreciate the comments of Roselie McDevitt, Stephen Senge, Joseph Weintrop and seminar participants at the North East Region Meeting of the American Accounting Association, the Annual Meeting of the American Accounting Association, and at Fairfield University. We also acknowledge the support of the Swahnberg-Novotny Fund for Faculty Research and Development, Simmons College.

I. Introduction

Economic models of long-term labor contracts suggest two mechanisms for engendering long-term employment: pay employees more than they can earn elsewhere, and/or structure compensation contracts to include incentives for employees to stay with the firm (Ippolito 1991; Allen *et al*. 1993). Deferred pay types with tenure related provisions provide retention benefits to firms since employees may forfeit a significant portion of total career earnings by not staying with the firm for the period contemplated by the deferred pay type.

The accounting and economics literature suggests that firms' use of stock options for retention of non-executive employees is related to significant investment opportunity sets (Core and Guay, 2001; Ittner *et al*., 2003) and competitive labor markets (Oyer and Schaefer, 2005). Balsam *et al*. (2007) provide evidence that stock options provide retention benefits to the firm for the duration of the option-vesting period. Although these papers consider retention to be a motivating factor for option granting, they do not consider how this behavior is affected by firms' contemporaneous use of other retention mechanisms.

The pension related labor economics literature examines the role of retirement plans in retaining employees. This literature finds that firms with retirement plans have lower quit rates and higher employee tenure than firms without (Gustman and Steinmeier 1993; Even and MacPherson 1996). A subset of this pension literature also finds that while defined benefit plans (DBPs) and defined contribution plans (DCPs) are both useful for retaining employees, DBPs provide more significant retention benefits than DCPs (Ippolito 1985, 1987, 1994; Allen *et al*. 1993).

Different forms of deferred pay may function as substitutes or complements with respect to employee incentives and firm retention benefits. When constructing and negotiating employee compensation contracts, rational managers likely prefer to minimize the inclusion of pay types with substitute, or redundant, benefits.

While the "perfect" compensation contract would contain only complementary pay types, it is unlikely that this is achieved in practice. This suggests that we should observe differences across employee compensation contracts as a function of the extent to which pay types with redundant retention benefits are included in those contracts.

While stock options and retirement plans both have features that make them useful for retaining employees, structural differences, as well as differential financial reporting and tax reporting consequences, may limit the extent to which firms view them as substitutes. If stock options and retirement plans effectively are not substitutes, then we should observe no differences in option granting behavior between firms with retirement plans and those without. However, if stock options and retirement plans function as even partial substitutes, we should observe differences in option granting behavior when comparing firms with and without retirement plans. Furthermore, if DBPs have employee retention effects that are significant relative to DCPs, then we should observe differences in option granting behavior as a function of the type of retirement plan in use.

This paper examines the extent to which firms' use of stock options for non-executive employees is related to the use of other forms of deferred pay that also provide retention benefits to firms.[14] Section II contains the hypothesis development. We hypothesize that the granting of stock options to non-executive employees is affected by both the existence and type of retirement plans provided as well as the level of compensation provided by retirement plans.

Section III describes the model development and variables. We first examine the relation between the stock option proportion of pay of non-executives and the use of a retirement plan of any type. We then examine whether the type of retirement plan *per se* has an impact on firms' option granting behavior. Sample selection and data are described in Section IV. We use a large sample of US firms granting options to non-executive employees.

Results are discussed in detail in Section V and summarized in Section VI. Our initial cross-sectional results indicate that the stock option proportion of pay is lower for firms with a retirement plan than for firms without. We find that for firms with a retirement plan, the stock option proportion of pay is negatively related to the level of annual plan related compensation. Results from additional cross-sectional tests indicate that the use of DBPs *and* DCPs are both negatively related to firms' use of stock options for non-executive employees, but that the negative relation between the stock option proportion of pay and the use of a DBP is significantly larger than that for DCPs. We also find a significantly negative relation between the annual plan level of the DBP and the stock option proportion of pay, while the relation between the annual plan level for the DCP and the stock option proportion of pay is insignificant. These results provide evidence that firms' stock option granting behavior is impacted by the use of retirement plans, and more specifically, by the type of retirement plan used by the firm.

A negative relation between firms' stock option grants to non-executives and the level of the annual plan related compensation is not surprising, in that we expect firms to be concerned about overall levels of pay. More significant is the finding that firms' option granting behaviors are negatively impacted by the use of a retirement plan, independent of the level of the plan, and differentially so, when considering the type of plan in use. This provides new insights into how firms view the function of stock options and retirement plans in the compensation contracts of non-executive employees. Simply put, it is not *just* that more of one pay type leads to less of another.

II. Hypothesis Development

The differences between defined benefit and defined contribution type retirement plans, and between these plans and stock options, are complex and multifaceted. Exhibit 1 summarizes these differences on a number of relevant dimensions.

Typically, option contracts grant employees an opportunity to purchase stock at an advantageous price after a 3 to 5 year vesting period; however, if the employee remains with the firm option exercise may be deferred which provides significant tax advantages for the employee. If the employee leaves the firm, option contracts generally require the forfeiture of non-vested options and the immediate exercise of vested options. Forfeiture is costly for employees with significant financial capital accumulated in non-vested options. In addition, because the exercise of stock options generates taxable income to the employee on the exercise date, a forced early exercise of vested stock options may be quite suboptimal for the employee from a tax planning perspective. Options typically cannot be transferred, which means that the employee must remain with the firm to retain the right to exercise the options at vesting or later. Rational employees should consider the early departure costs associated with forfeiture (of non-vested) or forced exercise of (vested) options when they evaluate compensation contracts offered by potential employers.

Retirement plans provide retention incentives as a function of the way in which retirement benefits accrue. Although DBPs and DCPs accrue benefits very differently, both types of plans generate higher retirement distributions from longer employee tenure. Under a DCP, higher retirement distributions result from greater employer contributions over time and a longer period for (tax-free) investment gains. Under a DBP, the employer promises a specific monthly benefit at retirement, typically determined by a formula that defines the retirement benefit as a percentage of the worker's final five years' wages and total years of service, with the percentage increasing as years of service increase. The combination of increasing percentage and increasing wages over time

[14] This paper does not discuss the decision to establish different types of deferred pay schemes, which are assumed here to be already in place.

translates to greater increases in DBP type retirement distributions as employee tenure lengthens.

A small body of literature directly examines firms' use of options for retention of non-executives, and provides mixed results. Ittner *et al*. (2003) suggest that competition by new economy firms for specialized labor should lead to greater use of stock options for non-executives, but do not find evidence in support of this hypothesis. Conversely, Balsam *et al*. (2007) examine non-executive employee turnover at a Fortune 100 firm during the 1990s, and find significant differences in employee turnover rates in the six months prior and subsequent to the option vesting date, regardless of non-executive employees' reasons for voluntary departure (i.e., retirement or to change employers). Other literature *infers* firms use stock options for short-term retention of non-executives, largely as a function of the innovation opportunity set (Core and Guay, 2001; Ittner *et al*., 2003; Oyer and Schaefer, 2005).

Firms' use of retirement plans to minimize employee turnover has also been examined in the labor economics literature.[15] Gustman and Steinmeier (1993) find that individuals with employer retirement plans are significantly less likely to change jobs than those without, while Even and MacPherson (1996) find the use of a retirement plan is significantly associated with longer employee tenure. Other researchers have examined the *differential* role of DBPs and DCPs in retaining employees. When examining employees' projected and accrued pensions under DBPs, labor economists find that longer tenure (Ippolito 1985, 1987, 1991) and smaller probabilities of turnover (Allen *et al*. 1993) are associated with greater expected reductions in DBP retirement payouts resulting from early departure. Despite early literature characterization of DCPs as portable, tax-free savings accounts, which do not impose early departure costs on employees, more recent labor economics literature suggests otherwise, providing evidence that DCPs, like DBPs, can reduce labor mobility, although not nearly to the extent of DBPs (Gustman and Steinmeier, 1993; Even and MacPherson, 1996). Intervening factors in these relationships include firm size, cash flow constraints, labor market aspects and the firm's innovative opportunity set.

If, as the previous research on the use of stock options and retirement plans suggests,

stock options are useful for short-term retention (i.e., through the vesting period), while retirement plans are useful for long-term retention (i.e., the employee's career), then stock options and retirement plans may function more like complements than like substitutes in employees' compensation contracts. Complementarity between retirement plans and stock options implies no relation between the use of a retirement plan and the use of stock options, while substitutability between retirement plans and stock options implies a negative relation. If stock options and retirement plans are not substitutes, or are substitutes but not significantly so, then we should observe no differences in option granting behavior between firms using a retirement plan and firms not using a retirement plan. However, if stock options and retirement plans are substitutes and significantly so, then we should observe differences in option granting behavior between firms using a retirement plan and firms not using a retirement plan. Our first set of tests examines the relation between firms' stock option grants and the contemporaneous use of a *retirement plan of any type.*

If, as the previous research on the use of particular types of retirement plans suggests, DBPs provide retention effects over employees' careers (i.e., long-term) and DCPs provide retention effects at least through, and perhaps beyond the regulatory vesting period (i.e., short-term), then stock options and DBPs may function more like complements, while stock options and DCPs may function more like substitutes. Complementarity between DBP plans and stock options implies no relation between the presence of a DBP plan and the use of stock options, while substitutability between DCP plans and stock options implies a negative relation between DCP plans and the use of stock options. Our second set of tests considers whether the *type of retirement plan* used by the firm matters when firms grant stock options to non-executives.

Regardless of whether these plans are substitutes or complements, the *amounts* of compensation provided by different types of pay should be negatively related. If employees' total compensation is bounded at the appropriate competitive level, an increase in the amount of one type of compensation should lead to a decrease in the amount of other types of compensation (though not necessarily on a dollar-per-dollar basis). In order to examine complementarity versus substitutability of pay types, it is important to separate *pay levels* from *pay types*. Separating pay levels from pay types in both sets of tests enables us to examine the impact of retirement plans on option granting, independent of plan levels.

We hypothesize that the stock option proportion of pay is negatively affected by the existence of any type of retirement plan and by the level of compensation provided by these plans. We then consider differential effects of the type of retirement plan in place. We hypothesize that defined benefit plans will have a greater negative effect on the stock option proportion of pay than defined contribution plans.

III. Model Development and Variables

To examine how firms' use of stock options for employee retention is affected by the presence of retirement plans, we modify and extend the model

[15] See Gustman, Mitchell and Steinmeier (1994) for a survey of the literature on the role of pensions in the labor market.

used by Ittner *et al*. (2003).[16] To assess complementarity and/or substitutability between stock options and retirement plans, we include a variable to indicate the firm's use of a retirement plan of any type. To examine differential effects of DBPs relative to DCPs, we include variables to indicate the retirement plan type(s) used. In all tests, we include retirement plan levels to separate out the extent to which firms view stock options and retirement plans as substitute forms of pay in terms of levels. Finally, we control for the factors found in the prior literature to be significantly associated with firms' option grants to non-executives for retention purposes or other reasons (e.g., the firm's innovation opportunity set, wage levels and wage changes, size, and cash constraints).

We expect stock options and retirements plans to be substitutes as well as complements. Therefore, we expect that the proportion of total compensation provided by stock options will be lower for firms with retirement plans than for firms without, and that DBPs will have a greater dampening impact on this relation than DCPs. We also expect that the stock option proportion of pay will be inversely related to the level of compensation provided by these plans.

The stock option proportion of pay is calculated as the value of options granted to non-executive employees divided by total employee compensation. The level of stock option grants to non-executive employees is calculated from information contained in firms' annual proxy statements. SEC rules (item 402 of Regulation S-K), adopted in 1992, require detailed disclosure of the components of executive compensation (including information on stock option awards) for the chief executive officer and the other four most highly compensated executive officers whose compensation for the previous fiscal year exceeds $100,000 (base salary and bonus only). We classify these officers as "tier 1 employees." Disclosure rules require that the firm report the number of stock options awarded to these employees, the percent such awards represent of the total stock option grants to *all employees*, and the value of the options granted.

Data on option grants are obtained from Standard and Poor's ExecuComp database, collected from information disclosed in firms' annual proxy statements. We use the total number of options granted to the tier 1 employees and the total percent they represent to gross up and determine the total number of options granted to all employees.[17] We also assume that there is another tier of executives (we classify these as "tier 2 employees"), not reported on in the proxy statement, who receive, in the aggregate, the same number of options as received by the tier 1 employees. From the firm total options granted to all employees, we subtract the number granted to the tier 1 and tier 2 employees, resulting in the number of options granted to non-executive employees. The value of non-executive options granted is calculated as the number of options granted to these employees multiplied by the average Black-Scholes value of an option granted to the tier 1 employees. We use ExecuComp's modified Black-Scholes value of options granted to tier 1 employees

Total non-executive employee compensation is the sum of the value of options granted to non-executives plus total wages paid to non-executive employees plus total pension and retirement expense. Total wages paid to non-executive employees are calculated using wage data for production workers obtained from the U.S. Bureau of Labor Statistics and firms' disclosures about the number of employees, obtained from Compustat. We use firms' financial statement disclosures about retirement plans, obtained from Compustat, to identify the plan types utilized by firms as well as to calculate compensation provided by these plans.

Base on the previously cited research, we have included variables to control for the firm's innovation opportunity set and firm size. Since option grants require no cash, firms which are more cash constrained should substitute options for deferred compensation which requires cash (as do both DCPs and DBPs). Cash constraints are also included as a control variable. All of these variables are calculated using data obtained from Compustat. Two other control variables are included for wage levels and one-year change in wages, with data obtained from the U.S. Bureau of Labor Statistics. All variables, their data sources, construction, and the sign of their predicted coefficients are summarized in Exhibit 2.

To capture the extent to which firms' option granting behavior is related to the use of a *retirement plan of any type*, we test the following model ("the aggregated model"):

$$OPTPAY = \beta 0 + \beta 1PLAN\_YN + \beta 2PLAN\_LEVEL + \beta 3IOS + \beta 4SIZE + \beta 5CASHCON + \beta 6WAGE + \beta 7DWAGE + e \quad (1)$$

To capture the extent to which firms' option granting behavior is related to the *type of retirement plan in use,* we test the following model ("the disaggregated model"):

$$OPTPAY = \beta 0 + \beta 1PLAN\_TYPE\_DBP + \beta 2PLAN\_TYPE\_DCP + \beta 3PLAN\_LEVEL\_DBP \beta 4PLAN\_LEVEL\_DCP + \beta 5IOS + \beta 6SIZE + \beta 7CASHCON + \beta 8WAGE + \beta 9DWAGE + e \quad (2)$$

[16] This study includes restricted stock grants that are not available through public sources; we look only at option grants.

[17] We assume that options are granted to non-executive employees at the same time and under the same terms as they are granted to the top five employees.

IV. Sample Selection and Data

Sample selection

The firms in the ExecuComp (version 2003) database are used to identify all firms granting options during the five-year period from 1997 to 2002. Our rationale for this sample selection period is two-fold. First, SFAS 123, *Accounting for Stock-Based Compensation*, adopted in October 1995, was effective for years beginning after December 31, 1996. Thus, we exclude 1996 since it was the transition year to a new accounting standard for stock-based compensation, and begin our sample period in 1997. Second, in 2003, largely in response to well-publicized accounting scandals, FASB reopened deliberations on accounting for equity-based pay. The resulting uncertainty about the outcome of the deliberations, which took place over 2003 and 2004, complicated firms' incentives with respect to option granting. In addition, SFAS 123R, *Share-Based Payment,* adopted in December 2004, changed accounting for stock-based pay for years beginning after December 31, 2005. Thus, we end our sample period in 2002 to exclude the confounding effects of regulatory deliberations and the resulting change in the accounting rules applicable to stock options.

Financial statement data (from the Compustat Industrial database) and share price information (from the Compustat Price and Earnings database), for all years must be available for the firm to be retained in the study. In addition, reported SIC and NAICS (6 digit) codes must be available for matching hourly wages of production workers. Because we are interested in the use of stock options to compensate non-executives, firms are eliminated from the sample if the options granted to tier 1 and tier 2 employees are more than 50% of the options granted to all employees. This yields a final sample of 1,229 firms and 4,350 firm-years. Table 1 reports summary data the sample by year, one-digit industry class, and type(s) of retirement plan in use.

Data

Table 2, Panel A, presents descriptive statistics for the sample firms' economic characteristics as well as the model variables used in the analysis. All model variables (except indicators) were winsorized at 98% to reduce the effect of extreme values.

The economic variables (assets, sales, net income, and market capitalization) are reported for descriptive purposes only, and are not winsorized. The mean (median) value of options granted to non-executives is $113 ($14) million, indicating considerable skewness. The mean and median percent of total options granted by firms to non-executives are virtually the same, 72.3% and 72.0%. Non-executive employees receive, at the mean (median), 14.9% (4.8%) of their total compensation in the form of option grants. On average, 86.8% of firm-year observations reflect a retirement plan of some type. Approximately 51% of firm-year observations indicate use of a DBP and approximately 75%, use of a DCP. On average firms spend 17.3% of beginning of year assets on their innovation opportunity set and are cash constrained. Mean (median) hourly wage change is 3.8% (3.6%) of prior year's hourly wage, and non-executive employees receive a mean (median) hourly wage of $16.58 ($16.39).

Table 2, Panel B, summarizes the Pearson (Spearman) correlation coefficients for the variables in the aggregated model (those in bold are correlated at the 1% level). OPTPAY is significantly negatively correlated with PLAN_YN, suggesting that the stock option proportion of pay of non-executives is lower for firms using a retirement plan than for firms not using a retirement plan. OPTPAY is significantly positively correlated with IOS**,** suggesting that the stock option proportion of pay of non-executives is higher at firms facing higher innovation opportunity sets. OPTPAY is also significantly negatively correlated with CASHCON, suggesting that firms that are more cash constrained use options more to compensate non-executives. These relationships are all consistent with the effects hypothesized.

PLAN_YN and PLAN_LEVEL are both significantly negatively correlated with IOS, suggesting that firms using retirement plans have smaller innovation opportunity sets. The significantly positive correlation between PLAN_YN and CASHCON suggests that firms using retirement plans are less cash constrained than firms not using retirement plans. PLAN_LEVEL is significantly positively correlated with SIZE, suggesting that larger firms with retirement plans have higher retirement plan levels. PLAN_LEVEL is significantly positively correlated with CASHCON, suggesting that firms that are less cash constrained have higher retirement plan levels.

V. Results

Aggregated Model

Table 3 reports results of the cross-sectional OLS regression for the aggregated model. The main coefficient of interest, on PLAN_YN, is significantly negative, indicating that the stock option proportion of pay of non-executive employees is lower for firms with a retirement plan than for firms without a retirement plan. This finding supports the notion that the employee retention benefits of stock options and retirement plans are, to some extent, substitutes.

As hypothesized, for firms with retirement plans, the level of compensation provided by the plan has an impact on firms' option granting behavior as well. The coefficient on PLAN_LEVEL is negative and significant, indicating that the stock option proportion of pay of non-executives is lower for retirement plan firms with higher levels of compensation provided by the plans.

Coefficients on control variables are consistent with the findings of previous researchers. We find a significantly positive association between the stock option proportion of pay and our proxy for the innovation opportunity set, IOS. This supports the argument that firms facing a significant innovation opportunity set use options as a retention mechanism for non-executives. Consistent with the idea that monitoring of employee actions becomes more difficult as firm size increases, resulting in greater use of options, we find that the coefficient on SIZE is significantly positive. While previous researchers (Core and Guay 2001; Ittner *et al*. 2003) have argued that cash constrained firms will use stock options more to compensate non-executives, substituting options for cash wages, their findings are mixed (supported by the former but not by the latter). We find that the coefficient on CASHCON is statistically significantly negative, providing additional evidence that firms that are more (less) cash constrained use options more (less).

In terms of the wage related control variables, the coefficient on WAGE is positive and significant, suggesting that firms paying higher hourly wages grant higher levels of options as well. The coefficient on DWAGE is negative but not significant.

Disaggregated Model

It is interesting to examine economic characteristics as well as model variables for sample firms, stratified by type of retirement plan(s) maintained; these are presented in Table 4, Panel A. Firms using only DBPs are the largest firms, followed by the firms using both DBPs and DCPs. Firms without any type of retirement plan are the smallest. The stock option proportion of pay for firms without any type of retirement plan is highest, followed by firms using only a DCP. Firms with only a DBP grant the lowest stock option proportion of pay of any of the four groups. This supports our conjecture that stock options and DBPs provide the most directly complementary retention benefits. Firms without a retirement plan and firms using only a DCP tend to have larger innovation opportunity sets and are more cash constrained that the other two groups of firms. While hourly wage levels are highest for firms using only a DBP, wage changes are largest for firms without a retirement plan of any type and for firms using only a DCP. This indicates that firms without additional retention mechanisms must rely on wage adjustments to retain employees as market conditions change. Table 4, Panel B, summarizes the Pearson (Spearman) correlation coefficients for the for the disaggregated model variables. OPTPAY is significantly negatively correlated with PLAN_TYPE_DBP and PLAN_LEVEL_DBP, suggesting that the stock option proportion of pay is lower for firms using a DBP plan, and that for firms with a DBP, higher levels of compensation through DBPs accentuate this further. OPTPAY is significantly negatively correlated with PLAN_TYPE_DCP but not with PLAN_LEVEL_DCP, suggesting that the stock option proportion of pay is lower for firms using a DCP plan, but that DCP retirement costs have no impact on the stock option proportion of pay of non-executives.

Table 5 reports results of the cross-sectional OLS regression for the disaggregated model. The coefficients on both PLAN_TYPE_DBP and PLAN_TYPE_DCP are negative at significant levels, indicating that the presence of both types of plans reduces the stock option proportion of pay of non-executives. An *F*-test of the equality of the coefficients on PLAN_TYPE_DBP and PLAN_TYPE_DCP rejects the null hypothesis of equality. The negative impact of DBPs on the stock option proportion of pay is significantly larger than the negative impact of DCPs. We interpret these findings as evidence that both plans serve as substitutes and that DBP plans provide retention benefits incremental to those afforded by DCP plans, even in the presence of other forms of compensation that offer retention mechanisms (e.g. stock options).

The coefficient on PLAN_LEVEL_DBP is also significantly negative, while the coefficient on PLAN_LEVEL_DCP is insignificant, suggesting that compensation provided by DBPs but not DCPs, is considered when firms grant options to non-executives. This provides additional evidence that DBP plans provide retention benefits over and above those provided by DCP plans, though it calls into question the idea that stock options and DCPs are direct substitutes.

VI. Summary

Increased employee tenure is beneficial for firms for many reasons. It can improve returns on training costs and reduce monitoring costs by emphasizing long-term performance. In addition, repetition over time increases worker accuracy or proficiency, and efficiency is higher for teams that have worked together longer.[18] Orazem, Bouillon and Doran (2004) find a positive association between return on assets and employee tenure, and suggest that firm investments in firm-specific training, pension or benefit policies, deferred pay policies and human resources practices should be associated with higher firm value. Thus, it appears firms have incentives to provide compensation in ways that enhance employee retention.

If stock options and retirement plans, and DBP type plans, in particular, have features that make them useful for employee retention, then firms' option granting behaviors are likely impacted by firms' use of a retirement plan, as well as by the specific type of plan in use.

[18] See Ippolito (1991) for a summary of the prior literature on how long-term commitments enhance productivity.

We examine a sample of firms issuing more than 50% of their stock options to non-executives and find a negative relation between the stock option proportion of pay and the use of a retirement plan. This is consistent with the hypothesis that firms reduce their use of options for non-executive employees in the presence of alternative retention mechanisms. We also find a negative relation between the stock option proportion of pay, pension, and retirement plan levels. We conduct further tests to examine whether the specific type of plan used by the firm is related to the firm's stock option granting behavior. We find a negative relation between the use of both DBP and DCP plans, but that the negative relation between the stock option proportion of pay is larger for DBPs than for DCPs. Further, DBP plan levels, but not DCP plan levels, play a role in the extent to which employees receive stock option compensation.

Our research provides evidence on the impact of alternative retention mechanisms on firms' use of stock options for non-executives; further research could improve our understanding of the relationship between retirement plans and stock options for this group of employees. Ippolito (1991) suggests that the retention effects of DBPs are strongest during midstream of the tenure cycle. This in turn suggests that firms' option granting behavior with respect to employees will be a function of their tenure cycle. Research examining the relation between firms' option granting behaviors and employees' tenure characteristics could be a worthwhile expansion of this work. Ittner *et al*. (2003), Anderson et al. (2000) and Murphy (2003) suggest that the economic characteristics and pay practices of new economy firms differ significantly from those of old economy firms. Research examining new and old economy firms' use of stock options in conjunction with the contemporaneous use of other forms of deferred pay could also be a worthwhile expansion of this work.

This research presents substantial evidence that the use of stock options to compensate non-executives is significantly impacted by other forms of compensation that provide retention benefits for the employer. In particular, the existence of DPB and DCP plans, as well as the amounts of compensation they provide, appears to affect option granting behavior. Results of tests indicate that they do so differently, with DBPs dampening the use of options more than DCPs.

Our findings, as well as those of previous researchers whose works we discuss, suggest many remaining opportunities to expand on our understanding of firms' pay practices, and in particular, option granting behaviors.

References

1. Allen, S., R. Clark and A. McDermed (1993, "Pensions, Bonding and Lifetime Jobs", *Journal of Human Resources* 28(3): 463-481.
2. Anderson, M., R. Banker and S. Ravindran (2000), "Executive compensation in the information technology industry", *Management Science* 46: 530-547.
3. Balsam, S., Gifford, R., Kim, S. (2007), "The effect of stock option grants on voluntary employee turnover", *Review of Accounting and Finance* 6(1):5-14.
4. Core, J., Guay, W. (2001), "Stock option plans for non-executive employees", *Journal of Financial Economics* 61, 253-287.
5. Even, W.E. and D.A. MacPherson (1996), "Employer size and labor turnover: the role of pensions", *Industrial and Labor Relations Review* 49(4): 707-728.
6. Financial Accounting Standards Board (FASB). 1995. Accounting for stock-based compensation. Statement of Financial Accounting Standards No. 123. Norwalk, CT: FASB.
7. Financial Accounting Standards Board (FASB). 2004. Share-Based Compensation. Statement of Financial Accounting Standards No. 123R. Norwalk, CT: FASB.
8. Gustman, A.L., O.S. Mitchell and T.L. Steinmeier, (1994), "The Role of Pensions in the Labor Market: A Survey of the Literature", *Industrial & Labor Relations Review* 47(3):417-438.
9. Gustman, A. L. and T.L. Steinmeier (1993), "Pension portability and labor mobility", *Journal of Public Economics* 50: 299-323.
10. Ippolito, R. A. (1985), "The labor contract and true economic pension liabilities", *American Economic Review* 75(5):1031-43.
11. ---------- (1987), "The implicit pension contract, developments and new directions", *Journal of Human Resources* 23(3): 441-467.
12. ---------- (1991), "Encouraging long-term tenure: wage tilt or pensions?", *Industrial and Labor Relations Review* 44(3):281-299.
13. ---------- (1994), "Pensions and indenture premia", *The Journal of Human Resources* 29(3): 795-812.
14. Ittner, C. D., R.A. Lambert and D.F. Larcker (2003), "The structure and performance consequences of equity grants to employees of new economy firms", Journal *of Accounting and Economics* 34:89-127.
15. Murphy, K.J. (2003), "Stock-based pay in new economy firms", Journal of Accounting and Economics 34:129-147.
16. Orazem, P. F., M.L. Bouillon and B.M. Doran (2004), "Long-Term Attachments and Long-Run Firm Rates of Return", *Southern Economic Journal* 71(2):314-333.
17. Oyer, P. and S. Schaefer (2005), "Why do some firms give stock options to all employees?: An empirical examination of alternative theories", *Journal of Financial Economics* 76(1):99-133.

Exhibit 1. Comparison of Features of Defined Contribution Plans, Defined Benefit Plans and Nonqualified Stock Options

FEATURE	DEFINED CONTRIBUTION PLAN ("DCP")	DEFINED BENEFIT PLAN ("DBP")	NONQUALIFIED STOCK OPTIONS
Pay deferred until:	Retirement, but may be paid out earlier with payment of 10% early distribution penalty.	Retirement, but may be paid out earlier with payment of 10% early distribution penalty	End of vesting period
Tax implications: Employer	Tax deduction in amount, and at time, of contribution.	Tax deduction in amount, and at time, of contribution.	Tax deduction at time of employee exercise, in amount of difference between share price at date of exercise and exercise price.
Tax implications: Employee	Taxed at time of distribution, usually at retirement.	Taxed at time of distribution, usually at retirement.	Taxable at time of employee exercise, in amount of difference between share price at date of exercise and exercise price.
Annual Employer Participation Required After Initial Adoption	Yes, but some plans may not require any contribution if a profit threshhold is not met.	Yes.	No.
Determination of Annual Compensation Amount	Generally determined as a % of salary, % amount may vary with profilitability as stated in plan documents.	Actuarially determined in accordance with predetermined benefit formula contained in plan documents.	At management discretion, within parameters identified in the stock option plan.
Financial Statement Implications (during sampling period from 1997 to 2002)	Pension expense recognized equal to amount of annual contribution.	Actuarially determined pension expense recognized, could be negative if plan assets were large enough to generate sufficient expected returns. The expense does not usually equal the amount of the contribution. A modified measurement of the firm's net pension liability recognized on the balance sheet.	Firms could choose between expense recognition or footnote disclosure of what earnings would be if options had been expensed.
Cash Flow Implications	If a contribution is required, it must be made within a short window after year end.	Funding requirements determined by ERISA, annual contribution generally required if plan is not overfunded. Contribution must be made within a short window after year end.	Shares distributed at exercise may be provided through Treasury stock, requiring open market repurchase; or through issuance of additional shares in which case no cash outflow is ever required. Proceeds from exercise result in cash inflows.
Employee Inclusion Requirements	Virtually all full time employees must be included.	Virtually all full time employees must be included.	None.
Vesting Timetable	3 to 5 years	3 to 5 years	No regulatory mandate. In practice the vesting period is generally 3 to 5 years from grant date.
Employee Early Departure Costs	None, as plan functions as portable tax-deferred savings account.	Reduction in retirement distribution.	Forced exercise of vested options, forfeiture of non-vested options.

Exhibit 2. Variables Definitions
Panel A – Model Variables

CONSTRUCT	PREDICTED SIGN	LABEL		DEFINITION
Model Variables				
Stock option proportion of pay of non-executives	n/a	OPTPAY	=	OPT_VAL / (OPT_VAL + TOT_WAGE + PLAN_LEVEL)
Value of options granted to non-executives	n/a	OPT_VAL	=	(# options granted to non-executives) X (the average Black Scholes value of an option granted to the top 5 employees of the firm)
Total wages paid to non-Executives	n/a	TOT_WAGE	=	[(average hourly earnings of production workers) X (# of employees) X (8 hours per day X 5 days per week X 52 weeks per year)]
Retirement Plan employed	-	PLAN_YN	=	1 if firm maintains a retirement plan of any type, and 0 otherwise
Total Retirement Plan Compensation	-	PLAN_LEVEL	=	(PLAN_LEVEL_DBP) + (PLAN_LEVEL_DCP)
DBP type plan	-	PLAN_TYPE_DBP	=	1 if firm maintains a defined benefit plan, 0 otherwise
DCP type plan	-	PLAN_TYPE_DCP	=	1 if firm maintains a defined contribution plan, 0 otherwise
DBP compensation	-	PLAN_LEVEL_DBP	=	[the service cost of a defined benefit plan] / firm sales
DCP compensation	-	PLAN_LEVEL_DCP	=	[the retirement expense of a defined contribution plan] / firm sales

Exhibit 2. Variables Definitions
Panel B - Control Variables

CONSTRUCT	PREDICTED SIGN	LABEL		DEFINITION
Control Variables				
Innovation opportunity set	+	IOS	=	[(acquisition expenditures + research & development expenditures + capital expenditures) / total assets at the beginning of the year]
Firm size	+	SIZE	=	logarithm of firm market value at end of year
Cash constraints	-	CASHCON	=	(net cash flow from operating activities) - (cash dividends + capital expenditures + research & development expenditures) / (number of employees)
Wages paid to non-executives	?	WAGE	=	the average hourly wage of a production worker
One year change in wages paid to non-executives	?	DWAGE	=	(current period's WAGE - last period's WAGE) / (last period's WAGE)

Table 1. Sample Summary Data
Panels A and B

Panel A - Sample by Year	
1997	618
1998	644
1999	620
2000	645
2001	900
2002	923
TOTAL	4,350
Panel B - Sample by Industry (SIC) Classification	
SIC 1000	0
SIC 2000	191
SIC 3000	910
SIC 4000	1,604
SIC 5000	349
SIC 6000	340
SIC 7000	155
SIC 8000	667
SIC 9000	134
TOTAL	4,350

Table 1. Sample Summary Data
Panel C

Panel C - Firms and Firm-Years by Plan Type

MAINTAINS A DBP?	MAINTAINS A DCP?	FIRMS	FIRM-YEARS
Y	Y	480	1,708
Y	N	131	498
N	Y	462	1,570
N	N	156	574
		1,229	4,350

Table 2. Panel A – Sample Descriptive Statistics
Economic Characteristics and Model Variables

Variables	Mean	1-Qrt	Median	3-Qrt	Max
Assets	$10,395	$469	$1,738	$7,087	$1,097,190
Sales	$6,417	$416	$1,413	$5,580	$245,308
Net Income	$299	$3	$55	$269	$22,072
Market Value	$11,068	$600	$2,113	$7,702	$467,096
Value of options granted to non-executive employees	$113.421	$4.394	$13.895	$49.431	$49,883.700
Percent of options granted to non-executive employees	0.723	0.613	0.720	0.828	1.000
Proportion of stock option pay (**OPTPAY*)*	0.149	0.015	0.048	0.192	0.997
Retirement Plan Yes/No (**PLAN_YN)**	0.868	1.000	1.000	1.000	1.000
Pension and Retirement Expense *(***PLAN_LEVEL*)*	0.006	0.002	0.005	0.008	0.029
DBP Plan Type (**PLAN_TYPE_DBP**)	0.507	0.000	1.000	1.000	1.000
DBP Plan Level (**PLAN_LEVEL_DBP)**	0.003	0.000	0.000	0.005	0.016
DCP Plan Type (**PLAN_TYPE_DCP)**	0.754	1.000	1.000	1.000	1.000
DCP Plan Level (**PLAN_LEVEL_DCP**)	0.003	0.000	0.002	0.005	0.018
Innovation opportunity set (**IOS**)	0.173	0.066	0.122	0.220	1.110
Firm size (**SIZE**)	7.695	6.397	7.656	8.949	11.979
Cash constraints (**CASHCON**)	-14.852	-19.935	0.283	9.448	180.565
Wage (**WAGE**)	$16.58	$13.65	$16.39	$19.11	$31.14
Wage change (**DWAGE**)	0.038	0.017	0.036	0.053	0.285

Table 2. Panel B – Pearson (Spearman) Correlations above (below) the diagonal
Model Variables

	OPTPTOP	PLAN_YN	PLAN_LEVEL	IOS	SIZE	CASHCON	WAGE	DWAGE
OPTPAY		**-0.2897**	**-0.2094**	**0.3392**	**-0.0752**	**-0.3348**	**0.2044**	**0.0915**
PLAN_YN	**-0.2611**		**0.4097**	**-0.1703**	**0.1430**	**0.1780**	0.0037	**-0.0696**
PLAN_LEVEL	**-0.2430**	**0.5729**		**-0.1241**	**0.1772**	**0.0565**	**0.1350**	**-0.0472**
IOS	**0.3533**	**-0.1766**	**-0.1479**		**-0.0666**	**-0.3408**	**0.0462**	**0.0500**
SIZE	**-0.0768**	**0.1413**	**0.2276**	**-0.0809**		**0.1657**	**0.0700**	**-0.0766**
CASHCON	**-0.2401**	**0.1360**	**0.0740**	**-0.4272**	**0.2135**		-0.0871	**-0.0083**
WAGE	**0.2023**	0.0162	**0.1454**	0.0343	**0.1073**	**0.0690**		**0.3524**
DWAGE	**0.1058**	**-0.0604**	**-0.1022**	**0.0755**	**-0.0679**	-0.0008	**0.1962**	

Bold *(italics)* indicates significance at the **1%** level.
Assets are total assets at end of year. Sales are firm sales for the year. Net Income is net income before extraordinary items for the year. Market Value is the number of shares outstanding at year end times the end of year share price. Value of options granted to non-executive employees is the number of options granted to non-executive employees multiplied by the ExecuComp calculated Black-Scholes value of the option at grant. Percent of options granted to non-executive employees is the percentage of firm total options granted to all employees that was granted to non-executives. All other variables are defined in Exhibit 2. Dollars are in millions.

Table 3. OLS Regression
Aggregated Model

$$OPTPAY = \beta 0 + \beta 1PLAN\_YN + \beta 2PLAN\_LEVEL + \beta 3IOS + \beta 4SIZE + \beta 5CASHCON + \beta 6WAGE + \beta 7DWAGE + e$$

	Expected Sign	Estimated Coefficient	*t-stat*
Explanatory Variable			
Intercept	+/-	0.0608	*3.63*
PLAN_YN	-	-0.1024	*-11.21*
PLAN_LEVEL	-	-4.9211	*-8.97*
IOS	+	0.2597	*15.33*
SIZE	+	0.0007	*0.45*
CASHCON	-	-0.0006	*-14.63*
WAGE	?	0.0089	*13.76*
DWAGE	?	-0.0261	*-0.54*
N	4,350		
Adjusted R^2	0.256		

See Exhibit 2 for variable definitions.

Table 4. Panel A – Descriptive Statistics by Plan Type
Economic Characteristics and Model Variables

PLAN_TYPE_DBP	**Y**	**Y**	**N**	**N**	
PLAN_TYPE_DCP	**Y**	**N**	**Y**	**N**	***p-value F-test***
Assets	$11,670	$40,866	$2,338	$2,197	0.0001
Sales	$8,170	$17,452	$2,686	$1,831	0.0001
Net Income	$448	$873	$49	$40	0.0001
Market Value	$12,952	$26,442.	$6,431	$4,803	0.0001
Value of options granted to non-executive employees	$87.119	$115.610	$138.931	$120.014	0.5360
Percent of options granted to non-executive employees	0.714	0.729	0.731	0.728	0.0001
Proportion of stock option pay (**OPTPAY*)*	0.061	0.052	0.217	0.306	0.0001
DBP Plan Type (**PLAN_TYPE_DBP**)	1.000	1.000	0.000	0.000	0.0001
DBP Plan Level (**PLAN_LEVEL_DBP)**	0.005	0.006	0.000	0.000	0.0001
DCP Plan Type (**PLAN_TYPE_DCP)**	1.000	0.000	1.000	0.000	0.0001
DCP Plan Level (**PLAN_LEVEL_DCP**)	0.004	0.000	0.004	0.000	0.0001
Innovation opportunity set (**IOS**)	0.127	0.115	0.213	0.249	0.0001
Firm size (**SIZE**)	8.191	8.987	6.988	7.028	0.0001
Cash constraints (**CASHCON**)	0.380	-5.591	-22.049	-48.522	0.0001
Wage (**WAGE**)	$16.12	$17.78	$16.71	$16.53	0.0001
Wage change (**DWAGE**)	0.030	0.026	0.047	0.049	0.0001

Table 4. Panel B – Pearson (Spearman) Correlations above (below) the diagonal
Model Variables

	OPTPTOP	PLAN_ TYPE_ DBP	PLAN_ TYPE_ DCP	PLAN_ LEVEL_ DBP	PLAN_ LEVEL_ DCP	IOS	SIZE	CASHCON	WAGE	DWAGE
OPTPAY		**-0.4310**	**-0.1055**	**-0.3223**	0.0056	**0.3392**	**-0.0752**	**-0.3348**	**0.2044**	**0.0915**
PLAN_TYPE_DBP	**-0.4745**		**0.0487**	**0.4147**	**-0.0221**	**-0.2805**	**0.3775**	**0.1910**	-0.0175	**-0.1530**
PLAN_TYPE_DCP	**-0.0691**	**0.0487**		0.0058	**0.4764**	**-0.0461**	**-0.0766**	**0.1064**	**-0.0654**	-0.0023
PLAN_LEVEL_DBP	**-0.4495**	**0.9134**	0.0212		**0.0335**	**-0.2043**	**0.3462**	**0.1207**	**0.0879**	**-0.1149**
PLAN_LEVEL_DCP	**0.0432**	-0.0201	**0.6892**	-0.0185		0.0156	**-0.0676**	-0.0161	**0.1082**	**0.0437**
IOS	**0.3533**	**-0.3267**	-0.0382	**-0.2943**	0.0265		**-0.0666**	**-0.3408**	**0.0462**	**0.0500**
SIZE	**-0.0768**	**0.3898**	**-0.0737**	**0.4077**	**-0.0686**	**-0.0809**		**0.1657**	**0.0700**	**-0.0766**
CASHCON	**-0.2401**	**0.1800**	**0.0923**	**0.1385**	0.0299	**-0.4272**	**0.2135**		**-0.0872**	-0.0083
WAGE	**0.2023**	0.0093	**-0.0715**	**0.0674**	**0.0391**	0.0343	**0.1073**	**-0.0690**		**0.3524**
DWAGE	**0.1058**	**-0.1750**	0.0127	**-0.1752**	0.0231	**0.0755**	**-0.0679**	-0.0008	**0.1962**	

Bold *(italics)* indicates significance at the **1%** *(5%)* level.
Assets are total assets at end of year. Sales are firm sales for the year. Net Income is net income before extraordinary items for the year. Market Value is the number of shares outstanding at year end times the end of year share price. Value of options granted to non-executive employees is the number of options granted to non-executive employees multiplied by the ExecuComp calculated Black-Scholes value of the option at grant. Percent of options granted to non-executive employees is the percentage of firm total options granted to all employees that was granted to non-executives. All other variables are defined in Exhibit 2. Dollars are in millions.

Table 5. OLS Regression Results
Disaggregated Model

$$OPTPAY = \beta 0 + \beta 1PLAN\_TYPE\_DBP + \beta 2PLAN\_TYPE\_DCP + \beta 3PLAN\_LEVEL\_DBP + \beta 4PLAN\_LEVEL\_DCP + \beta 5IOS + \beta 6SIZE + \beta 7CASHCON + \beta 8WAGE + \beta 9DWAGE + e$$

	Expected Sign	Estimated Coefficient	*t-stat*
Explanatory Variable			
Intercept	+/-	-0.0213	*-1.31*
PLAN_TYPE_DBP	-	-0.1355	*-16.97*
PLAN_TYPE_DCP	-	-0.0209	*-2.92*
PLAN_LEVEL_DBP	-	-5.1664	*-5.02*
PLAN_LEVEL_DCP	-	0.2664	*0.33*
IOS	+	0.1912	*11.56*
SIZE	+	0.0121	*7.49*
CASHCON	-	-0.0006	*-15.05*
WAGE	?	0.0083	*13.28*
DWAGE	?	-0.1189	*-2.56*
N	4,350		
Adjusted R^2	0.32		

See Exhibit 2 for variable definitions.