

NEW ECONOMY VERSUS OLD ECONOMY FIRMS: THE USE OF STOCK OPTIONS AND RETIREMENT PLANS FOR NON-EXECUTIVE EMPLOYEES

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Abstract

Human resources and financial economics research suggests that a distinguishing feature of new economy firms is their use of stock options to attract, retain, and compensate employees. Previous research has examined the relationship between the granting of stock options and the use of alternate deferred pay mechanisms (defined benefit and defined contribution pension plans) for non-executive employees. This paper brings these research streams together, examining whether the option granting behavior of new and old economy firms is differentially impacted by the use of these other deferred pay plans. Using a large sample of US firms, we find that new economy firms differ significantly from old economy firms in their pay practices and that the relationship between the components of pay differ as well.

Keywords: stock options, non-executive employees, retirement plans

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I. Introduction

Human resource and financial economics research suggests that a distinguishing feature of new economy firms is their extensive use of stock options to attract, retain and compensate non-executive employees. The new economy is centered on information technology and includes companies in the computer, software, internet, telecommunications or networking fields which are knowledge and human capital based. The literature suggests that new economy firms face different organizational and managerial challenges than old economy firms, stock options are uniquely suited to meet these challenges, and as a result, new economy firms rely more heavily on stock options in their employee compensation contracts for employees at all levels.

The empirical research in this area has focused on option granting behavior in the context of economic characteristics that differentiate new economy and old economy firms. Ittner et al. (2003) find that the new economy firms' use of options is partly explained by factors that determine option granting behavior for all types of firms, but that there remain significant differences in the influence of these factors depending on new or old economy status. Murphy (2003) argues that new economy firms compensate employees with

options because they are prevalent in their competitive environment and their perceived cost is low.

Another stream of research examines firms' use of stock options and for retention of non-executives. Balsam, Gifford and Kim (2007) find that voluntary non-executive employee turnover increases once options have vested, consistent with stock options providing retention benefits to the firm for the duration of the option vesting period. Weiden and Mooney (2010) examine the extent to which firms' stock option grants to non-executives for retention purposes are affected by the use of other pay types that also serve as mechanisms to retain employees. They find that stock option grants to non-executives are impacted by the presence of a retirement plan, by the annual level of plan-related compensation, and more specifically, by the type of retirement plan in use.

This study examines whether the option granting behavior of new and old economy firms are differentially affected by the firms' use of defined benefit and defined contribution retirement plans. We identify a sample of firms that grant more than 50% of their options to non-executives employees and then classify the sample into new and old economy firms. Descriptive information on the components of pay of

non-executive employees and the use of retirement plans for both types of firms is provided. We examine the relation between the stock option proportion of pay, the type of retirement plan(s) in use, and the level of compensation provided by the plan(s). We analyze the effect of firm type on option granting behavior as well as the intervening effects of firm type on the impact of retirement plans on option granting behavior.

Descriptive results confirm prior findings that the stock option proportion of pay of new economy firms is higher than for old economy firms. However, the results also indicate that new economy firms use retirement plans to a lesser extent than old economy firms do, and that the level of annual plan-related compensation is lower for new economy firms than for old economy firms. In addition, wage levels are higher and wage changes are larger for new economy firms than for old economy firms.

Our empirical findings confirm previous research (Weiden and Mooney, 2010) with respect to the cross sectional sample: both new and old economy firms behave as though stock options and retirement plans are, to some extent, substitute forms of pay. However, we find that the presence of a retirement plan of any type, the particular type of plan in use, and the annual level of plan-related compensation differentially affect the stock option granting behaviors of new and old economy firms. Taken together, these results provide additional evidence that new economy firms' pay practices are significantly different from those of old economy firms, and new evidence on the differential relations between various pay types within the compensation contracts of new and old economy firms.

II. Hypothesis Development

Human resources literature suggests new economy firms face different organizational and managerial challenges than do old economy firms, largely because old economy firms value hierarchies and organizationally defined roles and tasks, while new economy firms value intra-firm project teams and inter-firm clusters and communities (DeFillippi, 2002).¹ Consistent with this hypothesis, prior financial economics research reports that the economic

¹ DeFillippi (2002) suggests new economy firms (1) must be able to create and dissolve teams rapidly in response to rapidly changing requirements, (2) have a greater need to create inter-departmental teams, (3) are typically required to create teams where members collaborate at a significant physical distance from one another, (4) have a greater need to create inter-firm teams, where suppliers, customers and third party contractors serve as members of project teams, (5) rely more heavily on real-time coordination and collaboration, and (6) have a greater need for the more rapid communication of a shared understanding of goals and responsibilities of the team.

characteristics and equity-based pay practices of new economy firms differ significantly from those of old economy firms.

With respect to economic characteristics, Ittner et al. (2003), using survey data, show that in comparison to old economy firms, new economy firms are smaller (when measured by sales and number of employees), invest more heavily in the innovation opportunity set, experience more rapid growth, report lower accounting returns, and have lower marginal tax rates. Anderson et al. (2000) report that, in comparison to non-information technology firms, information technology ("IT") firms have higher sales growth, lower book to market ratios, lower dividend payout ratios, higher top employee turnover rates, higher levels of top employee total compensation, lower debt-to-assets ratios, higher times interest earned, and are slightly smaller than non-IT firms.

With respect to non-executive employee equity-based pay practices, Anderson et al. (2000) report that the mean value of options granted to non-executives of IT firms is three times higher than the mean value of options granted to non-executives of non-IT firms, suggesting aggressive use of broad-based stock options by IT firms. Murphy (2003) shows that a greater share of total options granted by new economy firms went to employees below the top five executives than for old economy firms, and that per-employee grants are significantly higher in new economy firms than in old economy firms.²

Recent organizational behavioral literature suggests that differences in pay practices between new and old economy firms may extend beyond equity-based pay. This literature discusses an observed cross-sectional shift from "relational" employment contracts (employees perceive a personal, supportive, long-term relationship with the employer) toward "transactional" employment contracts (limited economic transaction with an emphasis on pay for performance) and suggests the transformation of employee pensions in the U.S. reflects this shift (Westerman and Sundali, 2005; Rousseau and Ho, 2000; etc.).³ Human resources researchers suggest that the shift towards transactional employment contracts will be more noticeable for new economy firms than for old, and that "(i)ssues of loyalty and commitment are redefined in these more fluid, project-based employment relations."⁴ In particular, just-in-time recruitment of outsourced

² With respect to stock based pay for executive employees, Ittner et al. (2003) report that CEOs and Vice-Presidents of new economy firms receive a significantly higher proportion of pay in the form of equity than do the CEOs and Vice-Presidents of old economy firms. Anderson et al. (2000) report that executives of IT firms receive a significantly greater share of their total compensation in the form of option grants, and hold higher mean levels of stock and option holdings than non-IT executives.

³ See also Niehaus and Yu (2005), Ippolito (1995), Ippolito (2001)

⁴ DeFillippi (2002) pg. 15.

workers may be more common, and compensation, project driven, with an emphasis on pay for performance (for both team and individual project performance). The inference of this latter stream of research seems to be that the desirability of long-term employee tenure may be significantly different for new and old economy firms.

Modern-day non-executive employee compensation contracts typically include a combination of current pay, current welfare benefits, deferred pay and deferred welfare benefits.⁵ If new and old economy firms differ significantly with respect to the desirability of long-term employee tenure, then it is likely that the compensation contracts of new and old economy firms will differ across a number of dimensions, not just with respect to equity-based pay. In designing employee compensation contracts, firms make choices with respect to the particular pay types utilized, the relation between the pay types utilized, and the level of pay. Therefore, we expect that differences in the desirability of long-term employee tenure between new and old economy firms are reflected in differences in the choices of deferred pay types and the levels of those deferred pay types. In this study, we focus on differences in the use of two forms of deferred pay used by new and old economy firms to retain employees: stock options and retirement plans.

The labor economics literature generally suggests that deferred pay types that impose costs for early departure can serve as mechanisms to retain employees. The financial economics literature characterizes stock options as a form of deferred pay, since employees must wait until the end of the vesting period (typically three to five years from option grant date) (Huddart and Lang, 1996) to exercise their options and acquire the stock. Early departure imposes costs on employees in the form of forced exercise (forfeiture) of vested (nonvested) options, which is likely suboptimal for employees with significant financial capital accumulated in unexercised options. Balsam et al. (2007) examine patterns of voluntary employee turnover during the early 1990s at a Fortune 100 firm to assess the impact of broad based stock option grants on employees' decisions to depart. After controlling for employee grade, age, tenure with the company and proximity to layoffs, they find that voluntary employee turnover increases once options are vested. Based on their findings, they conclude that options provide an incentive for employees to remain with the firm, but that once options vest, some or all of the retention effects are diminished or lost completely.

An extensive body of labor economics literature has examined the role of retirement plans, another form of deferred pay, in retaining employees. Employer-funded retirement plans impose costs for early departure because an employee faces the prospect of lower retirement distributions if they leave the firm early. The empirical findings of this literature suggest that the early departure costs imposed by retirement plans significantly affect employees' departure behaviors, as firms with retirement plans have lower quit rates and higher employee tenure than firms without (Gustman and Steinmeier 1993; Even and MacPherson 1996). In addition, other researchers suggest that the *type* of retirement plan [i.e., defined benefit plan (DBP) or defined contribution plan (DCP)] used by the firm matters in terms of quit rates and employee tenure. Allen et al. (1993) and Ippolito (1985, 1987, 1991) both provide evidence that DBPs reduce employee turnover or increase employee tenure. Allen et al. (1993) suggests that firms whose production function is maximized by long tenure relations with employees will seek to attract "stayers," and that the use of DBPs particularly appeals to this type of worker.

Weiden and Mooney (2010) focus on the role of stock options in retaining employees, and study how firms' stock option grants to non-executives are affected by the use of other deferred pay types, specifically retirement plans, in compensation contracts. They point out that although stock options and retirement plans are both useful in retaining employees, important structural differences between these two forms of deferred pay suggests that, *in theory*, they do not function as substitute forms of pay. Stock options are useful for retaining employees for the duration of the vesting period, typically three to five years post option award, while retirement plans are useful for promoting long-term (i.e., career-long) tenure. Weiden and Mooney (2010) find that the presence of a retirement plan of any type *and* the total level of plan-related compensation lead to employees receiving a smaller proportion of their pay in the form of stock options. When considering the type of plan in use, they find that employees of firms using DBP type plans receive a significantly smaller proportion of their pay in the form of stock options than do employees of firms using DCP type retirement plans. Finally, they find that greater levels of DBP plan-related compensation, but not DCP plan-related compensation levels, lead to employees receiving a significantly smaller proportion of their pay in the form of stock options. Based on these findings, Weiden and Mooney (2010) conclude that in granting stock options to non-executives, firms behave *in practice* as though stock options and retirement plans are, to some extent, substitute forms of deferred pay.

⁵ By "current pay," we mean salary and bonus. By "current welfare benefits," we mean medical and dental insurance, cafeteria plans, education assistance, etc. By "deferred pay," we mean stock options, restricted stock and retirement plans. By "deferred welfare benefits," we mean post-retirement medical coverage.

III. Data and Methodology

Data

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. 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 kept in the study. In addition, reported SIC and NAICS (six 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 retained in the sample only if more than 50% of their options are granted to non-executives. We follow the methodology of Weiden and Mooney (2010) to estimate the percentage of options granted to non-executives.

These qualifications yield a final sample of 1,229 firms and 4,350 firm-years. Table 1 reports summary data for the sample by year, one-digit industry class, and type of retirement plan in use, as well as new and old economy status.

Methodology

Previous research has identified determinants as well as control variables that affect option-granting behavior across firms. Key variables include firm size, cash flow constraints, and the investment opportunity set (Core and Guay, 2001; Ittner et al., 2003). The impact of differences in competitive labor markets has been operationalized using variables that measure wage levels and changes in wage levels (Oyer and Schaefer, 2005). Our objective is to analyze differences in new and old economy firms' option granting behavior in the context of alternative retention mechanisms (deferred pay mechanisms, namely, retirement plans). We incorporate several variables to capture firms' use of retirement plans, both defined benefit (DBP) and defined contribution (DCP) plans (Weiden and Mooney, 2010). Exhibit 1 provides definitions for all variables.

We calibrate our results by examining the patterns that emerge from regressions based on a series of models. This series is summarized in Exhibit 2 and described below.

The basic model relates the stock option proportion of non-executive pay to the firm's use of a retirement plan of any type and to the level of annual plan-related compensation provided by the plan. We add an indicator variable ECON, which takes the value 1 if the firm is a new economy firm, 0 if it is an old economy firm. Allowing the intercept to vary permits us to examine whether differences in option granting behavior found by Ittner et al. (2003) persist after controlling for other deferred compensation mechanisms.

Because we are interested in identifying the differential impacts of the use of a retirement plan of any type as well as the level of annual plan-related compensation on new and old economy firms, we then interact ECON with the variables indicating use of and measuring the level of compensation provided by retirement plans.

Previous researchers (Ittner et al., 2007) show that the relative importance of variables affecting option grants differed for new and old economy firms and included interactive terms for all variables. We take this intermediate step to enable us to consider the effect of interaction on the retirement plan variables.

Next we move to a model which includes interactive terms for all variables. Our final iteration, again following prior research (Weiden and Mooney, 2010), uses a disaggregated model to allow for the identification of the retirement plan type as well as the level of annual plan-related compensation. This model relates the stock option proportion of non-executive pay to the firm's use of a DBP type plan and/or a DCP type plan, as well as the level of annual DBP and/or DCP plan-related compensation provided by the particular plan. Again, because we are interested in identifying the differential impacts of firm status, we use ECON as both an individual and an interactive variable.

New economy firms are defined as companies in the computer, software, internet, telecommunications or networking fields (see Anderson et al. 2000; Ittner et al. 2003; Murphy 2003). The remaining firms in the sample are classified as old economy.

IV. Empirical Results

Descriptive Statistics

Table 2 provides mean (median) values for key firm economic characteristics (Panel A) and model variables (Panel B), as well as p-values for t-tests (Wilcoxon tests) of differences in means (medians), with the sample divided into new and old economy firms. Table 2 confirms earlier findings that the economic characteristics of new and old economy firms differ significantly from those of old economy firms. On average, new economy firms are significantly smaller than old economy firms are when measuring by sales, assets and net income. New economy firms have, on average, significantly higher market value than old economy firms do.

Consistent with the findings of prior literature (i.e., Anderson et al., 2000; Murphy, 2003), new economy firms are more generous with respect to the use of stock options. The value of options granted to non-executives and the stock option proportion of pay is, on average, substantially higher for non-executives of new economy firms.

Table 2 also provides compensation-related descriptors of new and old economy firms not addressed in prior literature. Table 2 indicates that, in general, old economy firms are more generous than new economy firms with respect to the use of

retirement plans. That is, old economy firms use retirement plans to a greater extent than do new economy firms, and the level of annual plan-related compensation of old economy firms is higher than for new economy firms. When considering the type of retirement plan in use, Table 2 also indicates that old economy firms use both DBPs and DCPs to a greater extent than do new economy firms. The level of annual plan-related compensation of DBP plans for old economy firms is significantly higher than for new economy firms using DBPs, but the level of annual plan-related compensation of DCP plans for old economy firms is only marginally higher than those levels for new economy firms. Table 2 also indicates that new economy firms are more generous with respect to current wage compensation, as wage levels are higher, and wage changes larger, for new economy firms when compared to old economy firms.

With respect to the control variables, on average, new economy firms have greater investment opportunity sets and are more cash constrained, consistent with prior findings.

Regression Results

Table 3 reports OLS regression results for all 4 models. The results of each regression, as well as the progression of change in variable coefficients as we move through the models, illuminates differences between old and new economy firms' use of stock options. The term *deltaECON* below each variable is used to report the results of the interaction term *ECON* on each variable.

The results for Model 1 are generally consistent with the results of the aggregated model findings of both prior streams of research. The coefficient on *PLAN_YN* is negative at significant levels, confirming the finding that the stock option proportion of pay of non-executive employees is significantly lower in firms with a retirement plan than in firms without a retirement plan. The coefficient on *PLAN_LEVEL* is also significantly negative, consistent with the earlier finding that, for firms with retirement plans, the level of pension and retirement plan costs are negatively related to the stock option proportion of pay. Finally, the intercept for new economy firms, *deltaECON*, is significantly positive, reflecting higher use of stock options by new economy firms, independent of other factors. The coefficient on *IOS* is positive and significant, consistent with our expectation that firms with greater innovation opportunity sets have a greater need to retain employees and will use options more for this purpose. The coefficient on *CASHCON* is negative and significant, consistent with previous research supporting the idea that cash constrained firms use options as a substitute form of pay. *WAGE* and *DWAGE* are both significant, although somewhat ambiguous: the coefficient on *WAGE* is positive and *DWAGE* negative.

The coefficient on *SIZE* is positive, but with only very marginal significance (the t-statistic is just 1.6), which is puzzling given findings of previous researchers that larger firms have greater difficulties monitoring employees and will use options more for this purpose. Descriptive statistics presented in Table 2 indicate that firms employing DBPs are larger than firms employing only DCPs or no plan at all. Thus, a plausible explanation is that firm size is related to firm propensity to use DBP plans, and thus the coefficient is capturing the effects of this correlation.

The new economy interactive term is extended to *PLAN_YN* and *PLAN_LEVEL* in Model 2. There is no significance for the coefficient on *deltaECON* for *PLAN_YN*, implying that the stock option proportion of non-executive pay for new economy firms using retirement plans is not significantly different from that of old economy firms also using retirement plans. However, the coefficient on *deltaECON* for *PLAN_LEVEL* is negative and significant, suggesting that retirement plan levels have a differential negative impact on the stock option proportion of pay of new economy firms. Higher plan levels have a negative impact on the proportion of stock option pay for all firms, an impact which is much greater for new economy firms. The inclusion of the interactive effects on *PLAN_YN* and *PLAN_LEVEL* reduces the magnitude of the coefficient on the new economy slope coefficient, *deltaECON*, but the coefficients on the other model variables and the adjusted R^2 are virtually unaffected.

Model 3 permits new economy status to interact with all model variables. Some interesting observations emerge from comparing these results with those of the previous model. The magnitude and significance of the new economy slope intercept declines substantially, though it remains positively significant. *PLAN_YN*, *PLAN_LEVEL*, and their interactive terms are essentially unchanged. However, the firm size and cash constraint variables are clearly impacted by their interaction with firm status. The coefficient on *SIZE* becomes negative, and clearly insignificant. *DeltaECON* for *SIZE* is significantly positive, which suggests that, at least for new economy firms, larger size results in higher levels of option pay. This finding is consistent with the monitoring cost hypothesis. The lack of significance on *SIZE* itself may, as suggested earlier, be the result of a confounding effect with plan type. *DeltaECON* for *CASHCON* is negative and significant, suggesting a differential and increased effect of cash constraints on option granting behavior of new economy firms.

Finally, we show the results from Model 4 which includes variables disaggregating *PLAN_YN* and *PLAN_LEVEL* by type of plan, and permits firm status to interact with all variables. This model produces even more striking results.

We have four plan related variables (*PLAN_TYPE_DBP*, *PLAN_TYPE_DCP*, *PLAN_LEVEL_DBP*, and *PLAN_LEVEL_DCP*)

each with its own interactive term as well. DBP plans are negatively related to stock option levels of pay, and this is differentially the case for new economy firms. DCP plans now have mixed results: their coefficient is negative but not significantly so overall, while the coefficient on delta ECON for PLAN_TYPE_DCP is negative and significant. PLAN_LEVEL_DBP has a significantly negative coefficient, as does its interactive term. PLAN_LEVEL_DCP is weakly positive for while its interactive term is negative but insignificant. These results highlight important differences between new and old economy firms. The use of DBP type plans by new and old economy firms is negatively related to the stock option proportion of pay of non-executives, while the use of DCP type plans is negatively related to the stock option proportion of pay only for new economy firms. DBP plan levels are negatively related to the stock option proportion of pay of both new and old economy firms, while DCP plan levels are negatively related to the stock option proportion of pay of old economy firms only marginally. An *F*-test of the equality of the coefficients on PLAN_TYPE_DBP and PLAN_TYPE_DCP indicates rejects equality; we conclude from this that the negative impact of DBPs on the stock option proportion of pay is significantly larger than the negative impact of DCPs on the stock option proportion of pay.

The coefficient on the SIZE variable finally conforms to theoretical predictions. It is significantly positive by itself and when interacted with firm status. Thus firm size increases use of options for all firms and incrementally so for new economy firms. Since the use of various types of compensation forms is correlated with firm size as well as firm status, this has implications from a model building perspective. Without completely disaggregating the analytical model, we cannot adequately distinguish between effects relating to firm size, plan type, and firm status. The model intercept dwindles to insignificance, while the new economy firm intercept remains close to that obtained by Model 3 in terms of both magnitude and significance. R^2 for the first time shows a modest increase. We take this as evidence that it is this final model that does the best job of explaining option granting behavior. Furthermore, the significance of almost all interactive terms indicates that option granting behavior in the presence of alternative retention mechanisms must consider firm status as a complex rather than a simple intervening factor.

V. Conclusion

This study examines how stock option grants to nonexecutives for both new and old economy firms are differentially affected by the use of other deferred pay types, specifically, defined benefit and defined contribution retirement plans. All of these deferred pay types, which are contingent on some minimum tenure period, provide retention benefits for the firm.

Previous research has shown that use of options for nonexecutives is affected by the presence of other deferred pay types. Previous research has also shown differences in option granting behavior between new economy and old economy firms.

We examine option granting behavior using a large sample of firms that make more than 50% of their option grants to nonexecutives. The development of our research model supports the conclusion that compensation practices result from a complex set of interactive factors. The effects of intervening variables identified by previous researchers (investment opportunity set, firm size, wage levels, and wage changes) are clarified by including other types of deferred compensation as well as firm status in the research model.

Old economy firms are more likely to use defined benefit pension plans that encourage career long tenure by employees. DBPs negatively affect the level of stock option grants for both types of firms, with an incrementally greater impact on new economy firms. However, the use of defined contribution plans has a much stronger negative impact on stock option grants for new economy firms than it does for old economy firms (for the latter, the effect is statistically insignificant; for the former, highly significant). We believe that this is the result of differing retention objectives for new and old economy firms.

Once vesting period are satisfied for DCPs and stock options (and these are relatively short range) DCPs are truly portable; “cashing in” on stock options may be less straightforward. Thus for old economy firms there is a stronger substitution effect between options and DBPs, in terms of retention benefits. For new economy firms, options and DCPs are better substitutes, providing retention benefits but over a shorter time horizon. New economy firms may benefit more from the regular influx, through turnover, of new employees with more current technological skills and training.

Another important conclusion from this study is that it may be misleading to focus on only one dimension when examining competing explanations for the use of stock options in compensating nonexecutive employees. The mix of compensation provided to employees has become increasingly complex, reflecting a complex and interactive set of firm, as well as industry, factors.

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Appendices

Exhibit 1. Variables Definitions
Panel A – Model Variables

CONSTRUCT	PREDICTED SIGN	LABEL	DEFINITION
Model Variables			
Stock option proportion of pay of non-executives	n/a	OPTPAY	= $\frac{OPT_VAL}{OPT_VAL + TOT_WAGE + PLAN_LEVEL}$
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 pension and retirement expense	-	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
New versus Old economy status	?	ECON	=	1 if the firm is a new economy firm, 0 otherwise

Exhibit 1. Variables Definitions
Panel B - Control Variables

CONSTRUCT	PREDICTED SIGN	LABEL	DEFINITION
<i>Control Variables</i>			
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)

Exhibit 2. Model Development

EXPECTED SIGN	MODEL 1	MODEL 2	MODEL 3	MODEL 4
+/- ?	Intercept <i>delta ECON</i>	Intercept <i>delta ECON</i>	Intercept <i>delta ECON</i>	Intercept <i>delta ECON</i>
-	PLAN_YN	PLAN_YN <i>delta ECON</i>	PLAN_YN <i>delta ECON</i>	
-				PLAN_TYPE_DBP <i>delta ECON</i>
-				PLAN_TYPE_DCP <i>delta ECON</i>
-	PLAN_LEVEL	PLAN_LEVEL <i>delta ECON</i>	PLAN_LEVEL <i>delta ECON</i>	
-				PLAN_LEVEL_DBP <i>delta ECON</i>
-				PLAN_LEVEL_DCP <i>delta ECON</i>
+	IOS	IOS	IOS <i>delta ECON</i>	IOS <i>delta ECON</i>
+	SIZE	SIZE	SIZE <i>delta ECON</i>	SIZE <i>delta ECON</i>
-	CASHCON	CASHCON	CASHCON <i>delta ECON</i>	CASHCON <i>delta ECON</i>
?	WAGE	WAGE	WAGE <i>delta ECON</i>	WAGE <i>delta ECON</i>
?	DWAGE	DWAGE	DWAGE <i>delta ECON</i>	DWAGE <i>delta ECON</i>

Table 1. Sample Selection

Panel A - Sample by Year			
Year	New Economy	Old Economy	Total
1997	148	470	618
1998	157	487	644
1999	155	465	620
2000	166	479	645
2001	210	690	900
2002	229	694	923
TOTAL	1,065	3,285	4,350

Panel B - Sample by Industry (SIC) Classification			
Year	New Economy	Old Economy	Total
SIC 1000			0
SIC 2000		191	191
SIC 3000		910	910
SIC 4000	480	1,124	1,604
SIC 5000	80	269	349
SIC 6000		340	340
SIC 7000		155	155
SIC 8000	505	162	667
SIC 9000		134	134
TOTAL	1,065	3,285	4,350

Table 1 continued

Sample Selection

Panel C - Firms and Firm-Years by Plan Type and New and Old Economy Status

FIRMS			FIRM-YEARS				
OLD ECONOMY	NEW ECONOMY	TOTAL	MAINTAINS A DBP?	MAINTAINS A DCP?	TOTAL	NEW ECONOMY	OLD ECONOMY
447	33	480	Y	Y	1,708	127	1,581
121	10	131	Y	N	498	59	439
297	165	462	N	Y	1,570	620	950
90	66	156	N	N	574	259	315
955	274	1,229			4,350	1,065	3,285

Table 2

Panel A

Descriptive Statistics by New and Old Economy status
Economic Characteristics

<i>Economic Characteristics</i>	OLD ECONOMY FIRMS		NEW ECONOMY FIRMS		<i>p-value</i>	
	MEAN	MEDIAN	MEAN	MEDIAN	<i>T-TEST</i>	<i>WILCOXON</i>
Assets	\$11,650.500	\$2,333.150	\$6,521.227	\$693.880	0.000	0.000
Sales	\$7,099.502	\$2,005.000	\$4,313.043	\$486.840	0.000	0.000
Net Income	\$353.790	\$82.000	\$131.510	\$11.330	0.000	0.000
Market Value	\$10,334.360	\$2,408.580	\$13,330.750	\$1,525.210	0.000	0.000
Value of options granted to non-executive employees	\$55.373	\$10.796	\$292.470	\$36.513	0.000	0.000
Percent of options granted to non-executive employees	0.713	0.708	0.755	0.768	0.360	0.000
N	3,285		1,065			

Table 2

Panel B

Descriptive Statistics by New and Old Economy status

Model Variables

<i>Model Variables</i>	OLD ECONOMY FIRMS		NEW ECONOMY FIRMS		<i>p-value</i>	
	MEAN	MEDIAN	MEAN	MEDIAN	<i>T-TEST</i>	<i>WILCOXON</i>
OPTPROP	0.089	0.031	0.334	0.264	0.000	0.000
PLAN_YN	0.904	1.000	0.757	1.000	0.000	0.000
PLAN_LEVEL	0.006	0.005	0.005	0.003	0.000	0.000
PLAN_TYPE_DBP	0.615	1.000	0.175	0.000	0.000	0.000
PLAN_LEVEL_DBP	0.003	0.002	0.001	0.000	0.000	0.000
PLAN_TYPE_DCP	0.770	1.000	0.701	1.000	0.000	0.040
PLAN_LEVEL_DCP	0.003	0.002	0.003	0.002	0.000	0.000
IOS	0.147	0.103	0.252	0.210	0.000	0.000
SIZE	7.769	7.787	7.465	7.330	0.000	0.000
CASHCON	-7.774	1.452	-36.684	-17.776	0.000	0.000
WAGE	15.508	15.780	19.879	19.640	0.000	0.000
DWAGE	0.028	0.033	0.069	0.053	0.000	0.000
N	3,285		1,065			

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 1. Dollars are in millions.

Table 3. OLS Regressions

Explanatory Variable	Expected Sign	Model 1		Model 2		Model 3		Model 4	
		Estimated Coefficient	p-value						
Intercept	+/-	0.1012	6.52	0.0826	5.05	0.1023	5.62	0.0210	1.18
<i>delta ECON</i>		0.1919	27.62	0.2310	16.01	0.1366	3.51	0.1279	3.35
PLAN_YN	-	-0.0797	-9.43	-0.0714	-6.65	-0.0733	-6.82		
<i>delta ECON</i>				0.0068	0.39	0.0137	0.77		
PLAN_TYPE_DBP	-							-0.0778	-9.52
<i>delta ECON</i>								-0.0714	-2.94
PLAN_TYPE_DCP	-							-0.0073	-0.95
<i>delta ECON</i>								-0.0527	-3.41
PLAN_LEVEL	-	-3.4496	-6.78	-1.9430	-3.50	-1.8985	-3.42		
<i>delta ECON</i>				-8.6799	-6.74	-8.9534	-6.71		
PLAN_LEVEL_DBP	-							-3.0167	-2.95
<i>delta ECON</i>								-15.6332	-5.30
PLAN_LEVEL_DCP	-							1.3615	1.59
<i>delta ECON</i>								-1.4376	-0.80
IOS	+	0.1707	10.69	0.1631	10.24	0.1413	7.24	0.1100	5.78
<i>delta ECON</i>						0.0600	1.78	0.0385	1.17
SIZE	+	0.0023	1.6	0.0026	1.82	-0.0016	-0.95	0.0050	2.88
<i>delta ECON</i>						0.0149	4.55	0.0263	7.61
CASHCON	-	-0.0005	-14.55	-0.0006	-14.67	-0.0005	-10.63	-0.0005	-10.61
<i>delta ECON</i>						-0.0003	-3.23	-0.0003	-4.12
WAGE	?	0.0026	4.01	0.0025	3.98	0.0037	4.81	0.0047	6.26
<i>delta ECON</i>						-0.0026	-1.58	-0.0056	-3.59
DWAGE	?	-0.2069	-4.59	-0.1832	-4.08	-0.1510	-2.82	-0.1699	-3.29
<i>delta ECON</i>						0.0238	0.21	0.0891	0.81
N		4350		4350		4350		4350	
Adjusted R-sq		0.3670		0.3747		0.3793		0.4233	