

# BROAD-BASED EMPLOYEE STOCK OPTIONS – A UNION-NONUNION COMPARISON

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## INTRODUCTION

Until recently, stock options were primarily reserved for senior executives and selected managers in most American corporations. In the last decade or so, however, stock options have become part of the compensation package for an increasing number of rank-and-file employees. As of February 2000, the National Center for Employee Ownership (NCEO) estimated that there are more than 3000 active broad-based stock option (SO) plans in the United States based on an extensive review of press announcements by companies.<sup>1</sup>

The expected benefits of broad-based<sup>2</sup> SO plans resemble those of other incentive compensation: reduced turnover and increased effort, creativity, and cooperation, which in turn, presumably result in higher productivity and ultimately better overall firm performance (Kroll, 1997). In addition, stock options do not entail a direct charge against earnings,<sup>3</sup> and they have the potential to foster an “ownership” culture by focusing employee attention on the firm’s financial performance.<sup>4</sup> Finally, they allow a lot of flexibility in tailoring rewards: SOs can be granted as a reward for joining the company; they can be based on individual performance and/or meeting group/business unit goals; or the grant can be tied to the profitability of the company, etc.

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Empirical evidence for the positive effects of stock options on productivity and market valuation is beginning to accumulate (Weeden, Carberry & Rodrick, 1998; Sesil, Kroumova, Kruse & Blasi, 2000; Blasi, Kruse, Sesil & Kroumova, 2000). The expected benefits of SO plans make them attractive to both unionized and non-unionized employers who are trying to design an efficient compensation package. As unions tried to reinvent themselves as a valuable partner for both employers and employees in the 1990s, they have become more open to incentive pay, including stock options.<sup>5</sup> However, as of yet, there is little conceptual and empirical work on how broad-based stock option plans work, and what, if any, effect they have on company performance in union firms. An empirical comparison of the relationship between SO plans and firm performance in union and non-union firms may therefore be informative for future theory building. The goal of this paper is to assess the differences in economic and financial performance between stock option and non-stock option companies in unionized and non-unionized settings.

### **INCENTIVES AND GROUP INCENTIVES: THEORY AND EVIDENCE**

In a publicly owned company, property rights, broadly defined as the rights to the benefits, use, and disposal of assets and goods (Kang & Sørensen, 1999), have become fragmented. Use and disposal (control) rights are separated from benefit (ownership) rights (Berle & Means, 1932). Four broad classes of stakeholders share these rights: security holders, directors, managers, and employees. The diverging self-interests of these various stakeholders, along with the fragmentation of property rights, create opportunities for capturing rights that the original right holder cannot protect.<sup>6</sup> In the context of the employment relationship, managers can capture benefit rights from shareholders and employees, for example, by diverting cash towards perquisites; employees can capture additional benefit rights from managers and shareholders by withholding their effort (moral hazard) and/or providing inaccurate information about their ability (adverse selection). Such self-interested behaviors could be contained if the parties to the employment relationship had perfect information about each other and obtaining such information was not costly (Alchian & Demsetz, 1972). However, in the presence of imperfect knowledge and costly monitoring, the employer (or principal, in an agency theory framework) has to address problems resulting from self-interested worker (agent) behaviors such as moral hazard and adverse selection. In particular, the firm has to design an efficient compensation contract that provides employees with incentives to act in ways that are consistent with the interests of the other stakeholders (Asch &

Warner, 1997), and that takes into account that employees (agents) are more risk averse than shareholders (Weitzman & Kruse, 1990). Thus, an efficient compensation package would motivate employees to supply effort and to self-select into firms/jobs based on their unobservable characteristics (Asch & Warner, 1997).

A large variety of individual and group incentives are being used to address problems brought about by self-interested employee behaviors. Individual financial incentives include piece-rates, merit pay, commission systems, individual performance-based bonuses, efficiency wages and upward-sloping wage-tenure profiles.<sup>7</sup> Group incentives include bonuses based on group/business unit/firm performance, profit-sharing, gainsharing and employee ownership plans. These financial incentives vary in their ability to influence behavior, and their effectiveness is contingent on firm characteristics (Jones, Kato & Pliskin, 1997).

Stock option plans are a type of group incentive plan, and as such their impact on worker effort can be analyzed drawing on existing theoretical and empirical knowledge about other group incentive plans. Group incentive plans are expected to serve the same purpose as individual incentives, that is, to motivate employees to provide effort in the amount and direction desired by the firm. Specifically, theoretical arguments that predict a positive effect of group incentives on firm performance are based on extending agency theory (Eisenhardt, 1989) to conceptualize employees as agents of management. Granting stock options to employees may reduce the incentive conflicts that arise when the interests of workers are not aligned with the interests of owners and managers.<sup>8</sup> An added benefit of group incentives is that they are expected to result in improved cooperation among employees (FitzRoy & Kraft, 1987; Weitzman & Kruse, 1990; Strauss, Gallagher & Fiorito, 1991; Kruse & Blasi, 1997). Peer pressure and horizontal monitoring have been advanced as explanatory mechanisms for this effect (Weitzman & Kruse, 1990; Kruse, 1993). Consequently, group incentives may also reduce monitoring costs (Kruse, 1993). Further, Mitchell, Lewin and Lawler (1990) hypothesized that group incentives increase employee effort and commitment indirectly via improved communication about company performance and better employee understanding of the importance of profitability and organizational effectiveness.

However, there are also theoretical reasons to expect negative or mixed effects of group incentives on employee effort. First, depending on the design and implementation of the plan, the connection between individual effort and obtaining the group reward may be tenuous<sup>9</sup> (Gomez-Mejia & Balkin, 1992; Blasi, Conte & Kruse, 1996), which would result in a weak or non-existent

incentive to supply effort. Stock-based rewards may be especially susceptible to this problem because, with these types of incentives, the reward is experienced only if and when the stock price increases, yet many of the factors that influence stock price movements over the short run are outside of employee control.<sup>10</sup>

Second, whenever it is hard to monitor individual employee effort and when any one employee's reward depends on everyone else's effort, a dilution or free-rider problem may occur. Employees may cut back on their effort because individual accountability is low (Weitzman & Kruse, 1990; Cooke, 1994; Jones et al., 1997). Thus, in a static, one-period framework, the larger the group among which the reward is to be shared, the smaller the incentive value of the reward and the higher the likelihood of free-riding behavior.<sup>11</sup> Broad based stock option plans are vulnerable to this criticism in that the reward (stock price appreciation) is ultimately contingent on overall firm performance, and the reward is shared with all other stakeholders. Therefore, one might expect group incentives such as SO plans to have an insignificant or even negative effect on performance. Nonetheless, theoretical arguments based on game theory suggest that in a multi-period setting, where the "game" of group reward earning and sharing is repeated, cooperation is a possible equilibrium solution (but not the only solution) (Weitzman & Kruse, 1990; Levine & Tyson, 1990; Cooke, 1994). Ultimately, whether cooperation will emerge as the actual solution will depend on the organization's performance management system, culture, and other factors (Weiss, 1987; Weitzman & Kruse, 1990; Hansen, 1997).

Third, whether a stock option plan will elicit additional effort from employees will also depend on how employees "frame" the plan – as an extra reward or as a trade-off for foregone increases in base-level compensation. Framing a stock option plan as a trade-off may result in unchanged levels of work effort. To complicate matters further, such framing may change over time and be susceptible to fluctuations in stock price. For example, a stock option plan may initially be perceived as a trade-off for pay: if the stock price increases sharply it will likely be perceived as a reward, but if the stock price declines sharply ensuing disappointment will likely lead to a decrease in work effort.

Finally, contextual factors are also likely to moderate the effects of group incentives on employee behavior. Ben-Ner and Jones (1995) argue that ownership based only on return rights (broadly defined as financial and physical payoffs generated from the operation of the organization) is likely to have small and conflicting effects on individual motivation and performance and, as well, on cooperation across organizational units. They hypothesized that granting employees both return and control rights would improve effort and performance, albeit in a non-monotonic fashion.

Thus, theoretical arguments exist for both positive and negative effects of group incentive plans on motivation, effort, and performance. In this regard, several empirical studies have attempted to measure the net effect of group incentives on various employee and organization-level outcomes. Kruse & Blasi (1997) reviewed 26 empirical studies of the effects of employee stock ownership<sup>12</sup> on employee attitudes, motivation, and firm productivity and profitability. Although the studies exhibit a wide variety of measures, ownership forms, and contextual factors that make generalizations difficult, Kruse & Blasi (1997) report that most studies find a positive relationship between employee ownership and organizational commitment, and either positive or neutral effects of employee ownership on employee satisfaction. Perceived participation in decision-making appears to be an important predictor of employee satisfaction and commitment, either by itself or interacted with employee ownership. As far as firm productivity and profitability are concerned, the evidence indicates either better or unchanged performance under employee ownership. A weakness of this empirical research is that it sheds little light on the specific mechanisms through which employee ownership might improve performance, satisfaction, and other outcomes (see Pierce, Rubinfeld & Morgan, 1991, for a proposed model of how employee ownership affects productivity, satisfaction and commitment).

Jones et al. (1997) provide a critical review of the available econometric evidence on the effects of profit-sharing and gainsharing on performance. The evidence clearly supports the hypothesis that profit-sharing improves productivity, although its effect on profitability is less clear. As for the effects of such variables as firm size and capital intensity on the effectiveness of profit-sharing, the evidence is mixed, with studies variously finding positive, neutral, and negative effects. The empirical evidence about the relationship between worker participation and profit-sharing is also inconclusive. As with research on employee ownership, there is little research exploring the specific mechanisms through which profit-sharing increases productivity, though some studies suggest that profit-sharing increases effort and lowers voluntary quits, absenteeism and dismissals (see Jones et al., 1997, for a review of these studies).

In summary, empirical work on group incentive plans such as profit-sharing and employee ownership indicates that their net effect on productivity is either positive (as with profit-sharing) or neutral (as with employee ownership). No evidence exists that such group incentives decrease average productivity. As far as stock option plans are concerned, an organizational characteristic that has received little attention is the presence of a union. Therefore, we may ask, “do stock option plans operate in the same way in unionized as in non-union work-

places?” And, “are the effects of group incentive plans on productivity and financial performance smaller or larger in unionized than in non-union firms?” The next section summarizes some theoretical arguments and empirical evidence on these questions.

## **UNION EFFECTS ON GROUP INCENTIVES AND PERFORMANCE: THEORY AND EVIDENCE**

Whether a stock option plan improves performance depends on individual employee perceptions of the instrumentality of the plan, individual employee decisions to put forth extra effort, and individual employee access to organizational resources required to get the job done. In addition, in a unionized setting, the SO plan would also have to be backed by (or at least not opposed by) the union for potential positive effects of the plan to materialize.

Do unions reduce or increase the potential effects of stock option plans on employee motivation and performance? Unions may perceive any effort to align the interests of employees with those of managers/owners via stock ownership as a threat to their *raison d'être*. Therefore, even if unions agree to the inclusion of a stock option plan in the compensation package, they might not support its implementation, thereby reducing its motivational impact. Lack of trust between union and management may increase the transaction costs of implementing the plan. Also, unions may tend to frame stock option plans as added benefits, substitutes for wage concessions, or mechanisms to maintain fixed industry wage patterns (Zalusky, 1990), rather than as incentives to improve performance. For example, an empirical study of group incentives in manufacturing firms in the Midwest (Cooke, 1994) found that group incentives such as profit-sharing and gain-sharing plans had modest positive cross-sectional effects on productivity in unionized firms, but more substantial positive effects in nonunion firms.

On the other hand, there are arguments suggesting a favorable union posture towards adopting and implementing stock option plans. Unions' struggles during the last several decades have been well documented as they have lost membership, bargaining power and political clout (Strauss et al., 1991). But during the 1990s, unions attempted to fight back and reestablish themselves as a valuable partner in the employee-employer relationship. As part of an effort to “add value to business” (Masters & Atkin, 1999), unions have been experimenting with designing and implementing high-performance workplace practices as well as workplace democracy initiatives that enhance employee involvement and commitment. Stock option plans are well suited to reward

union members engaging in such practices and initiatives. Union involvement in the design and implementation of a stock option plan may result in better communication and understanding of the benefits of the plan compared to non-union contexts. Such improved understanding may then, in turn, have positive effects on employee motivation and performance. Another important priority for unions in recent years has been recruiting new members (Masters & Atkin, 1999). To attract workers from the hi-tech sector, in particular, unions have had to go beyond traditional notions of pay, including by supporting stock option plans as a new form of employee compensation.<sup>13</sup>

Empirical evidence on union acceptance of “alternative” rewards such as skill based pay, profit-sharing, gainsharing, and stock ownership also suggests that unions have recently come to view stock option plans favorably. Heneman, von Hippel, Eskew and Greenberg (1997) found that unions favor incentive plans with objective, group-based performance measures as well as plans in which employees receive equal payouts. Broad-based employee stock option plans can easily accommodate these preferences: unionized employees can be awarded an equal number of options contingent on a group financial or operational target. Furthermore, over time, unions have been able to overcome their historic opposition to employee ownership<sup>14</sup> (McElrath & Rowen, 1992); in fact, today, stock sharing plans are especially prevalent in unionized firms.<sup>15</sup>

In sum, there are arguments favoring both positive and negative effects of stock option plans on employee motivation, effort and firm performance in unionized firms. But, whether any dominant effect will prevail is a matter for empirical investigation.

## **PURPOSE OF THE STUDY**

The goal of this study is to measure the net effect of SO plans on employee productivity and financial performance in union and non-union firms. We build in two ways on prior empirical work that has evaluated the effect of group incentives on performance:<sup>16</sup> first, we examine the effects of a highly popular, yet little studied type of group incentive plan, namely, broad based employee stock options;<sup>17</sup> second, we analyze such plans in both union and non-union companies. Following Cooke (1994), we compare the effect of group based incentives on productivity in samples of union and non-union companies. In addition, financial performance measures are included in the empirical analysis, and our data set contains firms from a broad range of industries (not just manufacturing). Further, we go beyond cross-sectional research to conduct a longitudinal analysis of the effects of SO plans on productivity and performance.

The limitations of our data (for example, we use sales per employee as a proxy for productivity) do not allow us to test hypotheses about the direct effects of stock option plans on motivation. It may be the case that employees do indeed perceive stock options as a valuable reward, and therefore increase their effort to obtain this reward; nonetheless, circumstances beyond employee control (as examples, poor management and lack of resources to get the job done) may counteract such an increase in effort. Because of this problem, a cross-sectional analysis using sales/employee as a proxy for employee effort is likely to underestimate the effect of SO plans. Another limitation on our analysis is that we do not know whether employees frame the SO plan as a reward or a trade-off. As mentioned above, incentives are motivating when the reward is perceived as valuable; hence, if in some of the companies in our sample employees perceive the SO plan as a concession, this would also result in an underestimation of the effects of SO on employee effort. Furthermore, when assessing the differential effects of SO plans on firm performance in union and non-union companies, unmeasured variables, such as the quality of the union-management relationship or the union's support of alternative compensation practices, may result in under- or over-estimating such differences.

**Table 1.** Distribution of Broad-Based Stock Option Plans by Industry, 1997.

	Percent of all Firms Unionized Within Each Industry	Percent of Unionized Firms with SO Within Each Industry	Percent of Non-union Firms with SO Within Each Industry
<b>Industry</b>			
Agriculture & Mining	52%	0%	3%
Construction	17%	0%	2%
Manufacturing	37%	5%	14%
Trans. & Comm.	43%	4%	1%
Utilities	55%	8%	10%
Wholesale	23%	0%	10%
Retail	15%	2%	5%
Fin., Ins. & Real Estate	15%	6%	5%
Services	16%	4%	15%
All Industries Combined	31%	5%	11%
<i>N</i>	3691	1246	2715

*Source:* Compustat data merged with data from IRS's Form 5500 to determine union status and NCEO's broad-based stock option data base to determine presence of SO plan. Only compustat companies that provided employment data for either 1996 or 1997 are included.

## **DATA SETS AND VARIABLES**

The primary data set used in this study is Standard & Poor's Compustat. Firms that reported employment levels in either 1996 or 1997 were included in the data set.<sup>18</sup> This yielded an initial list of 8,152 publicly held companies. Compustat files provide extensive standardized financial information on public companies, but do not provide information on unionization. Therefore, we used Internal Revenue Service (IRS) Form 5500 to determine the union status of all firms in the study.<sup>19</sup> A company was considered unionized if one or more of the pension plans it sponsors was collectively bargained. Form 5500 data allowed us unambiguously to establish union status for 4,173 of the initial 8,152 Compustat companies.<sup>20</sup> To determine whether a company sponsors a broad-based stock option plan, we used a list of 1,360 companies provided by the National Center for Employee Ownership (NCEO);<sup>21</sup> we were able to match 493 of these 1,360 companies to Compustat data. Merging information from all data sets (Compustat, Form 5500, and the NCEO list) resulted in a total sample size of 3,961 publicly owned firms (with a total of about 36 million employees) from nine industry sectors. Of these, 1,246 are union firms and 2,715 are non-union firms. Of the 1,246 union firms, 60 had a SO plan; of the 2,715 non-union firms, 309 had a SO plan (see Table 1 and the Results section below).

We divided the 3,961 companies in our sample into four categories based on union status and presence of a SO plan: unionized firms with SO plans; unionized firms without SO plans; non-union firms with SO plans; and, non-union firms without SO plans. We then compared the economic and financial performance of the four union/SO groups using a set of four performance indicators. Productivity was used as a proxy for employee effort, with the specific measure being the natural logarithm of sales per employee, adjusted for inventory change. Financial performance was assessed via two market-based measures, namely total annual shareholder return (TSR) and Tobin's  $q$  ((market value + preferred stock + long term debt)/(capital stock + current assets – current liabilities)), and by one accounting measure, namely, return on assets (ROA). Because we used an augmented production function for our analysis, our independent variables included dummies for union/SO status, labor, capital intensity and industry (see the Appendix for variable definitions and Table 2 for descriptive statistics on all variables).

## **MODEL SPECIFICATIONS**

We perform two sets of empirical analyses using four different measures of firm performance for each set. The first set uses a cross-sectional specification that

**Table 2.** Descriptive Statistics and Mean Comparisons, 1997 levels.

	Full Set of Firms, 1997			
	Unionized Firms		Non-union Firms	
	Stock Options	No Stock Options	Stock Options	No Stock Options
	(1)	(2)	(3)	(4)
Levels in 1997				
Sample Size	60	1186	309	2406
Sales(000,000s)	12118.780(15344.15)***	4021.049(12286.05)***	2629.666(7442.237)***	940.058(3575.473)
Employees(000s)	48.122(56.44236)***	17.858(52.226)***	10.623(26.940)**	5.974(29.190)
Capital Intensity (total assets/ee)(000s)	178.251(240.136)	250.158(530.992)***	78.116(182.691)	141.139(820.887)
Ln (Sales)	8.613(1.470)***	6.405(2190)***	6.283(1.765)***	5.266(1.796)
Ln (Employees)	3.140(1.456)***	1.265(1.973)***	0.883(1.687)***	0.195(1.716)
Ln (Capital Intensity)	4.470(1.222)***	4.439(1.498)***	3.646(1.061)**	3.443(1.367)
Productivity – In (sales/ee)	5.421(0.076)***	5.248(0.022)***	5.388(0.037)***	5.066(0.016)
ROA	25.514(3.382)***	12.887(0.421)	16.561(1.287)**	13.821(0.390)
Tobin's <i>Q</i>	3.618(0.449)***	1.836(0.039)***	3.361(0.145)***	2.356(0.040)
TSR	31.702(4.142)***	15.505(1.267)	8.815(2.981)**	14.837(1.042)

Notes: Standard deviations in parentheses.

Significantly different from non-union-non-SO companies (col. 4) at \*\*  $p < 0.05$  \*\*\*  $p < 0.01$ .

Robust estimation of means was used for Productivity, ROA, Tobin's *q* and TSR to minimize the influence of extreme data points.

**Table 3.** Union Status, Stock Options Plans and 1997 Performance Levels.

Dependent variables: Ln (output/employee)	Total Shareholder Return	Tobin's <i>Q</i>	Return on Assets	
Independent variables	(1)	(2)	(3)	(4)
Union Stock Option	0.287 *** (0.076)	-0.280 (6.298)	0.630 *** (0.217)	1.540 (2.136)
Union No Stock Option	0.038 (0.023)	-2.657 (2.066)	-0.142 ** (0.069)	-1.732 *** (0.651)
No Union Stock Options	0.355 *** (0.035)	-8.519 *** (2.879)	0.613 *** (0.100)	0.375 (0.986)
Ln (total employment)	-0.369 *** (0.010)	5.960 *** (0.883)	0.431 *** (0.030)	5.640 *** (0.287)
Ln (net assets)	0.318 (0.008)	-0.474 (0.727)	-0.324 (0.024)	-2.823 (0.234)
Intercept	3.642 *** (0.070)	11.015 * (6.010)	3.835 *** (0.202)	23.655 *** (1.952)
F	242.23	17.66	754.44	914.95
2-digit industry dummies	Yes	Yes	Yes	Yes
<i>n</i>	3456	3160	3295	3464

Based on robust regressions that minimize influence of outliers.  
Standard errors in parentheses. \*  $p < 0.10$  \*\*  $p < 0.05$  \*\*\*  $p < 0.01$ .  
The excluded group is No Union\*No Stock Option.

**Table 3A.** Estimated Proportional Differences in Productivity by Firms Categories.

Union*Stock Option	33.3%
Union*No Stock Option	3.9%
No Union*Stock Option	42.6%

\*Exponential functions of coefficients reported in Table 3:  $[(\exp(B_i)-1)*100]$   
(The reference group is No Union\*No Stock Option).

captures the net differences in firm performance among the four union/SO categories. Results from these analyses are presented in Table 3. Cross-sectional estimates are vulnerable to a number of estimation problems, such as self-selection and omitted variable bias. Given the limitations of our data set, we attempt partially to correct for some of the biases associated with cross-sectional estimation by also conducting a longitudinal analysis. Thus, our second set of empirical analyses compares the average performance and the average differences in performance among the four union/SO categories in the periods before and after adoption of an SO plan.<sup>22</sup> Results from these analyses are reported in Table 4.

**Table 4.** Union Status, SO Plans, and Changes in Performance Levels, 1985–1987 to 1995–1997.

Dependent Variables	Ln(Output/ Employee)	Total Share- holder Return	Tobin's <i>Q</i>	Return On Assets
Independent variables	(1)	(2)	(3)	(4)
All companies w/data in both periods <sup>^</sup>				
1985–1987	0.094 ** (0.045)	4.690 (3.287)	0.329*** (0.085)	1.329 (1.154)
1995–1997	0.213*** (0.046)	4.840 (3.641)	0.553*** (0.089)	3.355*** (1.198)
Union-No Stock Option				
1985–1987	0.081*** (0.017)	6.743*** (1.278)	−0.125*** (0.033)	−0.519 (0.438)
1995–1997	0.088 (0.021)	1.202 (1.637)	−0.181 (0.041)	−0.041 (0.525)
No Union-Stock Option				
1985–1987	0.157*** (0.030)	2.154 (2.189)	0.432*** (0.057)	0.939 (0.760)
1995–1997	0.387*** (0.033)	6.535*** (2.449)	0.644*** (0.062)	5.313 (0.814)
No Union-No Stock Option				
1985–1987				
1995–1997	0.044*** (0.017)	4.397*** (1.313)	0.089*** (0.033)	1.140*** (0.409)
Change from 1985–1987 to 1995–1997 <sup>^^</sup>				
Union Stock Option	0.119 * (3.42)	0.150 (0.00)	0.224 * (3.37)	2.026 (1.49)
Union-No Stock Option	0.007 (0.06)	−5.542*** (7.33)	−0.056 (1.15)	0.478 (0.50)
No Union Stock Option	0.230*** (27.12)	4.381 (1.80)	0.212*** (6.40)	4.374*** (15.57)
No Union No Stock Option	0.044***	4.397***	−0.089***	1.140***
Difference Union SO-Union NSO				
	0.112 * (3.19)	5.692 (1.53)	.280** (5.57)	1.548 (0.91)
Difference Union SO-No Union SO				
	−0.111 (2.32)	−4.231 (0.63)	0.013 (0.01)	−2.348 (1.59)
<i>F</i>	543.8	63.7	136.75	118.59
<i>Total Observations</i>	13210	11565	1619	14206

Notes: Standard Errors in Parentheses. \*  $p < 0.10$  \*\*  $p < 0.05$  \*\*\*  $p < 0.01$ .

The excluded group is No Union No Stock Option in 85–87.

<sup>^</sup> Based on robust regressions run on all companies with complete data for the 1985–1987 and 1995–1997 periods and ln(assets) plus year dummies and 2-digit industry dummies.

<sup>^^</sup> *T*-statistics (not standard errors) reported in parentheses in these companies.

Following prior empirical work assessing the net effect of group incentives on performance, we use an augmented production function for our cross-sectional productivity analysis (Kruse, 1992, 1993; Blasi et al., 1996; Jones et al., 1997). We use the same model when financial performance rather than productivity is the dependent variable.

Our first model is cross-sectional. Firm performance in 1997 is modeled as follows:

Model (1)

$$Perf_i = b_0 + b_1 USO_i + b_2 UNSO_i + b_3 NUSO_i + b_4 \ln(L)_i + b_5 \ln(K)_i + b_{6-13}(\text{industry dummies})_i + e_i$$

where Perf = ln(output/employee), total shareholder return, return on assets, and Tobin's  $q$  in 1997

USO = dummy for union, stock option plan in 1997

UNSO = dummy for union, no stock option plan in 1997

NUSO = dummy for non-union, stock option plan in 1997

ln(L) = ln(number of employees) in 1997

ln(K) = ln(capital intensity) in 1997

$e_i$  = error term assumed normally distributed i.i.d.

$b_i$  = coefficients.

As noted above, cross-sectional regression results are susceptible to omitted variable bias. It may be the case that factors (for example, quality of the union-management relationship and quality of the workforce) other than the ones we measured affect performance and are non-randomly distributed across union/SO status. Also as noted, cross-sectional coefficients may be biased due to self-selection problems: firms in our sample have selected themselves into union/SO categories, and the selection rule may be related to the outcome being measured. In other words, firms with preexisting high productivity may be particularly likely to adopt SO plans. If so, then even if a cross-sectional analysis finds that SO firms are more productive, such higher productivity may not be due to the adoption and presence of SO plans (Kruse, 1993). One simple method to correct for this type of self-selection bias is to compare pre-adoption and post-adoption firm performance levels. Unfortunately, we did not have plan adoption dates for the majority of SO companies in our data set, and so could not use panel data to estimate the difference between pre- and post-adoption performance.<sup>23</sup> We did, however, have information on plan start dates for a limited number of SO companies. We obtained this information from a survey of broad-based U.S. SO companies conducted by the NCEO in 1998. The survey had a response rate of approximately ten percent and contained a

total of 133 SO companies. Of these, 93 provided plan start dates, only 10 of which were identified as union companies. Eighty-five percent of these 93 companies had adopted their broad-based SO plans during or after 1989. Consequently, in the absence of information on plan start dates for the majority of companies in our sample, we compare mid-1980s company performance with mid-1990s company performance as a proxy for a comparison of pre- and post-adoption performance. This approach involves some measurement error, as a small number of SO plans may have been adopted during the early 1980s or before. Also, such a comparison does not establish causality since it may be the case that other important changes (as examples, restructuring, downsizing and changes in management) occurred simultaneously with SO plan adoption. Nonetheless, comparing average performance in the 1985–1987 to average performance in the 1995–1997 period within and across union/SO groups (Model 2) allows for some useful insights about the relative changes in performance experienced by our 4 categories of firms. The longitudinal specification used is as follows:

Model (2)

$$Perf_{it} = b_0 + b_1[USO*(85-87)] + b_2[USO*(95-97)] + b_3[UNSO*(85-87)] + b_4[UNSO*(95-97)] + b_5[NUSO*(85-87)] + b_6[NUSO*(95-97)] + b_7[NUNSO*(95-97)] + b_8 \ln(L) + b_9[\ln(L)*(95-97)] + b_{10} \ln(K) + b_{11}[\ln(K)*(95-97)] + industry + year + e_{it}$$

where Perf = ln(output/employee), total shareholder return, return on assets, and Tobin's  $q$  in 1985, 86, 87, 95, 96, and 97

USO = dummy for union, stock option plan

UNSO = dummy for union, no stock option plan

NUSO = dummy for non-union, stock option plan

85–87 = period dummy for 1985–1987

95–97 = period dummy for 1995–1997

ln(L) = ln(number of employees) in 1997

ln(K) = ln(capital intensity) in 1997

$e_{it}$  = error term assumed normally distributed i.i.d.

$b_i$  = coefficients.

In Model (2), the excluded group is No Union–No Stock Option Plan in 1985–1987. The coefficient  $b_1$  indicates the average adjusted difference in performance between Union–Stock Option companies in 1985–1987 and No Union–No Stock Option Plan companies (i.e. the excluded group) in 1985–1987. Comparisons of differences in performance among union/SO status groups over time (e.g. comparing average performance in 1985–1987 to average

performance in 1995–1997) are obtained by subtracting the respective coefficients. To illustrate, the average change in performance for Union–Stock Option companies between 1985–1987 and 1995–1997 is obtained by subtracting  $b_1$  from  $b_2$  (see Table 4). To obtain an estimate of the difference between average changes in performance across time periods for Union–Stock Option companies and Union–No Stock Option companies, we use  $[(b_2 - b_1) - (b_4 - b_3)]$  (see Table 4).

## RESULTS

Table 1 provides information on the industry distribution of the companies in the combined data set and the prevalence of stock option plans within each industry for both union and non-union companies. About 30% of the 3,961 firms in our sample had union workers;<sup>24</sup> about 11% of the 2,715 non-union companies had a broad-based SO plan compared to 5% of the 1,246 companies that had union employees, suggesting that SO plans are more prevalent in non-union firms. That trend held across all major industry groups with the exception of Finance, Insurance and Real Estate.

Descriptive statistics and simple mean comparisons for all variables are provided in Table 2. In 1997, there were 60 unionized SO firms and 309 non-union SO firms. Unionized firms with SO plans were larger than other firms in terms of both sales and employees, and also had higher capital intensity compared to all the other categories of firms. Hence, the results from the empirical analysis below should be interpreted as applying primarily to large publicly owned firms with union employees.<sup>25</sup> These firms also had higher productivity, ROA, Tobin's  $q$  and TSR levels in 1997 than the three other categories of firms. Note that non-union firms without stock option plans were considerably smaller than the three other categories of firms.

Table 3 reports cross-sectional results comparing performance across union-SO status controlling for capital intensity, firm size and industry characteristics in 1997. The reference category for the estimates reported in this table is nonunion firms without stock option plans (NU-NSO). To minimize the influence of outliers, robust regression was used in estimating all of the equations.

Productivity, an outcome that is theoretically more directly affected by employee effort than market and accounting based measures of firm performance, was significantly higher for firms with SO plans irrespective of union status (these results are consistent with Sesil et al., 2000). Table 3A indicates that productivity was about 33% higher in union firms with SO plans compared to the reference group (namely, NU-NSO firms); the productivity difference

was even larger – 43% – between non-union firms with SO plans and non-union firms without SO plans.<sup>26</sup> By contrast, the difference in productivity between union firms without SO plans and non-union firms without SO plans was small—about 4%—and statistically insignificant.

Tobin's  $q$ , a measure reflecting the present value of a firm's future profit stream (and a proxy for the nontangible value of the firm), was also significantly higher for stock option firms than for non-stock option firms irrespective of union status.<sup>27</sup> These results imply that financial markets evaluate the future prospects of SO firms more positively than the prospects of non-SO firms; the fact that a firm has unionized workers does not alter that evaluation. Conversely, union non-stock option firms had a Tobin's  $q$  that was significantly lower than all other groups, including the baseline group, implying that financial markets have low expectations about the future profit streams of union, non-stock option firms. A plausible explanation of these results is that the existence of a SO plan is interpreted by financial markets as a proxy for "progressive" management and good employee relations in both union and non-union firms. For union firms, the absence of SO plans may be interpreted by investors as a proxy for traditional management with poor employee relations.

The cross-sectional results for our second measure of market-based firm performance, TSR, differ across union and non-union SO firms. TSR at union SO firms was slightly but not significantly different from TSR in the reference group (NU-NSO) of firms. However, TSR was 8.5% lower in non-union SO firms than in the reference group, and the difference is significant at  $p(L)0.01$ . Why do stock option plans appear to have a net negative or no effect on TSR, as opposed to their positive effects on productivity and Tobin's  $q$ ? One possible explanation is that stock options entail an economic cost – the firm either issues new shares and effectively sells these at a discount to employees or has to buy back its own stock. This cost could result in diluted shareholder earnings if productivity does not improve or if the employees rather than the shareholders capture the benefits from improved productivity. However, before interpreting the above results as evidence that employee stock options reduce shareholder returns, it should be noted that TSR in any single year is a very "noisy" measure of firm performance—more so than the three other performance measures used here.<sup>28</sup> Consequently it is more informative to look at the pre-post comparison results presented in Table 4, since they average TSR over two 3-year periods.<sup>29</sup>

The accounting measure of performance used in this study, ROA, suggests that both union and non-union stock option companies do not perform worse than the baseline group (also see endnote 28 for 1995 and 1996 cross-sectional ROA results). On balance, the empirical evidence suggests that there is no

significant relationship between the presence of a SO plan and ROA (in 1997). Consistent with prior research, union firms without stock option plans have a lower ROA compared to non-union firms, suggesting that unions may be shifting returns from capital to labor (see Bell & Neumark, 1993).

Were performance levels higher or lower for SO firms before plan adoption? Did performance improve after SO plan adoption? Table 4 reports pre- and post-adoption comparisons evaluating differences within and across union/SO groups between two time periods – 1985–1987 and 1995–1997. The excluded group is non-union, non-stock option firms in the 1985–1987 period. The results indicate that productivity in the pre-adoption period was higher in SO firms than in the reference group, both in union and non-union firms. Productivity in these firms continued to be higher in the 1995–1997 period compared to the reference group. More important, between 1985–1987 and 1995–1997 productivity increased for both union stock option firms and non-union stock option firms, and the increases were relatively large (0.119 and 0.23, respectively) and significant (see Table 4, “Change from 1985–1987 to 1995–1997”). The productivity increase was smaller in union SO firms than in non-union SO firms (–0.111), but the difference was not significant. Thus, these results not only support the cross-sectional evidence in Table 3, they also suggest that companies that adopted SO plans had higher productivity levels before plan adoption compared to NSO firms and experienced a significant increase in productivity after SO plan adoption. In contrast, union NSO firms were more productive than non-union NSO firms during the mid-1980s, but their productivity did not increase over time.

The same pattern of results was found for Tobin’s  $q$ , namely, levels were higher for both union and non-union SO companies before adoption, they remained higher after adoption, and there was a significant increase in Tobin’s  $q$  from pre- to post-adoption. By contrast, for union NSO companies, Tobin’s  $q$  was significantly lower than in the reference group of firms during the mid-1980s, and there was no increase over time. Thus, financial markets had lower expectations about the future revenue streams that union NSO companies might expect in the mid-1980s, and these lower expectations persisted over time.

As for TSR, all three groups of firms had somewhat higher returns compared to the non-union NSO firms, but only the difference between union non-stock option and non-union non-stock option firms was statistically significant. TSR did not change significantly from pre-adoption to post-adoption for either union or non-union stock option companies; it decreased for union non-stock option firms and increased for non-union, non-stock option firms. Union NSO companies exhibited a significant decline in TSR over the period

from the mid-1980s to the mid-1990s. However, these results should be interpreted as suggestive since additional analysis using risk-adjusted monthly (rather than yearly) TSR data is needed (see note 29).

Pre-post comparisons for ROA indicate that ROA increased significantly from the mid-1980s to the mid-1990s for non-union firms (the increase was larger for stock option firms, as shown in Table 4). Over the same period, ROA did not change significantly for union firms irrespective of their SO status. These results again support the cross-sectional evidence presented in Table 3, and also suggest that, for union SO companies, better productivity did not result in higher ROA (or TSR). Thus, it may be the case that returns are indeed shifted from capital to labor in these firms. In union NSO firms, ROA is consistently lower throughout the studied period than in non-union firms.

To summarize, the cross-sectional analysis suggests that productivity and Tobin's  $q$  are significantly higher in stock option firms compared to non-stock option firms; this holds true for both union and non-union stock option firms. Moreover, the size of the effect appears to be similar for stock option firms across union status. The longitudinal analysis indicates that for stock option firms, both union and non-union, levels of productivity and Tobin's  $q$  were higher before adoption, increased between the pre-adoption and post-adoption periods, and remained higher in the post-adoption period. Consequently, union and non-union SO firms outperformed the two other groups of firms based on these measures. However, TSR did not improve over time in SO union and non-union firms, while it increased significantly in non-union NSO firms. And, the adoption and presence of a SO plan had different effects on ROA in union and non-union firms. For union firms, ROA did not increase after SO plan adoption, whereas ROA increased significantly for non-union SO firms. In addition, over time union non-stock option firms fared worse than both non-union firms and union stock option firms on all four performance measures – that is, their productivity, Tobin's  $q$ , and ROA did not increase over time, and their TSR declined significantly.

Our results have some important limitations. All the union stock option firms in our sample were large (90% of them had more than 3,000 employees and over half had more than 24,000 employees). Hence, our results apply primarily to large, publicly held union companies. Also, the lack of panel data including exact stock option plan adoption dates for union and non-union firms prevents us from using a true panel data set to implement two-stage modeling. Thus, it may be the case that characteristics (such as superior management and higher quality human capital) that prompt companies to adopt SO plans are also the characteristics that make companies more productive. Though we attempted to address this issue with our pre-post analysis, new data and further research are

required better to address both of these problems. Also, our measures of union status and TSR were rather unsophisticated; it would be especially informative to repeat this analysis using a within-firm measure of union density rather than a simple dummy variable, and using monthly, risk-adjusted data for the TSR comparisons.

## CONCLUSION

This empirical study evaluated the net effects of employee stock option plans across union status on economic and financial measures of firm performance. The data set contained 3,961 public companies and was obtained by merging company information from several sources: Standard & Poor's Compustat, IRS's Form 5500, and an NCEO database. The analysis produced fairly strong evidence that broad-based employee stock option plans yield substantial gains in firm-level productivity and Tobin's  $q$ . Furthermore, the net effect of stock option plans on productivity and Tobin's  $q$  was found to be similar in union and non-union firms. In addition, union stock option firms consistently outperformed union non-stock option firms with respect to these two measures of performance. Our results for productivity are consistent with Cooke (1994), who found that both union and non-union manufacturing firms with group incentive plans outperform non-union firms with no group incentives, the magnitude of the effect being 18–21%. Results for total shareholder return were less clear-cut, suggesting that SO plans might have an economic cost associated with them. As for return on assets, non-union SO companies improved their ROA after adoption, whereas union SO companies did not. Thus, even though productivity increased over time for both union and non-union SO companies, this increase resulted in higher operating income per unit of assets only for non-union firms, raising the possibility that the gains from improved productivity in union firms were captured by the workers rather than the firm.

In summary, on the positive side, the empirical evidence implies that stock option plans are associated with a net positive effect on productivity, and union and non-union firms capture the potential incentive effects of these plans on productivity equally well. Thus, the results alleviate fears that contemporary group incentives, such as stock options, do not function well in unionized settings. Also, financial markets appear to value the future prospects of SO firms highly, perhaps because SO plans are used as a proxy to indicate better, performance-aligned management practices. On the other hand, increased productivity did not result in higher annual shareholder returns for SO firms (irrespective of union status), and ROA increased after SO adoption only in

non-union companies. These findings raise the question of how the economic gains from incentive plans are captured within union and non-union firms, and which stakeholders benefit from such economic gains. Further research and better data are needed to explore this question.

We believe the analysis presented here provides useful information on a topic that has been little explored – stock option plans and their impact on firm performance in union and non-union settings. As with any other research endeavor, many interesting questions remain unanswered. Specifically, why do companies adopt employee stock option plans, and do union firms adopt such plans for different reasons than non-union firms? How are stock option plans structured (that is, are options awarded based on merit, tenure, percent of pay, and/or other factors?), and do union firms structure their plans differently (e.g. more equitably or bureaucratically) than non-union firms? How well do employees understand the functioning of their stock option plan?, how do they frame it (as a valuable reward, an unimportant add-on, or as a way to reduce their base pay rate)?, and are there “understanding” and “framing” differences between union and non-union employees/firms? To address these questions, panel data for large representative samples of all four types of firms studied here are needed—data that contain information on plan adoption dates, plan design, and other human resource management practices.

We hope this paper will stimulate further interest in this area and will encourage researchers to develop greater understanding of how stock options interact with other key factors (including other human resource management practices) to effect employee effort and firm performance.

## NOTES

1. Available at: [www.nceo.org](http://www.nceo.org)

2. We define broad-based plans as plans that offer stock options to 50% or more of all employees. For simplicity, broad-based SO plans are referred to as SO plans in the remainder of this paper.

3. See Huddart & Lang (1996) for an overview of the accounting and tax treatment of employee stock options.

4. A study by Coopers & Lybrand (1993) estimated that if companies reported the value of options granted the average reduction in net company income after the phase-in period would have been 3.4% for mature companies and 26.5% for emerging companies.

5. Recent examples of union employees receiving stock options include Harley Davidson and Verizon.

6. Assuming rational, self-interested economic actors.

7. For an in-depth review of the existing theory and empirical findings on piece rates, executive compensation, merit pay, and commission systems, see Asch & Warner, 1997.

8. Stock options provide a gain to employees only if the stock price increases between the grant and exercise dates; thus, both employees and shareholders benefit from the price increase. If the stock price falls below the grant price, shareholders experience a loss (the value of their investment has decreased over the period in question) whereas employees receive no gain. Some argue that this reduces the incentive power of options (compared to, say, stock ownership). Nonetheless, it may be the case that employees expect to receive a financial gain from their SO plan (a quite reasonable assumption during the rising market of the 1990s). Hence, if their initial frame of reference is an expected gain, receiving nothing would be experienced psychologically as a loss.

9. Expectancy theory (Vroom, 1964) predicts that a reward will elicit effort from employees if the reward is valued, the probability of obtaining the reward given performance targets are met is high, and the probability that effort will result in meeting performance targets is high. It is reasonable to assume that stock options provide a valued reward. But the relationship between meeting performance targets and stock price is fraught with uncertainty, and depends on much more than employee effort. Also, whether increased individual effort will result in improved group/unit/company performance is likely to depend on a company's financial and human resource management systems, its culture, and other factors.

10. Gomez-Mejia and Balkin (1992) report that about 18% of the variance in firm performance can be attributed to managerial decisions in response to the incentive structure; the remainder can be attributed to unsystematic factors.

11. This logic implies that the larger the firm/workplace size, the more difficult it is for management to monitor employees and for employees to monitor the output of their co-workers. Hence the need for incentive compensation, either individual or group, is greater in large firms (e.g. see Brown, 1990, or Drago & Heywood, 1995). But, by the same token, such plans may be less effective at eliciting effort in large firms/work units. These conflicting dynamics may explain the mixed empirical evidence on the relationship between size and profit-sharing effectiveness (see Jones, Kato & Pliskin, 1997).

12. A potentially important difference between these types of plans and broad-based SO plans is that, under the latter, employees have somewhat greater control over when to realize the reward (i.e. when to exercise their options once they become vested). As a result, the timing and size of the reward will vary across individuals. In as much as reward timing and size affect future behavior, however, the behavioral effect of such plans is less consistent than the effect of either profit or gain sharing. Also, SO plans encourage employees to monitor the market performance of the firm more closely than any other group incentive plans, at least during the period before exercise/selling.

13. The recent strike against Verizon Communications illustrates this point. In August 2000, the Communications Workers of America and the International Brotherhood of Electrical Workers fought for, and won, concessions making it easier for them to organize the wireless part of the business. The agreement with the company also included the establishment of a profit-sharing plan and the allocation of stock options to union members. (Romero, S., "Labor Accord Hits New-Economy Notes", *New York Times*, August 22, 2000, Section C; Page 1; Column 4).

14. For an overview of unions' changing attitudes toward employee ownership, see McElrath and Rowan (1992). They argue that economic necessity, lack of evidence of a negative impact of ESOPs on earnings and employment, and realization that ESOPs can be used to achieve strategic union objectives have prompted unions to overcome their opposition to employee ownership.

15. In a survey of 150 union and 350 non-union firms, Heneman et al. (1997) found that union firms are more likely than non-union firms to use stock sharing plans.

16. For a review of prior empirical work on group incentives, see section two of this paper "Incentives and Group Incentives: Theory and Evidence".

17. For an exception, see Core and Guay (2000). Their paper addresses the question of why companies adopt non-executive employee stock option plans (although their data do not distinguish between broad-based and other types of employee stock option plans). They find that firms use greater stock option compensation when facing high capital requirements and financial constraints. The results from their empirical analysis also suggest that firms may be using options to attract certain types of employees, provide retention incentives, and create incentives to increase firm value (though the authors do not directly test any of these three propositions).

18. At the time this project was started, 1997 Compustat data was the most recent available to the authors. We used all annual Industrial and Full Coverage Files. These files contain all companies listed on the New York Exchange, American Exchange and NASDAQ, companies listed on regional exchanges, publicly held companies trading common stock, and wholly owned subsidiaries trading preferred stock or debt. We also included companies from the annual Industrial Research File This file contains companies that have been deleted from the Industrial Files due to bankruptcy, acquisition or merger, leveraged buyout, or because they became private companies.

19. IRS's Form 5500 is a tax form that all U.S. pension plans in establishments with 100 employees or more must file every year. We used data on 66,091 establishments from 1995 (the latest available in electronic format) to determine union status in 1997. This data base is made available by the U.S. Department of Labor.

20. We used employer identification numbers (EIN) to merge records from the two data sets.

21. In 1998, the NCEO compiled a comprehensive list of 1,360 companies (both public and private) sponsoring broad-based SO plans based on a national clipping service on stock compensation, regular reviews of company announcements, and information provided by various consulting firms and practitioners. Out of these 1,360, we were able to match 493 to Compustat data.

22. Unfortunately, we did not have plan adoption dates for most of the SO companies in our data set. Based on the limited information on plan adoption dates, we developed Model (2). See the Methods section above for a detailed explanation of the assumptions we made in developing Model (2).

23. The lack of plan start dates also limits our ability to use a two-stage model that would estimate the probability of adopting an SO plan as a first stage, and then use these estimates to explain firm performance in the second stage.

24. Since our measure of unionization was derived from Form 5500 data, we do not know the actual percent of workers within each company that belongs to a union. Also, because we combined data from several data sets, yet our primary source is Compustat, our final sample is composed only of public companies. Further, because of the merging procedure, only public companies that provided their correct employer

identification number and information on collective bargaining in Form 5500 are included.

25. To explore the possibility that the effect of SO plans varies with company size, we fitted model (1) using various employment size breakdowns. For union SO companies, the results for productivity were stable and similar to the ones reported in Table 3; the only difference occurred for companies with more than 50,000 employees. Specifically, the productivity effect was still positive but had shrunk to 7% (compared to the 33% reported in Table 3). The difference between non-union SO and non-union NSO companies also diminished for the biggest companies, but nevertheless remained large (30% compared to the 43% reported in Table 3).

26. The difference between the dummy coefficient for union/SO status and non-union/SO status was not statistically significant; in other words, there is no evidence that the net effect of stock option plans on productivity is different between union and non-union firms.

27. As with productivity, the effect sizes for union stock option and non-union stock option firms with respect to Tobin's  $q$  were similar in size, and the difference between these effect sizes was not statistically significant across union status. Hence, there is no evidence that the net effect of stock option plans on Tobin's  $q$  is different between union and non-union firms.

28. We estimated the four cross-sectional equations for 1995 and 1996 and compared the results to those for 1997 (reported in this paper). The direction, size, and significance of the union/SO effects were remarkably similar in all three years for productivity and Tobin's  $q$ ; if anything, the effects were slightly larger in 1995 and 1996, compared to 1997. For ROA, in both 1995 and 1996, SO companies had significantly higher ROA compared to the excluded group irrespective of union status, and the effect for the non-union, non-stock option firms is similar to the one estimated for 1997. The effects for TSR, however, vary widely. In 1996, all union/SO groups had lower TSR compared to the reference group, but the coefficients were small (-1% to -4%) and statistically insignificant. In 1995, non-union stock option firms showed an average return 15% higher than the reference group of firms (as opposed to 8% lower in 1997), and the difference was highly significant. The average estimated return for union stock option firms in 1995 was 4% higher than the return for the reference group, but the difference was not statistically significant. Hence, cross-sectional differences in TSR show an unstable behavior over time, as compared to cross-sectional differences in productivity, Tobin's  $q$  and ROA.

29. It may be difficult to interpret TSR coefficients unambiguously, even for our pre-post comparisons, because returns are not adjusted for market risk in this analysis (because Compustat provides only quarterly and yearly stock returns). If market risk is non-randomly distributed across union/SO status, it will be difficult to interpret the union/SO coefficients on a non-risk-adjusted basis.

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## APPENDIX

Variable	Definition
Union/SO status	Four dummy variables for: unionized firms with SO plans; unionized firms without SO plans; non-union firms with SO plans; and, non-union firms without SO plans
Ln (Employment)	Natural logarithm of total company employment (continuous)
Ln (Sales)	Natural logarithm of total company sales (continuous)
Ln (Capital Intensity)	Total assets divided by total employment (continuous)
Ln (Productivity)	Natural logarithm of output per worker (total sales adjusted for inventory and inflation divided by the number of employees) (continuous)
Tobin's $q$	(Market value + preferred stock + long term debt)/(capital stock + current assets – current liabilities) (continuous)
Total shareholder return	(Adjusted stock price (for stock splits) + adjusted dividend)/(adjusted price [t–1]) (continuous)
Return on assets	[(Operating income-adjusted depreciation)*100]/(net adjusted value of capital stock + current assets – current liabilities)
Industry controls	2-digit industry codes (dummy variable)