Complementarity of Shared Compensation and Decision-Making Systems: Evidence from the American Labor Market

Arindrajit Dube
UC Berkeley Institute of Industrial Relations

and

Richard Freeman
Harvard University Department of Economics and NBER

ABSTRACT: We use both worker and establishment level surveys to estimate the impact of shared decision making and compensation systems on worker attitudes and firm performance. Using the Worker Representation and Participation Survey (WRPS), we find that employee attitudes, workplace participation, ratings of effort of fellow workers, and job satisfaction are positively related to the presence of shared compensation schemes, such as profit sharing and stock ownership plans, particularly when they are combined with formal employee involvement (EI) programs. Evidence from establishment level data corroborates the complementarity in the incidence and effectiveness of shared compensation and decision making systems. The presence of EI and systems of performance pay and ownership are associated with better financial and product/service quality performance, as well as lower employee turnover at the firm level. Overall, the evidence points to the importance of collective financial incentives, especially when they are coupled with programs that increase worker participation.

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1 Introduction

The composition of compensation changed markedly for workers in the United States during the 1990s. Instead of paying workers solely with fixed wages, more and more firms moved toward compensation systems that made part of pay depend on the economic performance of the firm. They gave profit-sharing bonuses, paid group incentive schemes (gain-sharing), developed employee stock ownership programs, awarded stock options, and funded pensions through defined contribution pension plans which put considerable assets in the stock of the firm. Over the same period, firms sought increased employee involvement in decision-making by creating teams, total quality management, quality circles, employee involvement committees, and other similar structures. How significant are these new forms of compensation and modes of employee involvement? To what extent are the new forms of compensation linked to employee involvement programs? How have they affected employee behavior and attitude?

This paper examines these questions using the 1994-1995 Freeman-Rogers “Workplace Representation and Participation Survey” (WRPS) (Freeman and Rogers, 1999), and the 2003 California Establishment Survey (CES). The WRPS focuses on employee involvement and worker organization but it also contains questions on the mode of compensation that allows us to study linkages between compensation systems and employee decision-making. The CES surveys businesses on compensation and
decision making practices, and also has productivity-related outcomes which we use to assess the impact of compensation and decision making systems on firm performance.

Section 1 documents the extent and growth of shared forms of compensation in the 1990s. Section 2 examines the characteristics of workers and firms covered by the shared compensation systems and employee involvement programs. Section 3 estimates the impact of shared compensation and employee involvement on workers’ attitudes toward work and their work activity. Section 4 analyses the robustness of these findings using the worker survey. Section 5 uses establishment level data to assess the impact of these systems of firm performance. We conclude with a discussion of why employers may use shared systems, and possible directions for future research.

Our principal findings are as follows:

1. New forms of compensation based on pay for group or company performance, or ownership of company shares have increased rapidly;

2. Compensation systems that base part of pay on company or group performance are linked with employee participation in decision-making, suggesting that these institutions form a complementary package of employee-management relations;

3. Employee involvement programs have substantial independent impact on worker behavior, job satisfaction, and attitudes toward the firm; in contrast, the effect of shared compensation seems to be contingent on the presence of employee involvement programs. The highest outcomes occur when firms combine pay for company/group performance, ownership stake in the firm, and employee involvement committees;
(4.) Establishment level data also show the complementarity between employee involvement programs and shared compensation schemes in registering better financial and product quality performance, as well as lower employee turnover for otherwise similar firms.

(5.) Complementarity of shared compensation and decision-making systems—both in terms of incidence and in terms of productivity outcomes—are consistent with the hypothesis that shared compensation systems can have an impact on collective employee incentives.

2 The New Forms of Pay

Traditional economic analysis of labor market contracts distinguish between: employment contracts, whereby a firm buys the time of a worker to do what management views as profitable and pays a time-based wage; and sales contracts, where the firm buys a product from the worker (Simon, 1947). The wage model dominates most labor market analyses. Here, the employer determines the activities that workers undertake at the workplace subject to potential principal/agent problems whenever the employer cannot fully monitor employee effort. By contrast, the sales contract is effectively a model of self-employment where the worker decides how much to work and how to produce the product. The classic sales contract in the job market is the piece rate. In cases where pieces can be readily measured, this solves principal agent problems but loses the advantages of coordinated work and the sharing of newly discovered ways to improve productivity. Between these polar forms are the shared compensation and
**decision-making** arrangements on which we will focus. In these systems workers share the financial benefits and risks of economic activity and/or decisions about production with the firm. Ideally, giving workers a financial incentive to behave in the interests of the firm and empowering them to make decisions will increase the value of the firm and enhance worker well-being.

There are diverse systems of shared compensation. We differentiate between systems that involve **financial ownership**, where the workers’ reward depends on share prices, and group or company **profit-sharing or bonus incentive systems** that reward workers on the basis of group or company performance irrespective of share prices. Employee stock ownership plans (ESOPs), majority employee ownership, defined contribution pension money invested in one’s own firm, diverse stock purchase plans and employee stock options all fit under the financial ownership rubric. Gain sharing, profit-sharing, bonuses linked to performance, Scanlon plans based on cost-saving, and so on, fit under the profit-sharing rubric.

There are also diverse institutions for **shared decision-making**. Employee involvement committees (EI), works councils (in the European Union), quality circles and team production give workers a say in what happens at their work site. Workers on boards, (legislatively required in Germany but uncommon in the US), or directors appointed by worker-run pension funds are found at the corporate level.

To be sure, we should not over-emphasize the distinction among employment contracts, sales contracts, and shared compensation systems. Workers paid straight time wages have some control over decisions, and the better they perform, the more likely they
are to receive pay increases, promotions, and other benefits in the future. At the other end, even small partnerships will divide decision-making unevenly, and piece rate systems are more complicated than the simple sales contract model indicates, especially when the firm provides the capital and negotiates the piece rates with workers (Freeman and Kleiner, 1999). Still, the differences between traditional employment and sales contracts and modern shared compensation contracts are sufficiently large to make this a useful typology.

Shared compensation structures run into a problem when it comes to understanding how they incentivize workers. Rationalizing employee stock ownership or company-wide profit sharing is difficult in the normal economic framework, because it is hard to see how options can motivate individual workers. It’s one thing to pay the CEO of Starbucks or Bank of America in stock options or to give them profit-related bonuses, since their decisions can affect the share price and profits; but the clerks at a local store can hardly affect the share price or company-wide profits. Lazear (1999) offers a sorting explanation for variable pay amongst managers – that compensation linked to long term financial viability of the company elicits better information from managers about the true state of affairs. He admits, however, that such an explanation does not explain using shared compensation for lower level workers. Oyer and Schafer (2002) argue that options may be used to attract workers optimistic about the firm – which in conjunction with tax benefits from delayed exercise of options can provide an edge to this form of compensation. However, this argument seems to imply that options are useful mainly when they can fool employees – which is unlikely over a long period of time.
One possible explanation is that variable compensation affect employees in ways beyond individual calculations, by helping create a “corporate culture” that improves company performance. For instance, if employees feel that they will share the gains when the company is doing well, they may feel more enthusiastic about putting forth greater effort based on notions of “fairness.” Finding evidence that shared compensation structures actually influence employee actions or attitudes would point to such “behavioral” theories of the firm. In that sense, looking at “intermediate variables” such as employee attitudes and involvement (as we do) is valuable, as it helps us get a better sense of the pathways of compensation structures to productivity.

If shared compensation schemes actually have an impact on employees’ willingness to engage more intensively in production issues, it makes economic sense to couple such schemes with programs that devolve workplace decisions to workers. Firms that give workers financial incentives but that do not empower them to make decisions are unlikely to benefit from the incentive system. On the other hand, firms that give workers decision-making authority but no financial incentive face the risk that workers will make decisions that are not in the firms’ interest. This is the basis of the prediction that financial sharing systems should be complementary with systems of shared decision-making. Moreover, ceteris paribus, shared compensation and decision-making should produce higher outcomes together than separately. Of course, such coupling makes sense only if shared compensation schemes can actually have an impact on employee behavior. In this paper, we will pay close attention to this complementarity of the two systems – both in incidence and in outcomes.
2.1 Extent of Shared Compensation and Decision-Making Systems

It is difficult to obtain accurate estimates of the extent of compensation systems that vary pay with share price or company or group performance, and of decision-making systems that devolve decisions to employees. Most administrative-based or establishment-based compensation surveys cover a single form of pay – such as defined contribution pension funds, 401k plans, or profit-sharing, – with no information on the overlap with other forms of financial sharing. Since workers are likely to receive several forms of pay related to performance, simply adding the numbers under each separate category will overstate the total number of workers having shared compensation pay systems. The most complete compensation survey is the employment cost index which in principle includes various bonuses and profit-sharing, but excludes stock options and related programs and provides no information on pension funds invested in the firm. The Bureau of Labor Statistics (BLS) conducted a national benefit survey in 2000, but this focused primarily on retirement and health benefit plans. Finally, the BLS also conducted a survey in 1999 to assess the incidence of stock option based compensation, but this did not have information on other types of shared compensation plans.

Employee based surveys might resolve the overlap problem but they suffer from potentially large measurement error, particularly of the size and nature of benefit programs. In their study of pensions held by older workers, Gustman and Steinmeier report that “discrepancies between firm provided and administrative records ... and
respondent reports ... are large for many respondents”.

Opinion surveys typically find that 10 or so percent of workers report that their firm is employee-owned, which far exceeds any plausible estimate from administrative records (Freeman, Kruse, Blasi, Mackin, 2000). Many workers may interpret having a 401k plan that invests in their firm, or individual ownership of shares, as employee ownership when in fact the firm is owned by shareholders rather than workers. Still, by piecing together data from several sources, we can get a general picture of the extent and growth of new forms of compensation.

Table 1 estimates the proportion of the private sector work force that had a financial stake in the performance of their firm in the late 1990s from the sources described in Table 10. Approximately 25 percent of the work force had a stake in their firm through some form of ownership. In the United States the main vehicle for employee ownership has been the Employee Stock Ownership Plan (ESOP). The National Center of Employee Ownership (NCEO) estimated that in 1998 some 8,500,000 workers were employed in over 11,400 ESOP and related stock bonus plans with combined assets of around 400 billion. This is about 8% of the US private sector work force. In addition, the NCEO estimates that 7 to 10 million workers receive stock options as part of all employee stock option plans, for another 8% or so of the private sector work force. This estimate contrasts with the employee survey conducted by the BLS, which found that in 1999, 1.7% of all employees, or 5.3% of employees of publicly traded companies

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1Gustman and Steinmeier, p 40.

2More recent figures from NCEO indicate that in 2002, some 8.8 million workers were enrolled in ESOP plans, and around 15 million participated in stock purchase plans.
received options grants in 1999. The divergence can be due to a number of reasons, including the measurement window: since some companies may not give out broad based options each year, the number of employees who “regularly” receive options is greater than those who might receive it in one particular year. An additional 10% or so of the work force received special opportunities to buy company stock.

Profit sharing differs from employee ownership because it depends on accounting profits rather than share values. Employees at Amazon.com would receive nothing in profit shares when the firm has not turned a profit, but they would have gained from ownership of options, as the share price of the company has increased rapidly. Most profit sharing is deferred, with the profit share put into an employee retirement account (PSCA, 1993; BLS, 1998). Gain-sharing plans typically tie employee compensation to a group-based operational measure -- such as physical output, productivity, quality, safety, customer satisfaction, or costs -- rather than to a financial measure such as profitability. We estimate that about 25% of American workers are paid in part with some form of group or company financial incentives.

The third major way in which firms pay workers based on firm performance is through non-ESOP defined contribution pension plans, such as 401k plans. In 1997 55% of full time employees had 401k plans (approximately the same proportion had any form of defined contribution pension). While we lack estimates on the proportion of workers with 401k or other defined contribution funds invested in their firm, estimates of the proportion of 401k assets in company stock hover around 20%. On the basis of these figures, roughly 11% (= .55 x 20) of retirement pay depends on company shares. Absent
better information, we assume that this is about the proportion of workers who depend substantially on company shares for retirement pay.

Because workers who receive one form of shared compensation may also receive another form, we cannot add these separate estimates together to obtain the proportion of the workforce whose compensation depends on company performance. We must subtract the proportion with an overlap in coverage. Making such an adjustment, we estimate that about 45% of workers have a substantial portion of their pay varying with company or group performance.

2.2 The Growth of Financial Sharing

Figure 1 shows that the forms of variable pay have been increasing rapidly. The proportion of private sector employees with ESOPs rose from 0% in 1975 to 4% in 1980 to 8% in the 1990 but then stabilized in the 1990s. By contrast, the proportion receiving stock options rose exceptionally rapidly in the 1990s. A William Mercer company study found that the proportion of firms granting options more than doubled between 1993 and 1998. Figures for large electronics firms show a fourfold increase between 1994 and 1997. The rapidity with which firms adopted stock options during the nineties was striking. In 1998 26% of the Inc magazine 500 fastest growing privately held firms offered options to workers; in 1999, the figure had risen to 39%. A Federal Reserve Board Survey of 125 large firms found that 23% had introduced stock option programs for regular employees between 1996 and 1998, while 37% had broadened the eligibility

\(^3\)See NCEO, Employee Ownership Report Jan/Feb 2000, p 10
of their existing program. Profit or gain sharing plans also seem to have grown over the period, at least among large firms. The 45% of Fortune 1000 firms that reported profit/gain sharing systems in 1995 was up from 26% in 1987. Finally, fixed contribution pension plans grew in the 1990 as well. Assuming that the extent of investment in company stock fell less rapidly or did not fall at all, more workers had part of their retirement income tied to company performance.

In short, although measures of variable compensation are incomplete, there is no gainsaying that shared compensation mechanisms linking rewards to firm or group economic performance rose in the 1990s and to some extent in the 1980s as well.

2.3 Shared Compensation System, Employee Involvement, and Other HR Policies

Over roughly the same time period that compensation practices have been changing, employee involvement committees, teamwork, and other forms of empowering workers have become the cutting edge of labor relations in the US. Freeman, Kleiner and Ostroff’s (2000) analysis of firms found a very large increase in the number using various forms of employee involvement activity between 1983 and 1993. Osterman’s 1994 survey of establishments found that 55 percent used work teams, 34 percent had Total Quality Management (TQM), and 41 percent had quality circles, with most introduced in the late 1980s/early 1990s. In the Workplace Participation and Representation Survey (WRPS) that provides most of the data for this study, one-third of workers in firms with

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over 50 employees reported that they served on employee involvement committees, defined broadly to include TQM, QC, and related groups; and 55 percent reported that their firm had such committees (Freeman and Rogers, 1999).

To what extent if at all are the forms of financial sharing and employment involvement related? How are they linked to other modern human resource and personnel policies?

Table 2 presents data from the WRPS on modes of compensation and shared decision-making through employee involvement committees. With respect to compensation, the survey contained two questions on sharing through financial ownership and two questions on sharing through receipt of bonuses based on company/group performance:

On your main job do you ...

- Participate in an employee stock ownership or ESOP plan?
- Work in an employee-owned company?
- Receive any bonuses based on profit sharing?
- Receive any bonuses based on meeting workplace goals?

Because the WRPS did not ask detailed questions about these modes of financial sharing -- for instance distinguishing 401k plans or stock purchase plans -- nor differentiate between gain-sharing and individual bonuses, the data undoubtedly suffer from measurement error. Still, aggregated into broad categories, it provides a reasonably good indicator of the proportions of workers covered by performance pay or ownership plans.
The first column of Table 2 records the distribution of non-managerial workers according to their modes of compensation. It shows that 54% of the sample reported at least one of the variable forms of compensation, and that the two incentive-based systems of pay were more common than the ownership-based systems. The figures for ESOPs and ownership and for incentive bonuses are higher than those in Table 1 (in part perhaps because the WRPS covers larger firms), with the result that the proportion of workers covered by at least one form of shared compensation exceeds the estimate in Table 1. The final line in Table 2 records the proportion of non-managerial employees who serve on employee involvement committees: 29.9%. Since the WRPS contained a full module on these committees, and asked workers various details about how the committees operated and what they thought about them (see Freeman and Rogers, 1999, chapter 4), this is likely to be a reasonably accurate measure.

The WRPS confirms the prediction that employee involvement programs will be closely tied to financial sharing arrangements. The second column in Table 2 gives the percentage of workers on EI committees who are paid with different forms of variable pay while the third column gives the percentage of workers who are not on those committees paid by the same forms. Overall, 66% of workers on EI committees have some form of shared compensation compared to 34% of workers who are not on those committees. A similar pattern is found for each of the individual forms of pay. The difference in the distribution of compensation between workers with EI and those without EI are statistically significant in this univariate comparison, and remains so in analyses that control for diverse covariates.
Figure 2 shows the complementarity among the number of forms of shared compensation and employee involvement from a different perspective. It treats incentive pay, financial sharing, and shared decision-making as similar descriptions of workplaces and contrasts the proportion of workers having various combinations of these systems with the proportion that we would expect if the probability of having the different forms was an independent draw from separate urns. Over twice as many workers report having all three forms than predicted, and more workers have neither financial nor incentive systems nor EI committees than would be expected. The concentration of values at the two extremes is consistent with the hypothesis that these forms of workplace organization and compensation are complementary.

What are the characteristics of workers and firms with shared compensation systems and employee involvement activity? Table 3 records the proportion of workers with various demographic characteristics in the entire sample and in two polar cases: workers who have an ownership stake, profit/gain-sharing, and shared decision-making through EI committees; and workers with none of the systems. The general pattern is clear: workers at companies with shared decision making and compensation systems are better educated, are twice as likely to be in the upper quartile of the wage distribution, are more likely to be male, and are more than twice as likely to be salaried than workers with none of the shared systems. In addition, the workers with all three forms of sharing are disproportionately professionals, sales workers, and skilled trades persons, and are disproportionately employed in manufacturing and finance, insurance, and real estate, and in larger firms. Workers with all three forms are twice as likely to be in firms with
over 1000 employees than those without any of these programs. The bottom part of Table 3 shows that firms that share financial rewards with employees and whose workers are on EI committees also tend to have other “good” labor practices: personnel policies, open door policies, town meetings and employee committees beyond EI committees.

3 Relation to outcomes

To what extent do shared compensation practices and employee involvement activities affect worker attitudes and behavior? To measure the potential effect of compensation and involvement activity we chose seven variables from the main body of the WRPS and two variables from the second wave of the survey\(^5\). We examined the relation between these variables and outcome measures of productivity-enhancing work, satisfaction with workplace relations, and attitudes toward the company.

The most problematic outcome measures relate to productivity. Since the WRPS is an employee survey, it provides no data on actual productivity, so we rely instead on worker reports of productivity-enhancing activity. (Section 5 revisits this issue using firm-level indicators of performance.) The survey asked workers how often they made productivity related suggestions and how often these suggestions are heeded by the management. Responses followed a four point scale, from least (1) to most (4) on both questions. We took the product of these two responses as the first measure of productivity-enhancing activity. The survey also asked workers how much influence

\(^5\)One-third of the WRPS respondents were asked a short follow-up set of questions, constituting a smaller second wave sample. See Freeman and Rogers (1999).
they exercise over workplace practices, which forms our second measure. Finally, the second wave of the survey asked workers to rate fellow employees on their concern for the success of the company and willingness to take on new responsibilities and to work hard using a school grade scale (from A to E). This “peer evaluation” forms our third measure. These three measures are broadly informative about the extent to which workers engage in productivity-enhancing activities at their workplace.

To determine how workers feel about their job, we selected four variables: whether they looked forward to going to work in the morning at one end versus wishing they didn’t have to go at the other end; their assessment of labor-management relations at their firm, their satisfaction with the influence they had at their workplace; and how they graded their managers on management’s treatment of employees using the school grade scheme. We chose these variables to investigate whether packages of shared compensation and decision-making create a work atmosphere where workers feel that their voice is heard and are treated fairly.

To measure the general attitude that workers have towards their firm, we took two questions: one on the “loyalty” workers felt toward the firm and the other on the degree of “trust” they had in the firm carrying out its promises to workers.

Finally, as a broad summary statistic, we constructed a single average outcome measure that includes three of our sets of variables: productivity indicators, workplace satisfaction, and attitude toward the firm. This average outcome provides a concise measure for assessing relations in the data.
Our “productivity related” measures offer one gauge of how employee behavior and firm’s profitability might be affected by shared compensation and decision-making structures. However, work satisfaction and attitude towards the company may also be economically relevant outcomes. For instance, Bartel et al. (2003) finds that workplace attitudes at different branches of a bank produced very different economic outcomes on turnover, sales, branch closings. Therefore, we think that all of these measures may be informative indicators of how compensation and decision making structures affect firms’ decision making.

What might we be able to conclude from relating these diverse measures of outcomes to the use of shared compensation and shared decision-making practices? Because shared compensation/EI practices are not randomly assigned to firms, the correlations in the data could arguably reflect omitted variables that affect both the decision of firms to adopt certain compensation/EI systems and that affect outcomes. Substantively, the problem is that “good firms” are likely to have both worker friendly practices and policies and have workers who are reasonably satisfied with conditions, and may be more likely to attract and retain more productive workers as well. One way of treating this problem is to include in regressions a large number of covariates that measure labor relations policies beyond those of interest to us. These covariates provide one form of control for the firm being “good.” Following this strategy, in the regressions, we include measures of the labor relations practices of a firm toward workers as a group and toward workers as individuals as well as measures of the personal characteristics of workers (demography,
occupation) and the characteristics of their firm (size, industry). Moreover, our measure of labor relations policies is based not only on the presence of particular policies at the firm, but also on workers’ assessment of their effectiveness. That is, we give the highest score when firms have many practices that workers view as effective and lower scores when firms have few practices or when workers view their practices as less effective. With these measures of human resource practices in the equation, our estimates attribute to the shared compensation and decision-making variables only the portion of the outcomes above and beyond those associated with these other attributes of firms. In section 4.1, we will deal with the “good firm” effect in a different manner.

### 3.1 Basic Findings

Table 4 reports the coefficients from a regression of our overall outcome measure on the forms of compensation and employee involvement, and an extensive set of covariates. The performance pay (PP), employee involvement (EI), and ownership stake (OS) variables have substantial statistically significant effects on the average outcome. This is above and beyond the effect of the two human resource variables, which are themselves highly correlated with positive outcomes. In addition, the data provide some support for a complementary relation among the shared systems variables and the average outcome. We tested for complementarities by including interaction terms in the regressions – i.e., a term for the presence both of an ownership stake and employee involvement committee, a

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6 The term “good” is only being used as a shortcut for a firm having a set of practices that tend to produce a higher level of outcome in terms of worker satisfaction and participation.

7 Questions on the labor relations policies can be found in Freeman and Rogers (1999).
term for ownership and profit/gain-sharing, etc. Statistical tests reject the null hypothesis that there is no added effect on outcome from complementarity between PP and EI at the 6% level and reject the null of no interaction effects between PP and OS and EI and OS at weaker levels (15-21%).

To examine the interactive effects of these variables on outcomes in a more direct manner, we replaced the measures of each separate policy with mutually exclusive variables representing each possible combination of practices, and regressed outcome variables on this new set of independent variables. Table 5 gives the regression coefficients on dummy variables representing all the combinations of EI, Ownership, and Performance Pay. Here, EI means “EI only,” “P” means “Performance Pay only,” “P, EI” means “Performance Pay and EI” and so on. The first line of the table gives the coefficients on these variables on our overall outcome measure. Succeeding lines give coefficients on separate outcomes grouped into our three categories.

The calculations show that EI has a substantial and statistically significant link to all outcomes, whereas the compensation variables by themselves have limited importance. But the threefold combination of EI, ownership and performance pay is always statistically significant and represents the numerically largest value in the overall outcome regression and in all of the regressions for separate outcomes save one. The complementarity between shared compensation and decision making system both in terms of outcome and in terms of incidence lends strong support to the hypothesis that systems work best in tandem, and that they influence employee behavior.
The regression for the average outcome in Table 5 also shows that while shared decision making structures have an *independent* effect on outcomes, the impact of compensation practices appears to be *contingent* on such decision making structures. The firm has to empower workers to make decisions if it expects to gain from shared compensation and ownership structures, consistent with the hypothesis that such shared compensation schemes actually have incentive effects.

Looking at the underlying variables, we see that the presence of EI is critical for any significant effect of practices on productivity related measures – the variable to which management presumably pays most attention. Complementary compensation variables boost the productivity indicators only when coupled with EI decision-making structure. To recapitulate, these variables include productivity related suggestions, peer rating of effort, and the extent of influence in productivity decisions. In contrast, attitudes toward companies are affected by shared compensation structures that include both *ownership* and *performance pay* separately from EI. Finally, worker satisfaction variables display mixed results: decision-making structures (EI) always matter, and compensation structures matter independently for some but not all variables. In all cases, however, the combination of EI, ownership, and performance pay is always significant and quantitatively greater than individual effects (and often greater than the sum thereof).

The human resource policy variables entered significantly in all of our regressions, so that our results on shared compensation and decision-making systems are an “add on” effect. To what extent do the shared compensation and decision-making systems increase the efficacy of the human resource policies themselves? The WRPS asked workers about
the effectiveness of four group-based HR policies: town meetings, open door policies, employee committees independent of EI, and about HR policies toward individuals as a group. Table 6 regresses workers’ assessment of the effectiveness of these programs for workers who have the programs on our shared compensation and decision-making variables, and a full set of demographic and company controls.

We find that both EI and complementary compensation policies substantially improve the efficacy of the human resource policies, with a pattern quite similar to that found for the outcome variables in Table 5. Since our measure of HR policies in those regressions included a weighting of the variables by their effectiveness, at least part of the effect credited to HR policies might be due to the fact that compensation and decision making structures increased their effectiveness.

4 Robustness of Findings

In this section, we will address two concerns that might limit the validity of the results above. The first one involves selection on unobservables, and the second one involves issues of specification biases and comparability of individuals/companies with and without the programs that are being evaluated.

4.1 Selection on Unobservables

Although we try to control for the “company effect” by proxies for human resource and personnel policies, it is always possible that there is an unobservable latent variable that is correlated with the EI and compensation policies. Moreover, this might misleadingly produce significant coefficients on these policy variables, when really they
are picking up the impact of the latent “company effect.” Ideally, we would use some exclusion restrictions (variables which impact the incidence of the policies without directly impacting outcome) to engage in selection correction. However, we do not believe any of our variables can be credibly used for such purposes. Instead, we follow a different route, exploiting the fact that we have multiple outcomes for each person.

Imagine there is a single latent factor – the “company effect” – which is correlated with the policy variables (EI, profit-sharing, etc...). We could then examine the effect of the policy variables on our productivity measures, net of the composite worker satisfaction variable. This is a particularly strong test of the relation between the shared policies and outcomes. To the extent we expect the general or attitudinal outcomes (such as company loyalty, job satisfaction, and worker-management relations) to more likely reflect an omitted “company effect,” using those variables as controls will better isolate the impact of EI and compensation structures on the productivity outcomes. Effectively, we credit all the impact of EI and compensation structures on the attitudinal outcomes to “good company” effects by including them as controls in the regressions on productivity measures. This produces a lower bound in terms of the effect of EI and compensation structures on productivity related outcomes.

However, simply including the attitudinal outcomes as regressors do not allow us to recover a lower bound. To see this, consider the following model with a single latent factor. $Y_{1i}$ is the productivity variable, and $Y_{2i}$ is the overall worker satisfaction variable. $a_i$ is the latent company effect; $X_i$ is the vector of controls.

\[ Y_{1i} = b_1(X_i) + g_1 D_i + (c_1 a_i + e_{1i}), \quad Y_{2i} = b_2(X_i) + g_2 D_i + (c_2 a_i + e_{2i}) \]
Our single factor model allows $F(a_i, X_i)$, $F(a_i, D_i)$, $F(e_{i1}, e_{i2})$ to be arbitrary. But we assume that $e_{ji} \perp D_i$ and $F(e_{ji} | X_i, D_i) = F(e_{ji} | X_i)$. In other words, we are assuming that there is a single unobservable factor that might be correlated with the treatment status, $D_i$, but that the residual error is uncorrelated with treatment status. Moreover, the joint distribution of the measurement error term $e$ and the covariates $X_i$ is independent of the treatment status.

By substituting the second equation into the first, we have the following:

$$Y_{1i} = (b_1 - (c_1/c_2)b_2)X_i + (c_1/c_2)Y_{2i} (g_1 - (c_1/c_2)g_2)D_i + (e_1 - (c_1/c_2)e_2)$$

If we simply ran $Y_1$ on $X$, $Y_2$ and $D$, we would not recover the desired lower bound $g_1 - (c_1/c_2)g_2$ because our regressor $Y_2$ is correlated with the error term $e_1 - (c_1/c_2)e_2$.

Netting the productivity measures of the overall job satisfaction involves a two-step procedure. The first step uses moment restrictions implicit in the single factor model to identify the relative importance of the latent factor on the various outcomes. The second step uses this to “net out” the latent factor. The formal derivation of this can be seen in the Dube (2003). Here we only provide the basic description of our method.

First note that if we knew $c_1/c_2$, then we could run the following regression:

$$Y_{1i} - (c_1/c_2)Y_{2i} = (b_1 - (c_1/c_2)b_2)X_i + (g_1 - (c_1/c_2)g_2)D_i + (e_1 - (c_1/c_2)e_2)$$

This would indeed allow us to recover a lower bound on $b_1$, i.e., $(g_1 - (c_1/c_2)g_2)$. However, since we do not know $(c_1/c_2)$, we have to estimate it in another step. Under the assumptions about the covariance structure invoked above, it can be shown that:

$$(c_1/c_2) = \left( \frac{[V(Y_{1i}|X,D=1) - V(Y_{1i}|X,D=0)] / [V(Y_{2i}|X,D=1) - V(Y_{2i}|X,D=0)]}{V(Y_{1i}|X,D=1) - V(Y_{2i}|X,D=0)} \right)^{1/2}.$$ 

We estimate the equation above to recover $(c_1/c_2)$ in step one, which is then used to estimate the primary regression to recover a lower bound on $b_1$, i.e., $(b_1 - (c_1/c_2)b_2)$. 

Because \((c_1/c_2)\) is itself estimated, the OLS standard errors in the primary regression are not valid. Therefore, we use bootstrapped standard errors for this estimation.

The results from this are reported in Table 7. Note that we used the same “average productivity” and “average satisfaction” composite variables here as we did in the last section. We find that even attributing all the job satisfaction to a “latent variable” does not eradicate the significance of the EI and EI,P,O categories in predicting productivity outcomes. Put it another way, it is the case that the policies have an impact on productivity outcomes over and beyond their impact on worker satisfaction.

Numerically, the EI,P,O category continues to be larger than EI in isolation, supporting the assertion that the compensation variables mattering conjunction with EI. This gives us confidence that the results in the previous section are not merely driven by an omitted variable bias. Of course, this finding does not establish, beyond all reasonable doubt, that these policies have tangible effects on the productivity outcomes noted here. Rather, this single omitted factor model should be viewed as the toughest hurdle that we could set up regarding unobservables – and the main results seem to pass it.

4.2 Robustness to Specification and Comparability of Control Groups

Given the complementary nature of the personnel-policies, employee involvement programs, and compensation schemes, one might worry about specification biases. The covariates include individual and company information that might (1) enter into in a nonlinear fashion or (2) interact with the policy variables (i.e., compensation and EI variables). Moreover, if the impact of the covariates differs by the policy variable, then credible identification of the treatment effect requires a sample that has sufficiently
overlapping covariates for observations with and without the policy. Unfortunately, the linear regression provides little information about whether the measured impact of a program arises from comparing observationally similar companies with and without certain programs, or whether it estimates the impact largely through extrapolation between two non-overlapping groups. We could, in principle, do the analysis fully non-parametrically. But given the number of control variables, this would be a difficult task. Instead, we use propensity scores to construct a single measure of the control variables, and then compare the program’s effect within stratum where the propensity scores are similar. Intuitively, this constructs “control groups” which have similar covariates to control for disparate impacts of EI and compensation policies. The way in which the propensity score method can assuage these fears can be stated more rigorously. Consider the following relationship:

\[ Y_{1i} = b_1(X_i, D_i) + g_1 D_i + e_{1i} \]

What we are interested in is estimating the conditional expectation function, and seeing whether companies with the same covariates \( X_i \) have outcomes \( Y_{1i} \) that differ by treatment status (i.e., \( D_i \)). Assume that \( e_{1i} \) is a well-behaved error term with all the usual properties. One could use OLS to estimate this model with interaction terms. However, consider the following possibility. Say that the covariates \( X_i \) for the two categories of observation (\( D_i = 1, 0 \)) are completely non-overlapping. Then identification of the treatment effect fully relies on extrapolation of the data to cover the range of the covariates. Propensity score techniques enable us to do two things that show the robustness of the results. First, it allows the researcher to see how much overlap there is
in the covariates for practical purposes. Second, it allows the interactive effects described above. Estimation involves collapsing the covariates into a single function – the propensity score, which is the probability of treatment given the covariates. As demonstrated in Rubinstein and Rubin, the outcome conditional on the propensity score is stochastically independent of the covariates. In other words,

\[
\sum_{p(X)} (E(Y_{i1} | p(X), D=1) - E(Y_{i1} | p(X), D=0))w(p(X)) =
\sum_{p(X)} (b_1(X_{i1}, D_i=1) - b_1(X_{i1}, D_i=0) + g_1)w(p(X)) =
\]

\[
g_1 + E_X(b_1(X_i, D_i=1) - b_1(X_i, D_i=0))
\]

Here the propensity score recovers the average treatment effect – the “pure effect” \( g_1 \) as well as the interactive effect through the covariates. (Note that this does attribute all the interactive effect to the treatment policy.) Moreover, we can directly observe whether there is enough overlap in observations with respect to propensity scores (and hence the covariates) such that this analysis is credible. Since the estimator is a weighted average of within-propensity-score differences in mean outcomes, it only compares “similar companies” in coming up with the treatment effect estimate. Without sufficient overlap, the estimator will tend to be insignificant.

To empirically implement this propensity score estimation, we use a probit in the first step to estimate the propensity score for each of the following three “treatment” variables – EI only, P,O only, and EI,P,O. For each of these three cases, propensity score strata are created, and we check to see if the covariates are balanced. Subdivisions are made for strata where propensity scores are not balanced until they are so. The “treatment effect” is estimated as the mean within-strata difference in outcome. Table 7 reports the
propensity score estimates of three of the policy categories – EI only and EI,P,O. We find that the propensity score based coefficients are (1) quite similar to the coefficients using OLS, and (2) are statistically significant at the 10% level for EI and EI,P,O combinations. Again, this gives us confidence that the effects found in section 3 result from credible extrapolations. The results continue to hold when we look at differences between similar groups of companies – i.e., groups that have the same mean covariates. Again, this increases our confidence that shared compensation and decision-making policies have real impacts on worker contributions to company performance.

5 Evidence from Establishment Data

The worker survey results show that employee involvement programs (especially in conjunction with shared compensation schemes) seem to be associated with attitudinal variables such as satisfaction, effort and influence. However, whether these actually translate into better company performance is harder to discern. In this section, we use establishment level data on compensation and decision making systems to assess impact on more directly measured firm performance outcomes.

Our data comes from the 2003 California Establishment Survey (CES). This is a dataset of private sector California businesses designed by the UC Berkeley Institute of Industrial Relations, and conducted by the UC Berkeley Survey Research Center between May and October of 2003. The sample included private and non-profit establishments with five or more employees in California. Government agencies, public schools or
universities, and agriculture, forestry and fishing industries were excluded. The unit of observation was an establishment (in other words, a single physical location at which employees work and business is conducted), not an employer or business. A total of 2,806 establishments were sampled, with 2,200 meeting the eligibility criteria. The response rate was 49.1 percent, giving an overall sample of 1,080 establishments.

The CES asked responding establishments a host of questions on organizational and compensation practices, including the use of “employee involvement” programs such as quality circles and quality management programs, as well as questions regarding use of shared compensation schemes—i.e, stock ownership (ESOP and stock options) and profit sharing. The categories on ownership and performance pay are not exactly the same as in WRPS: the CES asks questions about stock options (besides ESOP’s), but not whether the companies are employee owned; and with regards to performance pay, the CES only asks questions on profit sharing and not gain sharing or bonuses. Finally, it should be kept in mind that the establishments being surveyed are only in California, and that there is a nine year gap between the two surveys.

Table 8 reports the distribution of the extent of use of profit-sharing and stock ownership schemes in the CES. The summary statistics are weighted by firm size, to produce the proportion of overall workforce in these programs. The CES shows a somewhat higher use of EI program (35.9% of workers versus 29.9% in the WRPS – first column of Table 2). The extent of profit sharing is somewhat lower in the CES, (21.6% as opposed to 26.2% in the WRPS), though comparing with Table 1 (25%), the figure is similar. The extent of ESOP is considerably lower in the CES (10.7% versus 23.0% in
WRPS), though again, it is much closer to the 8% figure from NCEO (Table 10). Another 11.0% of workers in companies surveyed in the CES participated in stock option plans, similar to the NCEO figure of 8% (Table 10). Overall, the incidence of EI in the CES is somewhat larger than that in the WRPS, while the shared compensation figures are somewhat lower—though they are similar to other establishment level sources.

Although we don’t report the results here, the incidence of EI is correlated with both profit sharing and ownership schemes in the CES (in the sense of chi square tests). This suggests that the similar pattern in the worker survey likely reflected establishment and not just worker level characteristics.

The CES also allows us to test whether the compensation and decision making schemes are associated with better establishment level outcomes. The CES includes companies’ self-reported assessments on the extent of employee decision-making, as well as assessments on product/service quality and financial performance. To be precise, these are self reported scores on a 1 to 4 scale, and are qualitative in nature. To assess the impact of compensation and decision-making systems on establishment-level outcomes, we regress the same set of disaggregated combinations of EI, Ownership (ESOP or stock option ownership), and Performance Pay (profit sharing) variables as before on these three outcomes. We also estimate the impact of these systems on employee turnover—which partly captures the degree of job satisfaction. The regressions include controls on firm size, age of establishment, two-digit level industry dummies, four-part occupational distribution (share of workforce that is managerial, clerical, sales,
or blue-collar), share of workforce with college degrees, and share with collective bargaining contracts.

Table 9 reports the results from our establishment level regressions. The first row shows that a formal EI program is associated with greater amount of employee decision-making, which is not surprising. The combination of performance pay, ownership and formal EI program registers the highest mark on worker decision making, though the differences are numerically small. When it comes to performance on quality and financial performance, the combination of EI and some type of shared compensation leads to the most positive (and statistically significant) outcomes. A final piece of evidence comes from our estimate of how these systems affect turnover (fourth row in Table 9). EI generally tends to reduce employee turnover; and the combination of ownership, performance pay and EI is associated with lower turnover than other configurations, and is statistically significant at conventional levels.

In sum, the results in this section are consistent with our evidence from the worker survey, and provides further support to the notion of a complementarity between shared compensation and decision-making systems in producing increased participation and productivity at the workplace.

6 Why do Firms Use Shared Compensation and Decision-Making Systems?
Using a worker survey, we found strong evidence that various shared compensation and decision-making systems tend to go together – firms using one tend to use the other as well. Moreover, we found fairly strong evidence that presence of shared compensation systems seems to make programs for employee involvement more successful. Both EI and shared compensation systems seem to encourage employee inputs into production decisions as well as general employee satisfaction. There is significant complementarity between shared decision making and compensation in terms of their impact on the outcomes – which is consistent with the hypothesis that shared compensation system actually have impact on economic incentives. This impact appears to be robust to some forms of unobserved “firm effects” as well as comparability of reference groups.

Finally, we report evidence that when shared compensation and decision-making systems are in place, firms report superior outcomes in product quality, financial performance, as well as employee turnover. The analysis here is correlational, and we are not utilizing exogenous variations in these systems as we estimate the impact on outcomes. Nonetheless, the evidence on worker attitudes combined with evidence on firm performance suggests that shared compensation schemes affect employee behavior in a real way, and are used for such purpose by firms. That being said, there are other contending explanations behind these patterns, and here we discuss some possible candidates.

One possible explanation for the growth of shared forms of pay is that the tax system has privileged them. Taxation can greatly affect the way firms pay workers, but tax factors do not explain the bulk of the rise of variable pay related to company
performance. Deferred profit-sharing and pension plans that give workers ownership stakes in their firm defer taxes until the funds are received at retirement, but they do not differ from other pension plans. There are no special tax incentives for profit sharing or gain-sharing, and stock options are taxed when exercised at income or capital gain rates similar to other assets. While tax advantages spurred the growth of ESOPs, the US Treasury has eliminated many ESOP tax incentives, with the major remaining incentive being that company owners can avoid capital gains taxes on shares sold to an ESOP. In Japan, ESOPs have grown without any tax advantages at all (Kato, 1999).

It is true that some businesses seem to have taken advantage of lax accounting rules for expensing options, especially during the stock market boom. Many companies are now voluntarily expensing option grants, and this makes them less attractive to management. Moreover, new accounting rules are being proposed which would mandate such expensing. Whether broad based stock options continue as a major compensation form in this new environment is an open question, though evidence from California shows that even in late 2003, around 11 percent of the workforce received some stock-option based compensation. However, profit-sharing, gain sharing and stock ownership do not depend on such accounting issues, and their prevalence suggest that shared compensation systems have some underlying value.

If legal reasons do not explain the rise of the new forms of compensation, presumably the competitive market favors them. From the firms’ perspective, the various forms of shared compensation seem positively related to productivity, though with a wide dispersion of results. Research on profit-sharing has found that it is associated with a
productivity advantage of 4-5%; employee ownership raises productivity by less, with the largest gains taking place within smaller firms (Kruse). Employee involvement programs have smaller and more variable effects, and seem to work best in union settings (Ichniowski, Shaw, Prennuchi; Lynch and Black; Freeman and Kleiner, Capelli and Neumark). Most case studies find that gain-sharing has positive effects on group performance (Collins, 1998: 16-17).

In net, the findings of this paper add weight to the argument that shared compensation is used at least partly to affect employee behavior, and hence for real as opposed to merely accounting reasons. Along this line, it seems reasonable that employee “empowerment” and compensation tied to company performance go together – both in terms of incidence and in terms of employee actions. However, as we said previously, a finding that compensation pegged to company wide performance affects individual behavior is difficult to explain with standard economic theory. Our establishment level evidence suggests that the attitudinal and behavioral effects we found in the worker survey may translate into greater output or profits for the firm, though it is difficult to quantify the extent of such gains without better data. Moreover, other researchers have found that as a general matter, employee attitudes do seem to affect productivity (e.g., Bartel et. al). In the final analysis, our findings point to possible importance of “collective incentives” and “corporate culture” in determining employee activity, and point to the inadequacy of existing theories of incentives and firm organization.
Tables and Figures

Figure 1: Growth of Shared Compensation Systems

- **Percentage of Wage and Salary Workers With ESOPS**
- **Percentage of Fortune 1000 Firms with Profit/Gain Sharing**
- **Percentage of 350 Major Firms Granting Broad Based Stock Options**
- **Percentage of Full Time Workers With 401K Plans**

SOURCE: ESOP Employees from NCEO Employee Ownership Report, Jan-Feb.'00, p.9; Broad Based Stock Options: from Mercer&Co. Executive Compensation Research Topics RT#10 - May26, 1998, p.5; Fortune 1000 Firms with Gain/Profit-Sharing from Employment Policy Foundation "US Wage and Productivity Growth," 1998; Workers with 401K plans from US Statistical Abstract, 1999, Table 622
Figure 2: The Distribution of Shared Compensation and Decision-Making Systems

SOURCE: Calculated from WRPS (Workers Representation and Participation Survey). The predicted values treat the proportion of workers with each of the shared systems as independent events. Thus, if 1/2 of the workers had an EI system and 1/10th had some ownership, the predicted proportion with both systems would be 1/20th, the predicted proportion with neither system would be 9/20ths and the predicted proportion with only one of the two would be 1/2. The actual proportions are taken directly from the data.
Table 1: Percentage of Employees/Firms With Pay Related to Company/Group Performance

<table>
<thead>
<tr>
<th>Stock Ownership Programs</th>
<th>25% of nonagricultural work force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit or Gain Sharing</td>
<td>25% of US work force</td>
</tr>
<tr>
<td>Defined Contribution Pension Funds Invested heavily in Company Stock</td>
<td>11% of US work force</td>
</tr>
<tr>
<td><strong>Total With Any Form of Shared Compensation adjusted for overlap</strong></td>
<td><strong>45% of US work force</strong></td>
</tr>
</tbody>
</table>

SOURCE: For details, see Table 10.

NOTE: If workers were covered by only one form of variable pay, our estimate would be the sum of the estimates for the bold categories in the table: 61%, of which 50 percentage points consists of ownership and incentive pay. But there is considerable overlap in coverage. On the basis of the the WRPS figures in table 2, we estimate that the proportion of workers with any form of performance pay and ownership exceeds the sum of the proportions covered by each form separately by 33% = (41.9+29.6)/53.8. Thus, we reduce the 50% to 38%. We do not have data on the overlap with the estimated 11% of workers with 401k or other plans with sizable amounts of company shares, but anticipate that this will be modest, giving us the 45% in the text.

Table 2: Complementarity between EI and New Compensation Structures in Incidence

<table>
<thead>
<tr>
<th></th>
<th>Full Sample (%)</th>
<th>With EI (%)</th>
<th>Without EI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Compensation Structure</td>
<td>53.8</td>
<td>66.1</td>
<td>33.9</td>
</tr>
<tr>
<td>Performance Pay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit Sharing</td>
<td>41.9</td>
<td>53</td>
<td>37</td>
</tr>
<tr>
<td>Gainsharing</td>
<td>28.9</td>
<td>39.9</td>
<td>24.1</td>
</tr>
<tr>
<td>Ownership</td>
<td>26.2</td>
<td>32.8</td>
<td>23.3</td>
</tr>
<tr>
<td>ESOP</td>
<td>29.6</td>
<td>40.2</td>
<td>25</td>
</tr>
<tr>
<td>Employee Owned</td>
<td>23</td>
<td>34.5</td>
<td>18</td>
</tr>
<tr>
<td>Employee Involvement</td>
<td>11.2</td>
<td>13.1</td>
<td>10.4</td>
</tr>
</tbody>
</table>

SOURCE: WRPS Survey, in What Workers Want. For exact wording of relevant WRPS questions, see Appendix B1.
Table 3a: Demographic, Occupational and Industrial Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Full Sample</th>
<th>Nothing</th>
<th>Everything (P,O,E1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Educ.</td>
<td>0.26</td>
<td>0.21</td>
<td>0.35</td>
</tr>
<tr>
<td>High Wage</td>
<td>0.24</td>
<td>0.19</td>
<td>0.38</td>
</tr>
<tr>
<td>Male</td>
<td>0.54</td>
<td>0.50</td>
<td>0.64</td>
</tr>
<tr>
<td>Salaried</td>
<td>0.31</td>
<td>0.22</td>
<td>0.46</td>
</tr>
<tr>
<td>Age</td>
<td>37.81</td>
<td>36.27</td>
<td>38.39</td>
</tr>
</tbody>
</table>

**Occupations:**
- Professional: 0.24 (P), 0.20 (O), 0.27 (E1)
- Clerical: 0.19 (P), 0.20 (O), 0.14 (E1)
- Sales: 0.10 (P), 0.07 (O), 0.16 (E1)
- Manuf. Representative: 0.03 (P), 0.01 (O), 0.04 (E1)
- Service Worker: 0.10 (P), 0.14 (O), 0.04 (E1)
- Skilled Tradesman: 0.15 (P), 0.15 (O), 0.17 (E1)
- Semi-skilled Worker: 0.10 (P), 0.11 (O), 0.10 (E1)
- Laborer: 0.09 (P), 0.11 (O), 0.08 (E1)
- Other: 0.01 (P), 0.01 (O), 0.01 (E1)

**Industries:**
- Agricult./Forestry/Fishing: 0.02 (P), 0.02 (O), 0.02 (E1)
- Mining: 0.01 (P), 0.01 (O), 0.0 (E1)
- Construction: 0.05 (P), 0.06 (O), 0.04 (E1)
- Manufacturing: 0.27 (P), 0.23 (O), 0.39 (E1)
- Transport/Public Utilities/Communications: 0.09 (P), 0.06 (O), 0.08 (E1)
- Wholesale Trade: 0.05 (P), 0.04 (O), 0.05 (E1)
- Retail Trade: 0.16 (P), 0.18 (O), 0.12 (E1)
- FIRE: 0.08 (P), 0.06 (O), 0.16 (E1)
- Health Services: 0.11 (P), 0.13 (O), 0.06 (E1)
- Business Services/Law: 0.07 (P), 0.07 (O), 0.05 (E1)
- Educational, social services/membership org.s: 0.05 (P), 0.09 (O), 0.01 (E1)
- Hotels: 0.01 (P), 0.02 (O), 0.01 (E1)
- Amusement/Recreation Services: 0.00 (P), 0.01 (O), 0.00 (E1)
- Personal Services: 0.01 (P), 0.01 (O), 0.00 (E1)
- Misc.: 0.00 (P), 0.00 (O), 0.00 (E1)
- Other: 0.01 (P), 0.01 (O), 0.01 (E1)
- No Answer: 0.02 (P), 0.02 (O), 0.01 (E1)

SOURCE: WRPS, What Workers Want. For full distribution, see Appendix Tables A1 and A2.
### Table 3b: Firm Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Full Sample</th>
<th>Nothing</th>
<th>All programs (EI, O, P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Size:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;25</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>25-99</td>
<td>0.21</td>
<td>0.27</td>
<td>0.09</td>
</tr>
<tr>
<td>100-499</td>
<td>0.25</td>
<td>0.27</td>
<td>0.21</td>
</tr>
<tr>
<td>500-999</td>
<td>0.11</td>
<td>0.10</td>
<td>0.09</td>
</tr>
<tr>
<td>&gt;1000</td>
<td>0.44</td>
<td>0.36</td>
<td>0.60</td>
</tr>
<tr>
<td>Personnel Dept</td>
<td>0.71</td>
<td>0.61</td>
<td>0.87</td>
</tr>
<tr>
<td>Open Door Policy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Individual)</td>
<td>0.87</td>
<td>0.81</td>
<td>0.92</td>
</tr>
<tr>
<td>Grievance Procedure</td>
<td>0.36</td>
<td>0.34</td>
<td>0.44</td>
</tr>
<tr>
<td>Town Meeting</td>
<td>0.49</td>
<td>0.34</td>
<td>0.76</td>
</tr>
<tr>
<td>Open Door Policy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Groups)</td>
<td>0.66</td>
<td>0.56</td>
<td>0.83</td>
</tr>
<tr>
<td>Employee Committee</td>
<td>0.40</td>
<td>0.28</td>
<td>0.61</td>
</tr>
</tbody>
</table>

SOURCE: WRPS, *What Workers Want*. For full distribution, see Table 3.9.

### Table 4: Linear Effects of EI, Performance Pay, and Ownership

<table>
<thead>
<tr>
<th></th>
<th>EI (Individ.)</th>
<th>P</th>
<th>O</th>
<th>HR (Indiv.)</th>
<th>HR (Group)</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Outcome (summed rating)</td>
<td>2.31 (0.31)</td>
<td>0.53 (0.28)</td>
<td>0.42 (0.30)</td>
<td>0.75 (0.18)</td>
<td>1.20 (0.14)</td>
<td>Y</td>
</tr>
</tbody>
</table>

NOTES: (1) All regressions include controls for: age, education, sex, race, experience, union membership, tenure, firm size, occupation (9 categories), industry (15 categories), salaried/non salaried status. See Appendix C Table C2 for the construction of the overall outcome variable and the questions in WRPS used to construct it. (2) Standard errors are within parentheses. Coefficients in bold imply statistical significance at 10% level.
### Table 5: Fully Disaggregated effects of EI, Performance Pay and Ownership Combinations

<table>
<thead>
<tr>
<th></th>
<th>EI</th>
<th>P</th>
<th>O</th>
<th>P,O</th>
<th>P, EI</th>
<th>O, EI</th>
<th>P, O, EI</th>
<th>Other Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall Outcome</strong></td>
<td>0.36</td>
<td>0.06</td>
<td>0.03</td>
<td>0.14</td>
<td>0.35</td>
<td>0.32</td>
<td>0.50</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.06)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.08)</td>
<td>(0.10)</td>
<td>(0.08)</td>
<td></td>
</tr>
<tr>
<td><strong>Productivity Variables:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AVERAGE</strong></td>
<td>0.41</td>
<td>0.08</td>
<td>0.02</td>
<td>0.03</td>
<td>0.4</td>
<td>0.43</td>
<td>0.56</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.05)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.08)</td>
<td>(0.09)</td>
<td>(0.07)</td>
<td></td>
</tr>
<tr>
<td><strong>Suggestions</strong></td>
<td>2.1</td>
<td>0.47</td>
<td>-0.05</td>
<td>-0.23</td>
<td>1.86</td>
<td>2.16</td>
<td>2.9</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>(0.34)</td>
<td>(0.28)</td>
<td>(0.37)</td>
<td>(0.34)</td>
<td>(0.40)</td>
<td>(0.47)</td>
<td>(0.39)</td>
<td></td>
</tr>
<tr>
<td><strong>Overall Influence at Job</strong></td>
<td>0.85</td>
<td>0.36</td>
<td>0.26</td>
<td>0.06</td>
<td>1.23</td>
<td>1.07</td>
<td>1.5</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>(0.32)</td>
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<td>(0.06)</td>
<td>(0.08)</td>
<td>(0.06)</td>
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<td>(0.11)</td>
<td>(0.08)</td>
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<td>0.13</td>
<td>0.08</td>
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<td>0.23</td>
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<td>(0.09)</td>
<td>(0.08)</td>
<td>(0.09)</td>
<td>(0.11)</td>
<td>(0.08)</td>
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<td>(0.09)</td>
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<td>(0.10)</td>
<td>(0.12)</td>
<td>(0.10)</td>
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<td>0.08</td>
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<td>0.44</td>
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<td></td>
<td>(0.11)</td>
<td>(0.11)</td>
<td>(0.14)</td>
<td>(0.13)</td>
<td>(0.13)</td>
<td>(0.22)</td>
<td>(0.14)</td>
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<td><strong>Attitudes towards Company:</strong></td>
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<td><strong>Reported Loyalty to Company</strong></td>
<td>0.17</td>
<td>0.06</td>
<td>0.07</td>
<td>0.17</td>
<td>0.25</td>
<td>0.1</td>
<td>0.29</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.06)</td>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.11)</td>
<td>(0.08)</td>
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<tr>
<td><strong>Reported Trust towards Company</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>0.30</td>
<td>0.1</td>
<td>0.18</td>
<td>0.21</td>
<td>0.25</td>
<td>0.15</td>
<td>0.35</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(0.09)</td>
<td>(0.13)</td>
<td>(0.12)</td>
<td>(0.13)</td>
<td>(0.17)</td>
<td>(0.13)</td>
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</tr>
</tbody>
</table>

NOTES: (1) All regressions include controls for: age, education, sex, race, experience, union membership, tenure, firm size, occupation (9 categories), industry (15 categories), salaried/non salaried status, as well as individual and group-based human resource practices. (2) Standard errors are within parentheses. Coefficients in bold imply statistical significance at 10% level.

SOURCE: WRPS

### Table 6: Impact on Effectiveness of Other Human Resource Practices
### Effectiveness of Group based HR policies:

- **“Town Meetings”**
  - 0.17 0.03 0.14 0.09 0.32 0.33 0.44 Y
  - (0.09) (0.09) (0.12) (0.10) (0.10) (0.13) (0.10)

- **Open Door policies for Groups**
  - 0.19 0.11 0.09 0.13 0.29 0.43 0.50 Y
  - (0.08) (0.07) (0.10) (0.09) (0.08) (0.11) (0.09)

- **Employee Committees**
  - 0.33 0.13 0.17 0.21 0.18 0.35 0.46 Y
  - (0.10) (0.09) (0.12) (0.12) (0.10) (0.13) (0.10)

### Effectiveness of Individual based HR policies

- 0.16 0.06 0.01 -0.01 0.11 0.21 0.31 Y
  - (0.07) (0.06) (0.07) (0.07) (0.07) (0.10) (0.08)

### Table 7: Regression Robustness Checks

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<td><strong>OLS estimates:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Average Productivity</td>
<td>0.41</td>
<td>0.08</td>
<td>0.02</td>
<td>0.03</td>
<td>0.40</td>
<td>0.43</td>
<td>0.56</td>
<td>Y</td>
<td>N</td>
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<td>(0.07)</td>
<td>(0.05)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.08)</td>
<td>(0.09)</td>
<td>(0.07)</td>
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<td></td>
</tr>
<tr>
<td>Average Productivity (after subtracting weighted Average Satisfaction)**</td>
<td>0.24</td>
<td>0.02</td>
<td>0.06</td>
<td>-0.05</td>
<td>0.26</td>
<td>0.26</td>
<td>0.30</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td></td>
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<td>(0.06)</td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.08)</td>
<td>(0.09)</td>
<td>(0.08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Propensity Score estimates:</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Average Productivity</td>
<td>0.38</td>
<td>.</td>
<td>.</td>
<td>0.02</td>
<td>.</td>
<td>.</td>
<td>0.62</td>
<td>Y</td>
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<tr>
<td></td>
<td>(0.08)</td>
<td>.</td>
<td>.</td>
<td>(0.08)</td>
<td>.</td>
<td>.</td>
<td>(0.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Productivity (after subtracting weighted Average Satisfaction)**</td>
<td>0.22</td>
<td>.</td>
<td>.</td>
<td>-0.04</td>
<td>.</td>
<td>.</td>
<td>0.27</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>.</td>
<td>.</td>
<td>(0.08)</td>
<td>.</td>
<td>.</td>
<td>(0.11)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Standard errors are within parentheses. Coefficients in bold imply statistical significance at 10% level. (**) indicates bootstrapped standard errors.

**SOURCE:** WRPS
Table 8: Extent of Participation in Employee Involvement and Shared Compensation in Establishment-Level Data

<table>
<thead>
<tr>
<th>EI</th>
<th>Stock Ownership</th>
<th>Profit Sharing</th>
<th>Stock Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>64.15%</td>
<td>89.26%</td>
<td>78.32%</td>
</tr>
<tr>
<td>Under 25%</td>
<td>6.79%</td>
<td>5.11%</td>
<td>4.68%</td>
</tr>
<tr>
<td>25% to 49%</td>
<td>6.47%</td>
<td>1.36%</td>
<td>2.68%</td>
</tr>
<tr>
<td>50% to 74%</td>
<td>2.20%</td>
<td>1.18%</td>
<td>1.71%</td>
</tr>
<tr>
<td>75% to 99%</td>
<td>1.65%</td>
<td>0.92%</td>
<td>1.23%</td>
</tr>
<tr>
<td>All</td>
<td>18.74%</td>
<td>2.17%</td>
<td>11.39%</td>
</tr>
<tr>
<td>Some</td>
<td>35.85%</td>
<td>10.74%</td>
<td>21.68%</td>
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</table>

SOURCE: CES

Table 9: Fully Disaggregated effects of EI, Performance Pay and Ownership Combinations in Establishment-Level Data

<table>
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<tr>
<th></th>
<th>EI</th>
<th>P</th>
<th>O</th>
<th>P,O</th>
<th>P,EI</th>
<th>O, EI</th>
<th>P,O, EI</th>
<th>Controls</th>
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<tr>
<td>Extent of Participation in Decision-Making</td>
<td>0.28</td>
<td>0.15</td>
<td>0.13</td>
<td>0.13</td>
<td>0.24</td>
<td>0.23</td>
<td>0.36</td>
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<td></td>
<td>(0.05)</td>
<td>(0.08)</td>
<td>(0.07)</td>
<td>(0.09)</td>
<td>(0.08)</td>
<td>(0.07)</td>
<td>(0.08)</td>
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<tr>
<td>Quality Performance</td>
<td>0.12</td>
<td>0.03</td>
<td>0.08</td>
<td>-0.03</td>
<td>0.35</td>
<td>0.22</td>
<td>0.27</td>
<td>Y</td>
</tr>
<tr>
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<td>(0.09)</td>
<td>(0.12)</td>
<td>(0.11)</td>
<td>(0.17)</td>
<td>(0.13)</td>
<td>(0.11)</td>
<td>(0.14)</td>
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<td>Financial Performance</td>
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<td>-0.04</td>
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<td>-0.31</td>
<td>0.33</td>
<td>0.21</td>
<td>0.32</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(0.25)</td>
<td>(0.13)</td>
<td>(0.19)</td>
<td>(0.13)</td>
<td>(0.13)</td>
<td>(0.17)</td>
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<tr>
<td>Employee Turnover</td>
<td>-0.07</td>
<td>-0.05</td>
<td>-0.10</td>
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<td>(0.05)</td>
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<td>(0.05)</td>
<td>(0.06)</td>
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NOTE: Standard errors are within parentheses. Coefficients in bold imply statistical significance at 10% level. Controls include firm-size (5 categories), 2-digit industries, percent of workforce with college degrees, percent of workforce managerial/clerical/sales/blue-collar, percent of workforce unionized, and age of establishment.


Table 10: Calculating the Percentage of Employees/Firms With Pay Related to Company/Group Performance
Stock Ownership Programs (about 25% of nonagricultural work force)

1. Employee Stock Ownership Plans (ESOPS) and Stock Bonus Plans (1998) (8.5 million workers) 8% of nonag empl

2 All Employee Stock Option Plans (1999) (7.0 - 10.0 million workers) 8% of nonag empl

3. Receive Stock Options or opportunity to buy company stock (1999) 26% of work force

4. Workers Eligible for options from 1352 large firms, 1999 19% of covered

5. Firms Offering Stock-Based Compensation, ACA Compensation Survey 1999-2000

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<th>Nonexempt</th>
<th>Exempt</th>
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<tr>
<td></td>
<td>Hourly nonunion</td>
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<td>Stock Option</td>
<td>22</td>
<td>26</td>
<td>66</td>
</tr>
<tr>
<td>Co Stock Purchase</td>
<td>57</td>
<td>56</td>
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<tr>
<td>Stock Grant</td>
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<tr>
<td>Phantom Stock</td>
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<td>1</td>
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<tr>
<td>Co Stock via 401k</td>
<td>68</td>
<td>72</td>
<td>73</td>
</tr>
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</table>

6. Fortune 1000 companies offering options to 60% or more workers 13%

Profit/Gain-Sharing (around 25% of US work force)

7 Workers in Medium and Large establishments with deferred profit-sharing, 1997 19% of work force

8 Profit/Gain Sharing in Fortune 1000 (1996) 45% of firms

9 Firms with some profit-sharing, 1993-1998 33%-40% of firms

10 Receive bonus based on own performance or company performance 43% of work force

Defined Contribution Pension Funds Invested in Company Stock (11% of work force)

11 Employees with 401k plans 55% of full time workers in priv. nonfarm estab.

12 Estimated Proportion of 401k Assets in company stock
   a) EBRI estimate, 1998 17.7%
   b) Hewitt estimate, 1999 23.3%

13. Savings and thrift plans, % of workers in plans that allow for investment in company stock
   Firm contribution 42%
   Worker contribution 46%

Table 10, Continued
### Overall Variable Pay Practices, FRB Survey

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<thead>
<tr>
<th></th>
<th>All Workers</th>
<th>Managers</th>
<th>Professionals</th>
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<tbody>
<tr>
<td>Any type</td>
<td>88%</td>
<td>85%</td>
<td>69%</td>
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<tr>
<td>Stock Options</td>
<td>34%</td>
<td>33%</td>
<td>7%</td>
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<tr>
<td>Profit-sharing</td>
<td>50%</td>
<td>48%</td>
<td>44%</td>
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<tr>
<td>Performance bonus</td>
<td>75%</td>
<td>69%</td>
<td>41%</td>
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**SOURCE:**

Line 1: National Center for Employee Ownership, Employee Ownership Report, Jan/Feb 2000, p 9

Line 2: National Center for Employee Ownership, private communication


Line 12: Economic Benefit Research Institute, EBRI Issue Brief Number 218, February 2000

Hewitt Resources: The Hewitt 401k Index observations, page 2 [www.hewitt.com/resc/resc055.htm](http://www.hewitt.com/resc/resc055.htm)


Line 14: Survey by FRB, Lebow, Sheiner, Slifman, Starr-McCluer, table 1.
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www.hewitt.com/resc/resc055.htm


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Profit Sharing Council of America, 1993, 36th Annual Survey of Profit Sharing and 401(k) Plans, Chicago, IL: PSCA.


