Employee capitalism or corporate socialism? Broad-based employee stock ownership

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Abstract

Employee share ownership plans (ESOPs) increase employee compensation and shareholder value. When the plan has less than 5% of outstanding shares, compensation increases are small; when the plan is larger, we observe a permanent 4.5% increase in compensation. The increases are greater if we exclude ESOPs implemented by poorly performing firms to conserve cash. The size has an opposite effect on shareholder value. Small ESOPs have substantial positive effect on firm value, while large plans show no value effect. This is robust to firm fixed effects and to controls for selection biases and time-varying firm characteristics. In addition, compensation increases following large ESOPs depend on financial leverage and unionization rates. When financial leverage is higher, employees gain less and stockholders gain more. The reverse is true with unionization rate. The division of productivity gains depends on employee control rights, leverage, and unionization rates, variables affecting worker bargaining power.

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Broad-based employee share ownership (ESO) is an important economic phenomenon. The two most common types of plans which encourage ESO are Employee Stock Ownership Plans (ESOPs) and 401-K plans with employer stocks. According to the National Center for Employee Ownership, in 2007, ten and one-half million employees participated in 9,650 ESOPs, with combined assets over $675 billion at public and private firms. The corresponding numbers for ESO through 401-Ks are four million participants in 2,200 plans with $75 billion in assets. Both of these plans show an increasing long-term trend; the NCEO estimates the number of participants in ESOPs was one-quarter million in 1975, five million in 1990, and over ten million in 2007. ESO through 401-Ks has also become increasing popular since the 1990s.

Previous studies have documented worker productivity increases following adoption of ESO plans (Jones and Kato, 1995; FitzRoy and Kraft, 1987; and Beatty, 1995). The finance literature also shows positive stock price reactions to the announcement of ESOP adoptions, if they are not implemented under takeover pressure (Gordon and Pound, 1990; Chang and Mayers, 1992; Chaplinsky and Niehaus, 1994; and Beatty, 1995). However, there is little evidence on how ESO plans affect employee compensation.

The effect on employee compensation is an important issue, not only because it has employee welfare implications, but also because any change in employee compensation has implications for firm valuation and shareholder value. The issue is particularly relevant because share ownership may give employees a stronger bargaining position in compensation negotiations.

A typical ESO bestows not only cash flow rights, but also voting or other forms of control rights to employees. As the size of ESO increases, greater cash flow rights may lead to greater productivity gains through improved team effects and collective employee behavior, while greater control rights may help employees obtain higher compensation. It is not clear how greater cash flow and control rights jointly affect the shareholder value.

To illustrate, define $\Delta\pi$, ΔV, and ΔC as the value of productivity gains due to ESO, the change in shareholder value, and the change in costs accompanying ESO, respectively, such that $\Delta V = \Delta\pi - \Delta C$. Then, $\Delta V \geq 0$, if $\Delta C \leq \Delta\pi$. The shareholder value effect, ΔV, may depend on the size of ESO. When the size is small, giving employees negligible control rights, most of $\Delta\pi$ may accrue to shareholders.

When the size of ESO is sufficiently large to allow employees significant control rights, employees' total compensation and benefits (TCB) may increase. When ΔTCB is positive, it will increase ΔC and may decrease the fraction of $\Delta\pi$ accruing to shareholders. However, ΔV needs not be smaller, because $\Delta\pi$ may be greater due to greater cash flow effects on worker productivity. If $\Delta\pi$ - ΔTCB increases with the size of ESO, ΔV will increase. Otherwise, an increase in ESO size may decrease ΔV.

An undesirable outcome arises if $\Delta\text{TCB} > \Delta\pi$ such that $\Delta V < 0$. This represents the danger of value destroying corporate socialism. When employees possess sufficient control rights, they may extract *unearned* compensations and benefits at the expense of other stakeholders, increasing the firm's marginal costs and eroding growth opportunities. Such firms will invest less, suffer poor performance, and be valued lower. Faleye, Mehrotra, and Morck (2006) observe such phenomena for firms with large ESO.

However, they also raise the possibility that poorly managed and badly performing firms may establish large ESO plans to share their misfortune with employees.

The purpose of this paper is to conduct an empirical investigation of how ESOPs affect employee compensation and shareholder value and how the effects vary with the size of ESOPs. Our data on employee compensation is obtained from a unique plant-level database maintained by the Center for Economic Studies at the U.S. Bureau of Census. We observe higher TCB per employee following the adoption of an ESOP. These compensation increases are significantly higher when firms adopt large ESOPs, which are defined as those with more than 5% of the shares outstanding. Our initial panel regression controls for plant fixed effects, state-year mean wages, plant age, and year fixed effects. The compensation increase following small ESOPs, those with less than 5% of the shares outstanding, is significant but small (0.8%); however, large ESOPs are followed by a 5.2% increase in TCB.

These increases in employee compensation are not temporary, as they would if the increases had simply reflected firms' reluctance to cut cash wages by the full value of the allocated shares following the adoption of ESOPs. Even when we exclude the first four years after ESOP initiations, a period during which the majority of ESOP share are allocated, we still observe a 4.5% increase in TCB following large ESOPs.

Some ESOPs in our sample are adopted by firms suffering a decline in sales (in 2006 dollars) during the year the ESOP was initiated. We define such ESOPs as "restructuring", because with sales decline and the ensuing shortage of cash inflows, the firms may be using ESOPs to pay part of wages with stocks to conserve cash. Our data indeed tell these restructuring ESOPs are unique; they are followed by a drop in TCB per

employee. These firms also are valued substantially lower than their industry medians. Without these restructuring ESOPs, we observe a permanent increase in TCB per employee by 2.8% for small ESOPs and 6.3% for large ESOPs.

There are two possible explanations for these results. The first is that small ESOPs increase productivity and employees are being rewarded for it. Compensation increases are greater with large ESOPs, because they bestow substantial control rights to employees, enabling them to extract higher compensation. The second is a non-causal story; firms already planning to increase employee compensation are electing to establish ESOPs as a means to increase employee compensation.

To separate the causal from the non-causal explanation, we conduct two tests. First, we investigate how compensation changes vary across different plants of the same firm. By law all employees must participate in an ESOP unless a union elects an alternative form of compensation; thus, the non-causal story predicts that compensation increases will be more or less equal at all plants. However, we observe significantly greater compensation increases at plants located in states with higher unionization rates, and this phenomenon applies only to large ESOPs. Since unionized workers are better able to coordinate their voting rights to extract higher wages than non-unionized workers, this result is more consistent with the causal interpretation.

Second, we investigate how compensation increases associated with ESOPs are related to financial leverage. Bronars and Deere (1991) show that high financial leverage weakens unions' bargaining power because of the threat of possible bankruptcy. We find that compensation increases following the adoption of large ESOPs are significantly

lower at firms with higher leverage. This provides further evidence in support of the causal interpretation.

Do these employee compensation increases adversely affect shareholder value? Or do they simply reflect employees' fair share of productivity gains? If it is the latter, higher employee compensation should be compatible with higher shareholder value. We investigate these issues by examining the relation between the presence of ESOPs and shareholder value using panel data on 418 publicly traded firms with ESOPs and a set of control firms without ESOPs during the period 1980 and 2004.

We find that, on average, firms establishing ESOPs realize an 8.12% increase in firm valuation, relative to the industry median. This estimate is based on panel regressions controlling for both observable and unobservable time-invariant firm characteristics. To control for time varying firm characteristics, we compare such future effects to a baseline estimated two years after an ESOP adoption. The valuation increase is estimated at 12%.[4]

When estimated separately, small ESOPs are associated with a valuation increase of 16% relative to the industry median. In contrast, large plans show no positive valuation effects. With large ESOPs, employees appear to capture all the gains, leaving little for their shareholders. The inverse U-shaped relation between employee ownership and firm value is not inconsistent with the Himmelberg, Hubbard, and Palia (1999) evidence of no relation between managerial share ownership and firm value with firm fixed effects. Our

[4] These estimates, however, represent the upper tail of the distribution of possible gains associated with ESOPs. Firms not promoting ESOPs are likely to have made that decision presumably because they anticipate smaller performance gains. For example, if employees are already well motivated or if efficient monitoring mechanisms are in place, costs of implementing ESO plans may outweigh their incremental benefits of improving incentive and team effects.

results are distinct from any underlying relation between managerial share ownership and firm value. The relation between ESOPs and firm value is significant only for those plans that distribute shares without a bias in favor of management.

Furthermore, the unionization effect and the disciplining effect of leverage on employee compensation have remarkably consistent effects on firm valuation. The value decline associated with large ESOPs relative to small ESOPs is smaller when financial leverage is higher. This positive valuation effect of leverage seems to be due to the disciplining effect of leverage on worker compensation.

Our results do not appear to be an endogenous result of firms choosing to implement an ESOP. To control for time-invariant unobserved firm characteristics, we estimate all regressions with firm fixed effects. We also carefully consider possible selection biases associated with time varying firm characteristics. None explains our results.

Finally, our findings raise the issue of why firms adopt large ESOPs, given the greater shareholder value associated with smaller plans. There are two possible explanations. First, some management establish large ESOPs hoping that the greater cash flow rights will improve team effects and collective worker behavior, and later succumb to the demand for high wages by workers with substantial control rights, yielding most of the value gains to employees. Second, management is using large ESOPs to form a management-worker alliance, as in Pagano and Volpin (2005) and Atanassov and Kim (2008).

Pagano and Volpin develop a theoretical model, in which managers expecting hostile takeover threats bribe workers with above-market wages in return for their

cooperation in fending off takeover bids. Indeed we find that the majority of our ESOPs were initiated during the late 1980s, early 1990s, a period when the fear of a hostile takeover was high. Their model also predicts that ESOPs are more prevalent in states with business combination statutes (BCS), because BCS makes ESOPs more effective deterrents against hostile takeover attempts. This prediction is confirmed in the data. Of 401 ESOPs in our sample adopted after New York State first enacted BCS in 1985, 305 (76%) were established by firms incorporated in states with BCS in effect.

However, our estimated compensation increases following ESOP initiations are not driven by the BCS effect documented by Bertrand and Mullainathan (2003), who find a significant increase in employee compensation following the enactment of BCS. Consistent with their finding, our data also show substantial BCS effect on employee compensation. However, our estimates of the effects of both small and large ESOPs hardly change when we account for the BCS effect. Thus, the substantial control rights large ESOPs bestow on workers, whether intended or not, appear to help employees reap most of value gains arising from having ESOPs.

The rest of the paper is organized as follows. Section I briefly surveys the literature on costs and benefits of employee share ownership and identifies a number of potential motives for establishing ESOPs. Section II describes the data. Empirical results and analyses of potential selection biases are presented in Section III, followed by additional robustness checks in Section IV. Section V concludes.

I. Effects on employees and shareholders

In this section we survey the relevant literature and identify four non-mutually exclusive motives to establish ESOPs: (1) an attempt to improve incentives and team efforts to

enhance worker productivity, (2) management-worker alliance to thwart hostile takeover threats, (3) cash conservation by poorly performing firms by substituting stocks for cash wages, and (4) tax benefits. We first summarize the literature on the effects on worker productivity through improved incentive and team effects.

A. Productivity gains

The most often stated objective of ESO is to increase firm value by improving employee incentives. Shareholders typically do not monitor non-managerial employees; instead, they delegate the monitoring to management, agents themselves vulnerable to their own incentive problems**.** As a supplement to delegated monitoring and to better align employee incentives with shareholder values, firms may encourage ESO as an incentive device. However, individual workers may feel they have little impact on stock price, raising doubt on the ability of ESO to alter individual behavior in tasks requiring additional individual effort or sacrifice.

Collectively, however, important benefits may arise if ESO provides a proper group-based incentive. Kandel and Lazear (1992) argue that free-rider problems can be mitigated by orientation and indoctrination of new employees about workplace norms, which creates a work environment where peer pressure enforces the group-based incentive. FitzRoy and Kraft (1987) and Blasi, Conte, and Kruse (1996) also argue that group-based incentive schemes such as ESO induce co-monitoring, reducing costly monitoring by managers. Jones and Kato (1995) argue that ESOPs induce employees to develop a sense of identity and loyalty to their company; participate more actively in productivity-enhancing activities, such as quality-control circles; and increase the quality of decision making. These arguments are consistent with the claims often made by firms

initiating ESOPs that ESO improves team work by fostering a culture of employee involvement.

ESO also may help prevent value loss due to labor disputes. Cramton, Mehran, and Tracy (2007) develop a model in which share ownership by unionized workers creates incentives for unions to refrain from costly strikes.

These theoretical arguments on productivity are supported by Jones and Kato (1995) who document that an ESOP adoption in Japan leads to a 4-5% increase in productivity, starting about three years after the adoption. This is remarkable because the typical Japanese ESOP is allocated 1% or less of outstanding shares, demonstrating that even very small ESOPs generate substantial productivity gains. Japanese ESOPs do not provide tax benefits and most shares are allocated to non-executive employees.[5] In addition, FitzRoy and Kraft (1987) find that profit sharing and workers' capital ownership have positive effects on factor productivity for a sample of metal working firms in West Germany. Although there are no comparable studies on worker productivity for U.S. firms, Beatty (1995) finds an increase in sales in the two years after the adoption of an ESOP.

B. Employee compensation

How are these productivity gains shared between employees and shareholders? When ESOPs grant significant control rights to employees, as in large ESOPs, workers may use their enhanced bargaining power to extract higher compensation and benefits. In the context of managerial pursuit of a "quiet life" in Bertrand and Mullainathan (1999, 2003), employee control rights may exacerbate the managerial tendency to acquiesce to

[5] In an earlier study (1993), Jones and Kato report that 91% of all firms listed on Japanese stock markets had an ESOP in 1989.

worker demands for higher wages. Large employee ownership may also indicate worker-management collusion as theorized by Pagano and Volpin (2005). Powerful employees may induce management to shift its allegiance to workers as documented by Atanassov and Kim (2007).[6] A likely result of any of these propositions is higher employee compensation.

ESOPs also cause employees to hold less diversified portfolios and have liquidity concerns. ESOP shares cannot be sold until employees leave the company, with the exception of diversification requirements triggered at 55 and 60 years of age. In equilibrium, these risks increase employee compensation.

C. Cash conservation

Core and Guay (2001) find stock option plans for non-executive employees are often used at firms which appear cash-constrained. Likewise, issuing stocks through ESOPs may be the result of cash constrained firms substituting stocks for cash wages. Since sales is the primary sources of cash inflows, we define an ESOP "restructuring" if it is adopted by a firm suffering sales decline in the year of the plan initiation. Such ESOPs are likely to lower cash wages without changing total employee compensation. While the decision to substitute equity for cash wages may be optimal for firms facing cash shortage, it is doubtful that such plans will have the same strong uplifting effect on employee morale, team effects, and collective behavior as non-restructuring ESOPs will. Thus, we expect no significant productivity gains from having restructuring ESOPs and, hence, no compensation increases or shareholder value gains.

[6] There are no specific legal requirements regarding who can vote ESOP shares held by a trust and, thus, firms are free to set their own rules at the ESOP initiation. The two most common approaches are to vote the shares 1) according to management's preferences or 2) in an identical proportion to the votes cast by employees holding allocated ESOP shares

D. Tax effects

ESOPs are often established through a trust which borrows money to buy company stock. Over time, the company repays the loan taken by the trust which, in turn, allocates its shares to employee accounts. These loan payments (interest and principle) are treated as wages and, thus, are tax deductible, within certain payroll limits. Tax benefits *unique* to leveraged ESOPs arise when dividends paid to stocks, held by the trust, are used to pay down debt. These dividends are effectively deducted twice from the firm's taxable income, once as wages and then again as interest payments.[7] If this tax benefit has an important impact on shareholder value, leveraged ESOPs will have more favorable impact on firm valuation than non-leveraged ESOPs.

II. Data

Our data on ESOPs cover US public firms from 1980 through 2004. This data is hand-collected. We first identify firms with ESOPs, using the Factiva news database. For each year, we search Factiva using the terms "ESOP" and "employee stock ownership plan." We read all articles and note the first date a firm is mentioned as having an ESOP. We identify 756 unique public firms with ESOPs over the sample period. Of these firms, we drop 35 firms with total assets less than $10 million in 2006 dollars. The lack of press coverage on such small firms makes it likely that we missed other similar-sized firms with ESOPs, wrongly identifying them as non-ESOP firms. This potential error is important because our control group is derived from firms in Compustat without identified ESOPs.

[7] Prior to November 1989, banks received a tax break to fund leveraged ESOPs, which led to below market interest rates on these loans. The dividend deduction became effective in 1986.

With the remaining 721 ESOP firms, we run additional Factiva searches using the firm's name and "employee stock" to locate further information on each firm's ESOP.[8] When available, we record information on whether the ESOP was funded with debt and the ESOP initiation date.[9] We are able to identify the year of the ESOP initiation for 418 unique firms.

We determine the size of ESOPs by reading annual proxy statements for all firms with ESOPs. In most cases, ESOP share ownership is reported only if the plan has more than 5% of the firm's common equity. We assume the ESOP controls less than 5% of the firm's outstanding shares if the proxy statement does not report specific numbers concerning ESOP size. The ESOP database is then matched to Compustat and Center for Research in Security Prices (CRSP) databases for accounting and stock market variables.

The ESOP database is also matched to the Standard Statistical Establishment List (SSEL) maintained by the U.S. Bureau of Census. The SSEL provides plant-level data on annual payroll and the number of employees for all firms operating in the U.S. This plant-level data is linked across time and ownership, thus allowing the researcher to create time-series panel data for all US plants owned by public US firms.

This Census data is an improvement over the wage and employment data reported in Compustat. For one, the Census data is available at the plant level which allows us to identify changes at one specific facility as opposed to having to rely on firm-level data. Second, we are able to observe the state of location for each facility. This allows us to

[8] In a few cases, this additional search led us to identify the presence of an ESOP in an earlier year. We exclude these observations because of a survivorship bias. Information about an ESOP may not have been discovered in our first search process if the firm was small and received limited press coverage. When the firm becomes more profitable and grows larger, press coverage becomes more likely, increasing the probability we observe the ESOP. This could cause a positive correlation between observed ESOPs and firm performance.

[9] If a firm underwent a bankruptcy or was dropped from Compustat for a year or more, we assume the ESOP was terminated unless other information is present.

control for geography-dependant mean wages and to study relative wage changes at different plants owned and operated by the same firm. Finally, many active firms in Compustat do not report the number of employees and total compensation, because personnel information is subject to looser reporting and auditing requirements than financial variables.

Unionization rates are from the Union Membership and Coverage Database (unionstats).[10] This database provides public sector labor union membership by state, using data compiled from the Current Population Survey (CPS).

We also use the employee ownership dataset provided by the Department of Labor (DOL) for additional information on the structure of ESOPs unavailable in our ESOP database. The DOL database begins in 1992 and includes all ESO through company-sponsored plans, as reported on Internal Revenue Service (IRS) Form 5500 files. We do not use the DOL database as our primary source of ESOP data because it does not cover ESOPs prior to 1992, a serious drawback as 61% of ESOP implementations in our sample occur before 1992.

Table 1, Panel A, lists the number of new ESOP adoptions and observation counts in our ESOP database by year. It identifies 5,596 firm-year observations between 1980 and 2004 with a median ESOP size of 5.93% of shares outstanding. For the 225 ESOPs achieving a size of 5% or greater at some point during their life time, the median and the mean employee ownership is 12.18% and 16.65% of shares outstanding, respectively.

Panel B of Table 1 provides summary statistics of the relevant firm level variables. The first column details the control group. It summarizes characteristics of pooled time-series observations in Compustat that meet the following criteria: (1) we do

[10] See Hirsch and Macpherson (2003) for more information.

not confirm an ESOP, (2) the firm has total assets greater than $10 million in 2006 dollars, and (3) the firm has more than 3 years of Compustat data-- our empirical design requires a minimum of 4 years data to estimate ESOP effects. The second column describes firms in Compustat for which we identify an ESOP. The third column details firms with large ESOPs. An ESOP is considered large if, at any point during the lifetime of the plan, it has more than 5% of the outstanding common shares. We choose this demarcation point because proxy statements only detail the size if the ESOP has more than 5% of the firm's equity. In addition, 5% is often used as a threshold for various disclosure requirements, presumably because it signifies an important source of control rights.

Comparing Columns 1 and Column 2 reveals that firms with ESOPs tend to be larger, more capital intensive, more profitable, less R&D intensive, and more highly levered than firms without ESOPs.

III. Empirical results

In this section we first estimate the relation between employee compensation and the presence of ESOPs, followed by an investigation of the relation between firm value and ESOPs.

A. Employee compensation

Our compensation provides plant level annual payroll, which includes all forms of compensation, such as salaries, wages, commissions, dismissal pay, bonuses, vacation allowances, sick-leave pay, and contributions to qualified pension plans. Our measure of total compensation and benefits (TCB) per employee is the ratio of annual payroll (in thousand dollars, normalized to 2006 dollars) to the number of employees. We use the

log of TCB per employee, which we shall refer hereafter simply as TCB, as the dependent variable in our regressions.

We estimate the relation between TCB at the plant level and ESOPs with panel regressions using all treatment and control firms meeting our sample construction criteria over 1982 to 2001.[11] To isolate the effect of an ESOP on TCB, we exclude some ESOP firm-year observations. The TCB at a plant before an ESOP, as captured in plant fixed effects, proxies for the expected TCB in future years, had the ESOP not been adopted. Thus, we only include those plant-year observations beginning five years prior to the ESOP adoption to capture the most current information. Second, we exclude the year of the announcement of ESOP adoption and the year after, because it may take time for effects associated with the ESOP implementation to be observed (Jones and Kato, 1995). We also exclude observations 10 years after an ESOP initiation and any observations following an ESOP termination.[12] We exclude these observations because changes unrelated to the ESOP occur over time. Observations after an ESOP termination are excluded to ensure that our baseline is not picking up post-termination effects.

The base regression contains two ESOP indicator variables: *ESOP*, equal to one if the firm has an ESOP; and *ESOPg5*, equal to one if employees have more than 5% of outstanding shares through the ESOP. All compensation regressions control for plant fixed effects and year fixed effects. Year fixed effects capture economy-wide changes in

[11] We shorten our available timeline in the TCB regressions due to a change in the across time data linkages prior to 1982 and after 2001.

[12] There are 56 ESOP terminations (138 plant-year observations) in our ESOP database. Terminating an ESOP is a complex legal procedure. The firm must be able to legally justify why the ESOP was value-increasing for the firm in the past but is now value-decreasing; otherwise, it is open to lawsuits from ESOP holders and shareholders. Thus, it is more common to "freeze-out" an ESOP. A freeze-out is usually not announced officially and thus is hard to identify. In our sample, firms which are electing to freeze-out their ESOP will still be recorded as having an ESOP, which is literally true because the ESOP still exists. There are some firms that have rolled up their ESOP into a 401-K plan. Such 401-K plans may still be recorded in our database as an ESOP, which is not completely off-base because they still represent ESO.

wages over time. Including plant fixed effects allows us to compare TCB following the ESOP to TCB at the same plant before the ESOP.

Following Bertrand and Mullainathan (2003), we also control for plant age and state-year mean wages. Plant age is estimated as the current year minus the first year the plant appeared in the SSEL. State-year mean wages are the mean wages of all plants located in the same state as the plant, but excluding the plant itself, and matched by year. This variable controls for state-specific changes in wages over time.

Column 1 of Table 2 reports the base regression estimate. It shows a positive significant relation between TCB and the presence of ESOPs. It also shows that large ESOPs are associated with a much bigger increase in compensation. The economic magnitude of the relation is worth noting. While TCB increases by only 0.8% with the presence of a small ESOP, the increase associated with the presence of a large ESOP is 5.2%.

As expected, we observe a strong positive correlation between the plant-level TCB and the average TCB in the same year and in the same state of location. We also observe a positive correlation between plant age and TCB, indicating that older plants have higher wages.

In column 2, we add firm-level controls. We again follow Bertrand and Mullainathan (1999) and add asset size and sales as control variables. We also control for leverage as ESOPs are often associated with changes to firm leverage. As in column 1, we observe a positive and significant correlation between TCB and large ESOPs; however, the relation for small ESOPs is no longer significant. Furthermore, the relation between age and TCB switches the signs, indicating that plant age may have been

proxying for other firm attributes. We observe TCB is negatively related to asset size, but positively related to total sales and leverage. One possible interpretation is that firms with higher asset turnover (sales/assets) tend to have higher skilled labor.

The compensation increases associated with ESOPs in columns 1 and 2 may simply reflect the value of ESOP shares granted. Granting ESOP shares will lead to a one time compensation increase if the sponsoring company does not cut cash wages by the full value of the allocated shares. Data limitations do not allow us to separate between cash wages and other forms of compensation, such as allocations to pension funds. Therefore, to isolate the permanent effect of ESOPs on TCB from the value of ESOP shares granted, we exclude those years where the majority of ESOP share are allocated: the first four years after the ESOP initiation.

In columns 3, the regression estimate excludes the first 4 years after the ESOP initiation. This eliminates the years where the expensed value of ESOP shares will be most important and, at the same time, allows time for employees to accumulate sufficient voting power. As such, we are stacking the deck against finding a compensation effect, unless there is a permanent increase in TCB.

In Column 3, we compare TCB reported before the establishment of an ESOP to observations reported by the same firm at least 5 years later, relative to compensation changes for the control group of firms over the same period. The results continue to show a positive and significant effect associated with large ESOPs. In addition, small ESOPs also show a significant 1.6% increase in TCB. The magnitude for large ESOPs is 4.5%.

In our sample of ESOPs, we identify firms that suffer a decline in sales in 2006 dollars during the year the ESOP was initiated. Because sales tend to be the main source

of cash inflows for most firms, we conjecture that these firms are experiencing cash shortage and that the prime motive of these ESOP implementations is to conserve cash by substituting stocks for cash wages. We distinguish these ESOPs by defining them as "restructuring" ESOPs.

In column 4, we include an indicator variable for restructuring ESOPs. The results clearly demonstrate the uniqueness of these plans. TCB increases associated with restructuring ESOPs relative to other ESOPs are significantly negative. The coefficients on other ESOP indicator variables imply that for non-restructuring ESOPs, the permanent TCB increases for small and large plans are 2.8% and 6.3%, respectively.

Employee compensation increases are also documented in states following the enactment of business combination statutes (BCS) by Bertrand and Mullainathan (1999, 2003), who attribute it to management's pursuit of quiet lives after BCS relieve them of the threat of hostile takeovers. These new regulations state that if a block of investors unaffiliated with management vote against a tender offer, the acquirer must wait three to five years before pursuing the takeover. Because courts have established ESOPs as "outside" investors, they can be especially effective at preventing hostile takeovers in those states. Our sample shows that 76% of ESOPs initiated after New York State first passed BCS in 1985 are established by companies incorporated in states with BCS in effect.

Thus, we check whether the increases in TCB accompanying ESOPs are proxying for the BCS effect. In column 5, we control for whether a plant-year observation belongs to a firm incorporated in a state with BCS in effect. Consistent with Bertrand and Mullainathan (1999, 2003), we find a positive and significant increase in TCB associated

with BCS.[13] More important, the coefficient estimates for both small and large ESOPs remain positive and significant, with the magnitude virtually unchanged from those in Column 4.

In sum, we observe significant increases in employee compensation following the adoption of both small and large non-restructuring ESOPs. The compensation increases are not just reflecting temporary increases due to the value of stocks granted. They appear permanent, and the magnitude of the increase is especially substantial following the adoption of large ESOPs.

There are two interpretations for these results. The first is that small ESOPs improve operating performance and employees are being rewarded for it. The greater compensation increases with large ESOPs are due to granting workers substantial control rights, which are used to obtain higher compensation. The second is that firms that have already decided to increase wages implement ESOPs and that ESOPs are not causing compensation increases. In the next section we attempt to separate these two interpretations.

A.1. Establishing Causality -- Unionization

The causal story implies that wages will increase the most when employee control rights are most affected by ESOPs. How effectively workers will use their voting rights to extract higher wages depends not only on the number of votes they control but also on their ability to coordinate their voting rights to increase their bargaining power during wage negotiations. We assume that unionized workers are more effective at coordinating

[13] Our estimate of BCS effect on TCB is larger than those reported by Bertrand and Mullainathan. There are two explanations of this difference. For one, we use a different measure of TCB as compared to their 2003 paper and a different dataset as compared to their 1999[0] paper. Furthermore, we use a different time period[0]. If we drop the later years in our sample, the effect on BCS declines.

and using their voting rights than non-unionized workers. Thus, our causal interpretation predicts that compensation increases more at plants that are unionized than at non-unionized plants. Although we do not have a direct measure of the unionization at each plant, there are important differences in unionization rates across states. Thus, we use the average unionization rate in the state of plant location as a proxy for the unionization at the plant. Because the presence of ESOPs may affect unionization rates, we use the unionization rate in 1983, the first year for which state-by-state unionization membership is available from Unionstats. The causal interpretation predicts that wages increase more at plants located in states with higher unionization rates.

The non-causal story does not have the same prediction. By law, all employees must participate in an ESOP. Thus, if an ESOP is established simply as a means to increase wages, the compensation increase is likely to be more or less equal at all plants, irrespective of unionization rates. There is one exception to this mandatory ESOP participation. During collective bargaining unions can elect alternative forms of compensation to an ESOP. Although we are unable to determine which unions do or do not participate in the ESOP, this option biases against finding a systematic relation between compensation increases and unionization rates. If a union elects an alternative compensation, it will do so because it is more beneficial to workers. And if the alternative form of compensation is not covered by annual payroll (e.g. more sick days), we will underestimate compensation increases at unionized plants, biasing against finding results consistent with the causal interpretation.

To minimize the impact of the value of ESOP shares granted on the estimate of compensation increases, we again exclude the first 4 years after the ESOP is established –

the time period during which the vast majority of shares are allocated. Table 3, column 1 reports the panel regression estimates, which show TCB is higher at plants located in states with higher unionization rates. More important, it shows that the TCB increase associated with an ESOP is greater if the plant is located in a state with a higher unionization rate. This is consistent with our causal interpretation. The indicator variable *ESOP* captures TCB gains at all plants covered by an ESOP. Relative to this mean ESOP effect, TCB increases more at plants which are more likely to be unionized. These are the same plants where the control rights provided through ESOPs will be used more effectively to enhance workers' bargaining position during wage negotiations. In an unreported regression, we add back the three excluded years (the second through the fourth year) following the adoption of ESOPs. The results are stronger in support of the causal interpretation.

In column 2, we add a control for the firm average wage, estimated by dividing the firm-level annual payroll by the total count of employees. Unsurprisingly, firm-level wages are strongly and positively correlated with the plant-level wages. More important, the results on the interaction of unionization likelihood with the ESOP indicator variable continues to hold.

In column 3, we add ESOPg5 and an interaction term of ESOPg5 with unionization likelihood. We observe a large, positive and significant coefficient on the interaction term and an insignificant coefficient on the interaction of ESOP and unionization. Apparently, all incremental TCB increases due to unionization are concentrated at those firms which adopt large ESOPs. Employee voting rights seem to enhance worker bargaining power at unionized plants only when ESOPs are large. In

Column 4, we add *Restructuring ESOP*. Again, the interaction of unionization likelihood with the ESOP indicator variables continue to hold.

A.2. Establishing Causality -- Leverage

To provide further collaborating evidence to the causal interpretation of the compensation increases, we consider the disciplining role of financial leverage. Bronars and Deere (1991) argue with supporting evidence that the ability of unions to extract concessions from shareholders can be limited by a high debt ratio because of its implied threat of bankruptcy. According to this argument, workers' ability to use the control rights bestowed by a large ESOP will be weaker if the firm has a high financial leverage. Thus, we predict that employee compensation increases following large ESOPs will be smaller at firms with higher leverage.

To test this prediction, in column 5 of Table 3 we interact leverage with *ESOP* and *ESOPg5*. The coefficient on the interaction term of leverage and *ESOPg5* is negative and significant, consistent with our prediction that leverage reduces large ESOPs' impact on compensation.[14] To check whether the negative coefficient on the interaction of *ESOPg5* and leverage is negative relative to zero (rather than being negative relative to the coefficient on the interaction of ESOP and leverage) we drop the interaction of ESOP and leverage in Column 6. We continue to find a negative and significant coefficient on the interaction of ESOPg5 and leverage.

B. Relation between firm valuation and ESOPs

[14] The results also show a positive and significant coefficient on the interaction of ESOP and leverage, indicating that the TCB increase associated with small ESOPs is higher in firms with higher leverage. Since small ESOPs are unlikely to give employees sufficient control rights to enhance their bargaining position, these TCB increases are more likely to arise from gains attributable to incentive and team effects. Perhaps highly leveraged firms are run more tightly, providing a more conducive environment to promote improved team efforts through ESOPs.

To investigate how the presence of ESOPs and the compensation increases accompanying ESOP implementation are related to shareholder value, we regress industry adjusted Q on indicator variables for the presence of ESOPs. Our dependant variable Q_{it} is estimated as fiscal year-end market value of equity plus market value of preferred stock plus total liabilities divided by total assets. We follow Bebchuk and Cohen (2005) and industry adjust Q by subtracting the median Q matched by industry (2-digit SIC code) and year.

Our general approach is similar to that of Himmelberg et al. (1999). We assume Q depends on the presence of an ESOP, observable firm characteristics, and unobservable firm characteristics. We include firm fixed effects to control for time-invariant unobservable firm characteristics. We also control for time series patterns with year fixed effects. To control for observable firm characteristics, we include the log of total assets (normalized in 2006 dollars), the R&D expenditures to sales ratio, the capital expenditures to assets ratio, and age. Because the indicator variable for an ESOP is comparing industry adjusted Q following the adoption of the plan to an earlier period, the coefficient on the indicator variable could pick up an age factor, if industry adjusted Q changes with firm age. We define *Age* as the difference between the current year and the first year the firm is included in Compustat.[15]

We first estimate the base regression using the ESOP database over the period 1980 to 2004. As in the earlier compensation regressions, we only include those firm-year observations beginning five years prior to the ESOP adoption to capture the most current information. We exclude the year of the announcement of ESOP adoption and the

[15] Because Compustat data is not available prior to 1950, the "oldest" firm in our sample is 54.

year after, observations which occur 10 years after an ESOP has been initiated and any observations following an ESOP termination.

Column 1 of Table 4 shows that the presence of an ESOP is associated with a statistically positive increase in industry adjusted Q. It also shows that the coefficients of the control variables are consistent with our expectations. Larger firms are valued less and firms with more R&D investment and capital expenditures are valued more. The negative coefficient on Age indicates that new firms have high valuations, possibly reflecting large growth options.

To give a sense of the economic magnitude of the result in Column 1, we note that the median value of Tobin's Q in our sample is 1.306. Thus, a coefficient of 0.106 implies that the presence of an ESOP is associated with a firm valuation increase of 8.12% relative to the industry median. If ESOPs are implemented to maximize shareholder value, then firms which choose not to have ESOPs may do so in anticipation of benefits being outweighed by costs. Thus, these estimates likely represent the upper tail of the potential distribution of shareholder value creation if all firms were to adopt ESOPs.

Column 2 adds *ESOPg5s* to the regression. The estimates show that the positive relation between firm value and an ESOP diminishes if the plan has more than 5% of the outstanding shares. Because the coefficients on the ESOP indicator variables are cumulative, the combined coefficient on *ESOPg5* is 0.209 – 0.190, or 0.019. To determine if large plans are associated with an overall firm value effect, we enter *ESOPg5* alone in Column 3 and find an insignificant coefficient. The relation between firm value and employee share ownership seems to be inverse-U shaped.

It is possible that this inverse-U shaped relation is driven by a similar inverse U-shaped relation between managerial share ownership and firm value, as documented by Morck, Schleifer, and Vishney (1988) and McConnell and Servaes (1990), among others. However, Himmelberg et al. (1999) show that this relation with managerial ownership disappears with the inclusion of firm fixed effects. Since our regressions also include firm fixed effects, it is unlikely our results are confounded by managerial share ownership. Nevertheless, we check the robustness by separating ESOPs into high and low levels of managerial participation by using information available in the DOL database regarding the nondiscriminatory coverage requirement (NCR).[16] In general, if a plan satisfies the NCR, the plan does not allocate highly compensated employees, presumably management, a disproportionate fraction of the ESOP shares. Since the DOL database starts in 1992, we assume that if an ESOP satisfies the NCR in any year, then the plan satisfies the NCR in all years. Whether or not an ESOP satisfies the NCR is virtually time-invariant[17]

In Column 4, we re-estimate the regression by separating the sample according to whether or not the NCR is satisfied. The coefficient on *ESOP biased towards highly compensated employees* is negative and significant relative to *ESOP*. Likewise, the coefficient on *ESOPg5 biased towards highly compensated employees* is significantly positive relative to *ESOPg5*. Estimated separately, the coefficients on *ESOP* and *ESOPg5*

[16] Specifically, the test takes into account differences between the coverage ratios for highly and non-highly compensated employees, the percentage of total employees covered, and the compensation of employees covered by the plan as compared to employees excluded by the plan. For more information, see the IRS instructions for completing form 5500 available at http://www.irs.ustreas.gov/pub/irs-prior/i5500--1998.pdf. The definition of highly compensated employee is contained in Code section 414(q), as amended by section 1431 of SBJPA, those regulations under section 414(q) that reflect current law, and Notice 97-45, 1997-33 I.R.B. 7.

[17] The mean (median) variance of an indicator variable on whether an ESOP satisfies the NCR is 0.097 (0.000).

at firms where the plans are biased toward highly compensated employees are not significantly different from zero. Thus, the inverse U-shaped relation between firm valuation and employee share ownership is driven by firms which do not give a disproportionate share of ESOP stocks to managers.

Finally, column 5 adds an indicator variable for restructuring ESOPs, the cases where the sponsoring firm suffers a decline in sales (in 2006 dollars) the year the ESOP was initiated. Unsurprisingly, these firms are valued with significantly lower than firms with non-restructuring ESOPs. When we include *Restructuring ESOP* alone without *ESOP* or *ESOPg5* in column 6, the coefficient is still significantly negative, implying 9.26% lower firm valuation relative to the industry median. Taken together with the results on employee compensation, this result suggests that these restructuring ESOPs are motivated by poorly performing firms short of cash as a means to conserve cash by substituting stocks for cash wages.

B.1. Leverage on Q

Our earlier analyses show that employee compensation increases following large ESOPs are greater with higher leverage. To examine whether this leverage effects carry over to firm valuation, we re-estimate the relation between industry-adjusted Q and ESOPs while interacting leverage with ESOP indicator variables.

Column 1 in Table 5 shows a positive and significant coefficient on the interaction term with between leverage and ESOPg5; furthermore, Column 2 shows that the *ESOPg5* leverage* interaction term has a positive coefficient in absolute terms, not just relative to the interaction term between ESOP and leverage. Taken together with the

compensation results, it appears that leverage mitigates the value negating effect of large ESOPs through its disciplinary effect on employee compensation.

Column 1 also shows a negative and significant coefficient on the interaction term between ESOP and leverage, implying that the value-enhancing effects of small ESOPs are less when firms have higher leverage. Perhaps there is less room for productivity improvement when workers are already under pressure due to high leverage.[18]

B.2. Tax benefits

If leverage is used in setting up an ESOP, it may give rise to unique tax benefits due to tax deductibility of dividends paid to shares held by the ESOP trust if the dividends are used to pay down debt. We investigate whether this benefit is substantive enough to effect firm value by an indicator variable for leveraged ESOPs, where the leverage classification is coded at initiation and maintained throughout the lifetime of the ESOP.[19] Column 3 in Table 5 reveals no differential firm valuation between levered and non-levered ESOPs. We expect a positive value associated with the ability to treat a portion of dividends as tax deductible expenses. However, this favorable tax treatment applies only to the dividends paid to shares held in trust and decreases over time as shares

[18]Another, non-mutually exclusive explanation is the reduction in leverage over time as a leveraged ESOP releases shares to the individual accounts. This will lead to a negative coefficient on the interaction term between *ESOP* and leverage if the plan has a value-enhancing impact. This explanation, however, requires that the firm does not rebalance its capital structure as the leverage decreases.

[19]Because news articles reporting the initiation of ESOPs tend to mention the leverage status only when it is leveraged, we assume it is not leveraged if they do not clearly state as such. Most leveraged ESOPs remain leveraged for no more than ten years; hence, maintaining the leverage status throughout the lifetime of an ESOP introduces noise because there are no tax benefits when an ESOP is no longer leveraged. The alternative approach of coding on an annual basis whether the ESOP is or is not leveraged introduces a different bias, because it will capture the changes in firm characteristics following both the adoption of an unlevered ESOP and the change in the leverage status from leveraged ESOP to unlevered ESOP. We repeat regression analyses using this alternative coding and find similar results. Because our ESOP database does not have the necessary information required for this alternative coding, this robustness check is done using the DOL database which covers ESOPs only from 1993.

are allocated to employee accounts. Maybe this tax benefit is too small to be detected by our empirical methodology.

In sum, we find a positive association between the presence of ESOP and firm value. This positive relation applies only to small ESOPs, and disappears when the size of ESOP becomes large. Our result is not driven by observations where management has a relatively disproportionate share in the ESOP. In addition, the valuation results concerning leverage are remarkably consistent with those for compensation results. The interactive effects with leverage is negative for compensation but positive for shareholder value. This consistency in interactive effects suggests that what employees gain from ESOPs come at the expense of potential shareholder value gains, and vice versa.

So far, we have been careful to describe our results as relations between firm value and ESOPs. We will next make the argument, supported by additional empirical evidence, that these results are consistent with a causal relationship.

C. Selection bias in Q Results

To argue for a causal relation between ESOPs and firm value, we first rule out alternative explanations of our findings based on selection biases. The most common selection story argues firms that select the treatment – in our case, establish ESOPs – are inherently different from firms not selecting the treatment. Such differences may involve firm characteristics which are stationary or evolving over time. Because the inclusion of firm fixed effects in all of our regressions controls for stable firm characteristics, we concentrate on possible selection biases which depend on time-varying characteristics.

C.1. Private information story

We first consider a story where a firm has private information, predicting higher future permanent profits, and decides to reward its employees through an ESOP. In such a case, we would expect to find a positive association between firm value and an ESOP. Industry adjusted Q will increase when the market learns the positive information following the adoption of the ESOP.

We control for this possible selection bias by relying on a stylized fact that ESOPs are often implemented over time. For example, with leveraged ESOPs, the firm establishes a trust which temporarily holds all ESOP shares. Over time, the trust allocates these shares to employee accounts, with regulation dictating that all shares must be allocated within ten years. Some non-leveraged ESOPs also allocate shares over time, especially when firms purchase shares on the open-market. Thus, we expect these ESOPs to have relatively modest effects on employee behavior in the first few years following initiation. To utilize this feature for a robustness check, we use the second full fiscal year after the announcement of the ESOP as the baseline year. [20]

If the valuation effect associated with ESOPs is due to the private information, we should observe no further valuation effect with this new baseline, because most private information does not remain private for more than two years. However, if ESOPs are affecting firm valuation through a combination of productivity gains and compensation changes, we expect to observe additional effects in later years, relative to the baseline of the 2nd year, as more shares are allocated to employees, increasing both cash flow and voting rights of employees over time.

In Table 6, we use this alternative baseline. We recode the firm-year observation which falls two fiscal years after the adoption of an ESOP (and thus was originally coded

[20] Data limitations prevent us from identifying which ESOP observations allocate shares over time.

as having an ESOP) as not having an ESOP. We also drop all earlier observations of ESOP firms. Now ESOP indicator variables will pick up differences in firm characteristics between this second year after an ESOP initiation and the subsequent years. The results reported in Table 6, Panel A, are similar to their counterparts in Table 4. Column 1 shows that small ESOPs continue to have positive impact on firm value even though we limit the pre-ESOP baseline to only one year (as compared to five years in the Table 4), increasing noise in the regression, Column 2 also confirms that large ESOPs have no valuation impact with the alternative baseline. In short, the inverted U-shaped relation between firm valuation and employee share ownership persists well after three years following ESOP adoption.

Although this persistent value effect may imply an underestimation of the valuation effect of having ESOPs at the time of initiation, it does not necessarily imply informational inefficiency in the stock market. The complexity of an ESOP makes it difficult to assess its full impact in the earlier years, because much of the details of how shares will be allocated are unknown. A worker's behavioral reaction to becoming an employee owner or the prospect of receiving more shares, is highly individual-specific. It is difficult to predict how the individual reactions will be sorted out in group behavior in the workplace. The same can be said about how the newly acquired voting rights, or the prospect of getting more, will affect employee influence on corporate decisions. These types of uncertainties require time to be resolved, and the market will reassess the firm value as shares are actually allocated and observable actions of employees materialize.

Furthermore, a large majority of ESOPs in our sample were initiated in the 1980s or early 1990s, a period when the media reaction to ESOPs was heavily focused on the anti-takeover implications of these plans.[21]

Another illustration of how ESOPs affect firm valuation over time is provided in Figure 1, which plots the mean sample industry-adjusted Q for firms with ESOPs around the year of ESOP initiation (year 0). For the full sample, we observe no discernable pattern of changes to Q prior to the ESOP initiation. However, starting the 3rd year after the initiation, we observe a clear steady increase in Q for small ESOPs. One possible explanation for this gradual rise in Q is that bad firms disappear from the sample over time and only good (high-Q) ESOP firms are left in the later years. To test this interpretation, we create the "Constant Sample," which is a subset of the full sample. For a firm to be included in the constant sample, the firm must have the full 16 year time series (e.g. data from year – 5 through year + 10). The Constant Samples follow very similar trends as the Full Samples.

Figure 1 also helps reject a "leverage" interpretation of our results. One may argue the increase in Q is due to an increase in leverage often accompanying an ESOP—e.g., leveraged ESOPs. If leverage was driving the value increase, we should observe a jump in Q at year 0 and a gradual decline over the next 5 years as the ESOP debt is paid off and the ESOP-associated leverage declines.

Finally, one may argue that if an ESOP is implemented to deter hostile takeovers, the announcement of an ESOP initiation may reveal private information that the

[21] This attention on the anti-takeover implications was also evident in the academic finance literature during the early 1990s--e.g., Gordon and Pound (1990), Chang and Mayers (1992), and Chaplinsky and Niehaus (1994).

management is concerned about possible takeover bids. This information is likely to be reflected immediately in stock prices, not three years after initiation.

C.2. Correlation between firm performance and issuance of new shares

We also explore whether our results are an artifact of the definition of the percentage of shares held by ESOPs, the ratio of the number of shares controlled by the ESOP to the number of shares outstanding. While the numerator is often constant for a number of years, the denominator fluctuates as the firm issues new shares or repurchases outstanding shares. If high performance firms issue new shares to expand their operations, the denominator will increase, making the relative size of' ESOPs smaller. Conversely, poorly performing firms may repurchase outstanding shares because they lack good investment opportunities, making the size of ESOPs larger.

To control for this possible spurious correlation, we create two additional variables to capture changes in (split-adjusted) shares outstanding. The first variable, *share difference 1 y*, is estimated as (current shares outstanding - shares outstanding from one year prior) / shares outstanding from one year prior. *Share difference 5 y* is estimated in a similar manner but with a five year change to shares outstanding. We revert to the original baseline as in Table 4, and compare changes following ESOP adoptions to firm-years which precede the ESOP. Column 3 in Table 6 reports a positive relation between the one-year share difference and firm value. However, controlling for changes in shares outstanding does not affect our principal finding of a positive coefficient on *ESOP* and a negative coefficient on *ESOPg5*. Column 4 re-estimates the regression with an alternative definition of *Share difference 5 y.*[22] The results are robust.

[22] Estimating *Share Difference 5 y* requires a minimum of five years of data on shares outstanding in CRSP, which may introduce a new bias by limiting the sample to older firms. Thus, we modify its

C.3. Confounding policy changes

Another alternative story for our findings is that at the time of ESOP initiation, the firm implements other policy changes that affect firm value. To explain the results in Table 6, Panel A, the effects of these policy changes must be slow changing and continue to impact stock prices two fiscal years after the ESOP initiation. An example would be a management team that believes a hostile takeover bid is looming and the best defense is to maximize firm value by increasing efficiency. As a precautionary move, the firm also implements an ESOP. If this were the case for a large portion of our sample firms, we would observe a positive correlation between an ESOP and firm value.

Although this story may explain some of our results, it is contradicted by our overall results. First, a common method to increase efficiency is to cut employee compensation. This is contradicted by our finding of a substantial increase in the employee compensation following ESOP initiations. Second, an efficiency-based story must not only explain the increase in firm value associated with small ESOPs, but also the disappearance of value gains with large ESOPs. To the best of our ability, we cannot think of an efficiency-based story that can explain both.

IV. Robustness checks

In this section we conduct additional robustness tests using alternative definitions of large ESOPs, non-linear controls for firm size, and an alternative definition of Q. In Table 7, we introduce *ESOPg10*, an indicator variable equal to one if the firm has an

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definition. In cases where there is inadequate data to estimate share difference 5 y, we instead code the difference in shares outstanding as zero. This captures the intent of our control. For firms without an earlier time period, we should anticipate no legacy effects from earlier time periods. The results are reported in column 4. As with Column 3, we find a positive coefficient on ESOP and a negative coefficient on ESOPg5. In unreported tests, we estimate various alternative regressions, including interactions between the change in shares outstanding and the ESOP variables. We consistently find a positive and significant coefficient on ESOP and a negative and significant coefficient on ESOPg5.

ESOP that is estimated to control more than 10% of the shares outstanding at any point in time. Although column 1 shows a negative coefficient on *ESOPg10*, its effects is not significantly different from those of *ESOPg5*.

Coles, Lemmon, and Meschke (2007) note that regression results of managerial ownership on Tobin's Q are sensitive to both the definition of and inclusion of non-linear size controls. Column 2 includes both assets and assets squared and, in Column 3, sales and sales squared. The results are robust to these additional controls.

In columns 4 to 6 we define Q as industry adjusted market to book value ratios, and then re-estimate regression with different combinations of control variables. The results remain robust.

V. Conclusion

In this paper we investigate whether adopting broad-based employee stock ownership enhances firm performance by improving employee incentives and team effects. That is, does employee capitalism work? If so, how are gains divided between shareholders and employees? Our results suggest ESOPs increase productivity, which, by a process of elimination, we attribute to incentive and team effects.

Unlike the evidence of Jones and Kato (1995) on Japanese ESOPs on worker productivity, our evidence of productivity increase is obtained by estimating the effects on two main direct beneficiaries of any productivity gains. When ESOPs are small, both employees and shareholders gain, with a bigger share of the value of the productivity gains accruing to shareholders. When ESOPs are large, only employees gain, and shareholders neither gain nor lose. Workers seem to be capturing all the value of productivity gains using their control rights.

How shareholders are affected by large ESOPs vary across financial leverage and unionization rates. Although large ESOPs erode the otherwise positive valuation effects of ESOPs, the erosion is less when firms are highly leveraged and is greater when plants are located in states with higher unionization rates. These findings are remarkably consistent the findings on employee compensation; compensation increases associated with large ESOPs are smaller with lower leverage and are greater with higher unionization rates.

One exception to these empirical regularities is ESOPs implemented by firms suffering decline in sales revenue and low firm valuation. These ESOPs seem to be motivated to conserve cash by substituting stocks for cash wages. They do not lead to higher employee compensation.

Finally, we find no evidence that large ESOPs enable employees to extract *unearned* compensation increases. Although there might be some exceptions, the non-negative valuation impact of large ESOPs does not support the notion that broad based employee share ownership leads corporate socialism. Quite to the contrary, employee share ownership seems to generate value. How stockholders and workers share the benefits of value creation seems to be largely dependent upon the size of control rights ESOPs grant to workers.

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Table 1: Panel A. **Summary Statistics of Employee Stock Ownership by Year**.
Counts of observations and average size of employee ownership summarized over time.

Fiscal Year	ESOP Initiations	Count of ESOP observations
1980	2	4
1981	0	4
1982	2	6
1983	5	13
1984	8	22
1985	13	38
1986	14	50
1987	24	72
1988	36	105
1989	82	189
1990	53	247
1991	16	262
1992	22	275
1993	10	314
1994	24	332
1995	15	349
1996	26	388
1997	18	396
1998	16	393
1999	17	396
2000	7	381
2001	2	362
2002	1	355
2003	3	347
2004	2	296
Total / Average	418	5,596

Table 1: Panel B. **Summary Statistics of Firms without and with Employee Stock Ownership**. Medians are reported with averages in parentheses. All accounting variables are winsorized. Column 4 reports the difference between Column 2 (firms with ESOPs) and Column 1 (firms in control group without ESOPs). We consider two different tests of significance of these differences. When comparing the difference in medians we use a Wilcoxan ranksum test. When comparing the differences in averages (reported in parentheses) we use a student's t-test. "***", "**", and "*" indicate significance at the 0.01, 0.05, and 0.10 level.

	1 Firms in control group (without ESOP)	2 Firms with ESOP, as identified in the ESOP database	3 Firms with ESOPg5, as identified in the ESOP database	4 Difference: 2 - 1
Industry Adjusted Q	-0.02 (0.32)	-0.03 (0.16)	-0.05 (0.03)	-0.01*** -(0.16***)
Market Capitalization ($M in 2006$)	169.55 (1,540.43)	643.81 (5,013.97)	436.40 (3,501.22)	474.26*** (3,473.54***)
Total Assets ($M in 2006$)	245.83 (2,857.70)	1,585.71 (8,675.21)	1,204.11 (6,707.02)	1,339.88*** (5,817.51***)
PP&E ($M in 2006$)	36.25 (652.02)	177.99 (1,814.27)	128.87 (1,275.96)	141.74*** (1,162.25***)
EBITDA / Total Assets (%)	10.25 (8.41)	10.50 (10.64)	9.49 (9.67)	0.25*** (2.23***)
Capital Expenditures / Total Assets (%)	4.61 (6.80)	4.91 (5.88)	4.61 (5.66)	0.30*** (-0.92***)
R&D / Sales (%)	0.00 (8.12)	0.00 (1.41)	0.00 (1.01)	0.00*** (-6.71***)
Leverage (%)	12.17 (17.74)	17.46 (18.91)	17.62 (19.04)	5.29*** (1.17***)

Table 2. Changes in TCB per Employee Following Adoption of an ESOP.

Table 2 reports results from an OLS panel regression. The dependent variable is calculated as the log of the ratio of annual payroll (in thousands) divided by number of employees. Annual payroll and employees are derived from the SSEL. ESOP is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t. ESOPg5 is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t and this ESOP controls more than 5% of the firm's outstanding common stock at some point during its observed lifetime. Restructuring ESOP is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t and this ESOP was implemented during a year when sales growth was negative. BCS is an indicator variable which assumes a value of 1 if the plant belongs to a firm incorporated in a state which has passed BCS. Age is measured as the current year minus the first year the observation appears in the SSEL. State-year mean wages is the mean wage for the plant's state of location, for year t, excluding the plant itself. All dollar-denominated variables are normalized to 2006 $. Assets, sales and leverage are derived from Compustat and are measured at the firm-level. Ages, state-year mean wages, assets and sales are log-transformed. The full sample runs from 1982 through 2001 and includes only plants identified as belonging to US public firms. We exclude plants belonging to firms with less than $10M in total assets and to firms for which we are unable to identify the state of incorporation. We also exclude firm-year observations for the year of- and the year after initiating an ESOP and firm-year observations which are more than five years before or more than 10 years after the initiation of an ESOP. We also exclude firm-year observations after an ESOP is terminated. In the 5+ sample we further exclude observations representing the 2nd, 3rd, and 4th year after an ESOP initiation. Coefficients are reported with standard errors in parentheses. "***", "**", and "*" indicate significance at the 0.01, 0.05 and 0.10 level.

	1	2	3	4	5
	Full Sample	Full Sample	5+ Sample	5+ Sample	5+ Sample
ESOP	0.008 (0.002)***	-0.000 (0.002)	0.016 (0.002)***	0.028 (0.002)***	0.027 (0.002)***
ESOPg5	0.044 (0.002)***	0.047 (0.002)***	0.029 (0.003)***	0.035 (0.003)***	0.034 (0.003)***
Restructuring ESOP				-0.052 (0.003)***	-0.062 (0.003)***
BCS					0.107 (0.001)***
Age	0.005 (0.000)***	-0.003 (0.000)***	-0.003 (0.000)***	-0.003 (0.000)***	-0.003 (0.000)***
State-year wages	0.820 (0.001)***	0.817 (0.001)***	0.819 (0.001)***	0.819 (0.001)***	0.819 (0.001)***
Assets		-0.004 (0.001)***	-0.004 (0.001)***	-0.003 (0.001)***	-0.003 (0.001)***
Sales		0.014 (0.001)***	0.015 (0.001)***	0.013 (0.001)***	0.013 (0.001)***
Leverage		0.018 (0.001)***	0.018 (0.001)***	0.018 (0.001)***	0.018 (0.001)***
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Plant fixed effects	Yes	Yes	Yes	Yes	Yes
N	6,759,481	6,759,481	6,606,357	6,606,357	6,606,357
R-squared	0.834	0.834	0.835	0.835	0.835

Table 3. Changes in TCB per Employee Following Adoption of an ESOP by Unionization and Leverage.

Table 3 reports results from an OLS panel regression. The dependent variable is calculated as the log of the ratio of annual payroll (in thousands) divided by number of employees. Annual payroll and employees are derived from the SSEL. ESOP is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t. ESOPg5 is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t and this ESOP controls more than 5% of the firm's outstanding common stock at some point during its observed lifetime. Restructuring ESOP is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t and this ESOP was implemented during a year when sales growth was negative. Age, state-year mean wages, BCS, assets, sales and leverage are included in all regressions but the coefficients are not reported to conserve space. The full sample runs from 1982 through 2001 and includes only plants identified as belonging to US public firms. We exclude plants belonging to firms with less than $10M in total assets and to firms for which we are unable to identify the state of incorporation. We also exclude firm-year observations for the year of- and the year after initiating an ESOP and firm-year observations which are more than five years before or more than 10 years after the initiation of an ESOP. We also exclude firm-year observations after an ESOP is terminated. In the 5+ sample we further exclude observations representing the 2nd, 3rd, and 4th year after an ESOP initiation. Coefficients are reported with standard errors in parentheses. "***", "**", and "*" indicate significance at the 0.01, 0.05 and 0.10 level.

	5+ Sample	5+ Sample	5+ Sample	5+ Sample	Full Sample	Full Sample
	1	2	3	4	5	6
ESOP	-0.012 (0.004)***	-0.002 (0.003)	0.018 (0.004)***	0.023 (0.004)***	-0.078 (0.004)***	-0.000 (0.002)
ESOPg5	0.027 (0.003)***	0.031 (0.003)***	-0.010 (0.006)	-0.004 (0.006)	0.135 (0.004)***	0.058 (0.003)***
Restructuring ESOP				-0.056 (0.003)***		
Unionization	0.166 (0.015)***	0.117 (0.014)***	0.115 (0.014)***	0.113 (0.014)***		
ESOP * unionization	0.075 (0.008)***	0.029 (0.008)***	-0.031 (0.011)***	-0.009 (0.012)		
ESOPg5 * unionization			0.115 (0.016)***	0.115 (0.016)***		
Firm wage ratio		0.277 (0.000)***	0.277 (0.000)***	0.277 (0.000)***		
Leverage					0.017 (0.001)***	0.019 (0.001)***
ESOP * leverage					0.314 (0.013)***	
ESOPg5 * leverage					-0.361 (0.015)***	-0.052 (0.009)***
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Plant fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	6,606,357	6,606,357	6,606,357	6,606,357	6,759,481	6,759,481
R-squared	0.836	0.848	0.848	0.848	0.835	0.835

Table 4: **Changes to Industry Adjusted Q following the Adoption of an ESOP**.
Table 4 reports results from an OLS panel regression. The dependent variable is industry adjusted Q, defined as fiscal year-end market value of equity plus market value of preferred stock plus total liabilities divided by total assets. Industry adjustment is calculated by subtracting the median Q matched by industry and year. ESOP is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t. ESOPg5 is an indicator variable which assumes the value of 1 if the firm's ESOP is estimated to control more than 5% of the voting shares at any point over the lifetime of the ESOP. All continuous variables are winsorized. Assets are normalized to 2006 $. Age is estimated as the difference between the current year and the first year the firm appears in Compustat. An ESOP is determined to be biased towards highly compensated employees if the plan does not satisfy nondiscriminatory coverage requirement. An ESOP is defined as a restructuring ESOP is the firm realized a decline in sales the year the ESOP was initiated. The sample starts with all firms in Compustat and all observations between 1980 and 2004. We then exclude firms with less than $10M in total assets and firm-year observations for the year of and the year after initiating an ESOP. We also exclude firm-year observations which are more than five years before the ESOP initiation and from more than 10 years after the ESOP initiation and any observations following an ESOP termination. "***", "**", and "*" indicate significance at the 0.01, 0.05, and 0.10 level.

	1	2	3	4	5	6
ESOP	0.106 (0.033) ***	0.209 (0.049) ***		0.318 (0.069) ***	0.322 (0.054) ***	
ESOPg5		-0.190 (0.066) ***	0.015 (0.045)	-0.261 (0.092) ***	-0.189 (0.066) ***	
Log assets	-0.211 (0.006) ***	-0.212 (0.006) ***	-0.211 (0.006) ***	-0.212 (0.006) ***	-0.212 (0.006) ***	-0.211 (0.006) ***
R&D / Sales	0.000 (0.000) ***	0.000 (0.000) ***	0.000 (0.000) ***	0.000 (0.000) ***	0.000 (0.000) ***	0.000 (0.000) ***
CapEx /Assets	1.178 (0.052) ***	1.178 (0.052) ***	1.176 (0.052) ***	1.178 (0.052) ***	1.178 (0.052) ***	1.176 (0.052) ***
Log age	-0.209 (0.008) ***	-0.209 (0.008) ***	-0.209 (0.008) ***	-0.209 (0.008) ***	-0.209 (0.008) ***	-0.210 (0.008) ***
ESOP biased towards highly compensated employees				-0.305 (0.121) ***		
ESOPg5 biased towards highly compensated employees				0.230 (0.156)		
Restructuring ESOP					-0.334 (0.069) ***	-0.121 (0.056) **
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	87,952	87,952	87,952	87,592	87,952	87,952
R-squared	0.577	0.577	0.577	0.578	0.577	0.577

Table 5: **Changes to Industry Adjusted Q Following Adoption of an ESOP: Leverage Effects and Tax Benefits**.

Table 5 reports results from an OLS panel regression. The dependent variable is industry adjusted Q, defined as fiscal year-end market value of equity plus market value of preferred stock plus total liabilities divided by total assets. Industry adjustment is calculated by subtracting the median Q matched by industry and year. ESOP is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t. ESOPg5 is an indicator variable which assumes the value of 1 if the firm's ESOP is estimated to control more than 5% of the voting shares at any point over the lifetime of the ESOP. All continuous variables are winsorized. The sample starts with all firms in Compustat and all observations between 1980 and 2004. We exclude firms with less than $10M in total assets and firm-year observations for the year of and the year after initiating an ESOP. We also exclude firm-year observations which are more than five years before the ESOP initiation and from more than 10 years after the ESOP initiation and any observations following an ESOP termination. Levered ESOP is an indicator variable if the firm's ESOP is funded using leverage. In Columns 2 and 3, Log assets, R&D/Sales, CapEx/Assets, and log Age are included as controls. All continuous variables are winsorized at 1%. Assets are normalized to 2006 $. Age is estimated as the difference between the current year and the first year the firm appears in Compustat. "***", "**", and "*" indicate significance at the 0.01, 0.05, and 0.10 level.

	1	2	3
ESOP	0.365 (0.077) ***	0.210 (0.049) ***	0.115 (0.066) *
ESOPg5	-0.439 (0.101) ***	-0.284 (0.082) ***	-0.141 (0.098)
Leverage	-0.092 (0.021) ***	-0.095 (0.021) ***	
ESOP * leverage	-0.721 (0.278) ***		
ESOPg5 * leverage	1.164 (0.359) ***	0.446 (0.227) **	
ESOPg5 initiated at firm with leverage > sample average			
Levered ESOP			0.139 (0.096)
Levered ESOPg5			-0.052 (0.135)
Plant fixed effects	No	No	No
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
N	87,950	87,950	87,950
R-squared	0.577	0.577	0.577

Table 6: **Changes to Industry Adjusted Q following Adoption of an ESOP Using Two years after Adoption as the Baseline (Panel A) and Controlling for Changes to Number of Shares Outstanding (Panel B)**.

Table 6 reports results from an OLS panel regression. The dependent variable is industry adjusted Q, defined as fiscal year-end market value of equity plus market value of preferred stock plus total liabilities divided by total assets. Industry adjustment is calculated by subtracting the median Q matched by industry and year. ESOP is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t. ESOPg5 is an indicator variable which assumes the value of 1 if the firm's ESOP is estimated to control more than 5% of the voting shares at any point over the lifetime of the ESOP. All continuous variables are winsorized. Assets are normalized to 2006 $. Age is estimated as the difference between the current year and the first year the firm appears in Compustat. An ESOP is determined to be biased towards highly compensated employees if the plan does not satisfy nondiscriminatory coverage requirement. An ESOP is defined as a restructuring ESOP is the firm realized a decline in sales the year the ESOP was initiated. The sample starts with all firms in Compustat and all observations between 1980 and 2004 after excluding firms with less than $10M in total assets. We exclude firm-year observations for the year of and the year after initiating an ESOP. We also exclude firm-year observations which are more than five years before the ESOP initiation and from more than 10 years after the ESOP initiation and any observations following an ESOP termination. In Panel A, we also exclude all observations before an ESOP initiation. We then code the 2nd year after the ESOP adoption as the baseline year (e.g. firm-year observations two years after the adoption of an ESOP are coded as if the ESOP were still not yet implemented.) In Panel B, we use the same baseline as in columns 2-6 of Table 2. In Column 3, share difference 1 y and share difference 5 y are estimated as split-adjusted (shares outstanding at time t - shares outstanding at time t-1 or t-5) / shares outstanding at t-1 or t-5, respectively. In Column 4, we assign a value of 0 to share difference 1 y or share difference 5 if necessary time series data is not available from CRSP to estimate the variable.

	Panel A		Panel B	
	1	2	3	4
ESOP	0.166 (0.085) **		0.162 (0.054)***	0.208 (0.049) ***
ESOPg5	-0.135 (0.115)	0.030 (0.077)	-0.145 (0.072) **	-0.189 (0.066) ***
Log assets	-0.215 (0.006) ***	-0.215 (0.006) ***	-0.204 (0.008)***	-0.212 (0.006) ***
R&D / Sales	0.000 (0.000) ***	0.000 (0.000) ***	0.000 (0.000)	0.000 (0.000) ***
CapEx /Assets	1.169 (0.052) ***	1.169 (0.052) ***	1.455 (0.081)***	1.179 (0.052) ***
Log age	-0.210 (0.008) ***	-0.210 (0.008) ***	-0.103 (0.026)***	-0.210 (0.008) ***
Share difference 1 y			0.014 (0.005)***	-0.000 (0.000)
Share difference 5 y			-0.001 (0.001)	0.003 (0.001)***
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	86,763	86,763	44,998	87,952
R-squared	0.579	0.579	0.623	0.577

Table 7. **Changes to Industry Adjusted Q Following Adoption of an ESOP with Alternative Variable Definitions and Controls.**

Table 7 reports results from an OLS panel regression. In columns 1 through 3, the dependent variable is industry adjusted Q, defined as fiscal year-end market value of equity plus market value of preferred stock plus total liabilities divided by total assets. In columns 4 through 6, the dependent variable is industry adjusted MB, defined as fiscal year-end market value divided by book equity. Industry adjustment is calculated by subtracting the median industry and year value. ESOP is an indicator variable which assumes the value of 1 if the firm has an ESOP at time t. ESOPg5 is an indicator variable which assumes the value of 1 if the firm's ESOP is estimated to control more than 5% of the voting shares at any point over the lifetime of the ESOP. ESOPg10 is an indicator variable which assumes the value of 1 if the firm's ESOP is estimated to control more than 10% of the voting shares at any point over the lifetime of the ESOP. All continuous variables are winsorized. The sample starts with all firms in Compustat and all observations between 1980 and 2004. We exclude firms with less than $10M in total assets and firm-year observations for the year of and the year after initiating an ESOP. We also exclude firm-year observations which are more than five years before the ESOP initiation and from more than 10 years after the ESOP initiation and any observations following an ESOP termination. All continuous variables are winsorized at 1%. Assets and sales are normalized to 2006 $. Age is estimated as the difference between the current year and the first year the firm appears in Compustat. Both age variables are normalized by dividing by 100. "***", "**", and "*" indicate significance at the 0.01, 0.05, and 0.1 level.

	1	2	3	4	5	6
ESOP	0.209 (0.049) ***	0.197 (0.049) ***	0.182 (0.049) ***	0.499 (0.091) ***	0.501 (0.091) ***	0.501 (0.091) ***
ESOPg5	-0.159 (0.096) *	-0.179 (0.066) ***	-0.149 (0.066) **	-0.219 (0.121) *	-0.212 (0.121) *	-0.356 (0.149) **
ESOPg10	-0.045 (0.098)					
Log assets	-0.212 (0.006) ***	-0.432 (0.018) ***		-0.182 (0.010) ***	-0.176 (0.010) ***	-0.176 (0.010) ***
Log assets squared		0.020 (0.002) ***				
Log sales			-0.104 (0.009) ***			
Log sales squared			0.005 (0.001) ***			
R&D / Sales	0.000 (0.000) ***	0.000 (0.000) ***	0.000 (0.000) ***	0.000 (0.000) ***	0.001 (0.000) ***	0.001 (0.000) ***
CapEx /Assets	1.178 (0.052) ***	1.215 (0.052) ***	1.179 (0.053) ***	2.058 (0.097) ***	2.058 (0.097) ***	2.058 (0.0097) ***
Log Age	-0.209 (0.008) ***	-0.196 (0.007) ***	-0.231 (0.008) ***	-0.406 (0.014) ***	-0.404 (0.014) ***	-0.403 (0.014) ***
Leverage					-0.215 (0.039) ***	-0.220 (0.039) ***
ESOPg5 * leverage						0.677 (0.410) *
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	87,952	87,952	87,952	87,952	87,952	87,952
R-squared	0.577	0.578	0.570	0.485	0.485	0.485

Figure 1. Changes to Mean Industry Adjusted Q around ESOP Intiation

Figure 1 charts the sample mean industry adjusted Q for firms which issued ESOPs relative to the year of the ESOP initiation. Year 0 is the year of the ESOP initiation. A small (large) ESOP is an ESOP which never (does) controls more than 5% of the firm's outstanding common stock during the lifetime of the ESOP. The Full Sample includes all available firm-year observations. The Constant Sample is corrected for a possible survivorship-bias. This sample is restricted to those firms for which the complete 16 year time series is available. Thus, the firm composition of the Constant Sample is the same for each year.