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LUMP-SUMS, PROFIT SHARING, AND LABOR COSTS IN THE UNION SECTOR

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ABSTRACT

This paper documents the increase in the use of lump-sum payments and profit sharing plans in union contracts in the 1980s, and evaluates the extent to which these innovations may have contributed to moderation in the growth of labor costs, and increased pay flexibility. We find evidence that lump-sum and profit sharing arrangements reduced labor cost growth at both the aggregate and firm level. But the evidence linking these plans to labor cost flexibility is mixed; although the evidence suggests that profit sharing plans may be associated with greater flexibility at the firm level, there is no evidence that lump-sum plans increase flexibility at either the firm or aggregate level.

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I. Introduction

Wage moderation was an important feature of U.S. labor markets in the 1980s. This trend was most pronounced within the union sector of the U.S. economy. Specifically, wage inflation in the union sector in the latter half of the 1980s was about one-and-one half percentage points lower per year than what would have been predicted from a stable Phillips curve estimated through the 1980s (Bell, 1989; Gordon, 1988; Mitchell, 1985 and 1986). Undoubtedly, the bulk of the moderation in union wage inflation occurred in conjunction with the well-publicized concessions which dominated union settlements in the 1980s, with an increasing preponderance of contracts entailing nominal wage givebacks or reduced wage growth (Bell, 1989). But the moderation in wage inflation also coincided with a rapid expansion of alternative compensation schemes including lump-sum payments and profit sharing plans. These alternative pay plans might, at least in theory, explain a portion of the aggregate wage trend.

The primary purpose of this paper is to explore the extent to which the shift from base wage adjustments to lump-sum payments and profit sharing contributed to the moderation in wage inflation in the union sector. Three complementary hypotheses regarding the effects of the growth of lump-sum payments and profit sharing on aggregate union wage inflation are considered.

First, lump-sums and profit sharing may have changed the wage and nonwage shares of labor costs, shifting some labor costs out of measured wages and salaries and into lump-sums and profit sharing. In this case labor costs may grow as predicted, while aggregate models might still overpredict the level of wage growth. Our evidence indicates that mismeasurement of this sort cannot explain the aggregate trends.

Second, the introduction of performance-related pay (directly through profit sharing

plans, and perhaps indirectly through lump-sums) may have led to increased levels of employment growth for any level of wage inflation, implying a reduction in the natural rate of unemployment. It is well known that in an economy with downwardly rigid wages and involuntary unemployment, the introduction of profit sharing can lead to declining unemployment as well as moderating wage inflation (Weitzman, 1984 and 1985). Empirically, an employment-promoting effect of this sort would imply a downward vertical shift of the aggregate Phillips curve. The empirical results we offer provide some support for this hypothesis, although the evidence in support of the theory is most strong at the aggregate level.

Finally, by introducing a performance-related component into compensation, lump-sums and profit sharing may increase labor market flexibility. In the aggregate, this would make the Phillips curve more vertical, with more labor cost inflation at low unemployment rates and less labor cost inflation at high unemployment rates, in sum implying relatively more labor cost variability for any level of employment variability. Such an effect is of independent interest; in addition, it could explain an episode of persistent prediction errors by Phillips curves that ignore the increased flexibility. The empirical results of our tests suggest that while profit sharing plans probably do enhance flexibility at the firm level, there is no evidence that lump-sums enhance flexibility at either the firm or aggregate level.

II. The Growth of Lump-Sum Payments and Profit Sharing

Union contracts in the 1980s increasingly involved alternative pay provisions such as lump-sum and profit sharing plans. These plans were often instituted in lieu of more standard base wage adjustments. Data documenting these trends were compiled from Bureau of Labor Statistics contract reports, published monthly in Current Wage Developments. This source lists all major collective bargaining settlements covered by the Labor Department involving more

than 1,000 workers, and includes data on the bargaining union and establishment, the industry, the number of workers covered, and settlement terms. Furthermore, the contract reports indicate settlements that included a lump-sum or profit sharing provision.[1] The data set used in this paper compiles information from 5,443 contracts negotiated in 1,241 establishments between 1975 and May of 1988, in private industry, excluding construction.[2]

The first column of Table 1 reports workers signing contracts with lump-sum payments as a percentage of all workers signing contracts in a year, for the years 1975-1988, for manufacturing and non-manufacturing industries separately.[3] The figures reveal the strong growth of lump-sums in the latter half of the 1980s. In 1986 and 1987, in particular, more than half of all union workers were covered by contracts with lump-sum provisions. Moreover, these plans seem to be fully entrenched in labor settlements as of the most recently reported 1988 figures.[4]

The second column reports the percentage of workers signing contracts with profit sharing provisions. Profit sharing plans have been far less prevalent than lump-sum plans, especially in non-manufacturing, and exhibit a tendency to taper off in the latter part of the 1980s. One explanation for this is that in an adversarial bargaining environment of the type

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[1]Unfortunately, formulas for lump-sum payments specified in the contract language are often based on levels of pay that are not reported. Consequently, it is not possible to determine the value of lump-sum payments.

[2]For more details on the construction of the data set, see Bell (1989).

[3]The trends in lump-sums, profit sharing, and wage concessions are not qualitatively altered by indexing the table according to the share of contracts containing each of the provisions, as opposed to the share of workers.

[4]The most recent compatible data from the Bureau of Labor Statistics indicate that greater than 42% of workers settled on a contract with a lump-sum provision in the first nine months of 1990.

that characterizes most of collective bargaining in the United States, workers and managers are likely to view profit sharing schemes skeptically, and their adoption will be less likely in the absence of a strong union that can monitor profit reporting.

The third column reports the percentage of workers signing contracts that involved wage concessions, defined as nominal wage freezes or reductions in the first year of the contract, and documents the retrenchment in wage settlements in the union sector over this period. Given the tendency for base wage freezes and reductions in the 1980s, it is perhaps not surprising that alternative methods of increasing pay to workers emerged at this time.

The fourth and fifth columns report the percentages of workers with overlapping wage concessions and either lump-sum payments or profit sharing plans. The interest is in documenting the degree to which lump-sum and profit sharing plans occurred independently of wage concessions. As is evident from the table, although lump-sum and profit sharing plans are associated with wage freezes and reductions, the overlap is by no means complete, and a significant share of lump-sum and profit sharing plans were adopted in contracts that bad positive base wage adjustments. Most importantly for our purposes, this suggests that the link between lump-sum and profit sharing plans on the one hand, and aggregate wages on the other, is unlikely to be a direct pass-through from wage concessions, although this possibility is considered directly using the firm-level data.

III. The Relation Between Lump-Sums, Profit Sharing and Wage Inflation: Evidence from Aggregate Data

It is well known that aggregate wage equations tended to overpredict wage inflation in the 1980s, for the economy as a whole (Gordon, 1988; Neumark, 1989), and in the union sector (Bell, 1989; Mitchell, 1986). Table 2 documents this tendency for the union sector, using the

Employment Cost Index for wages and salaries for union workers. The sample period covers the period from the inception of the ECI for union workers, in 1975, through 1988. The first column reports estimates of a standard wage equation for the union sector, using quarterly data. The unemployment rate for prime-age males is used as the measure of aggregate cyclical activity. The specification also includes (as do the remaining specifications in this table), a twelve-quarter geometric distributed lag of inflation in the personal consumption expenditures deflator, with the sum of the coefficients constrained to unity, and quarterly seasonal dummy variables.[5] The structural shift of the Phillips curve is demonstrated in column (2), in which a dummy variable set to one for the 1984-1988 period (the period of greatest overprediction) is added to the equation. The estimated coefficient on this variable indicates that wage inflation was nearly one-and-one-half percentage points per year lower than would have been predicted by a stable Phillips curve estimated over the entire sample period.

In columns (3) and (4) the share of workers signing contracts with lump-sums is added to the equation. The results indicate that the moderation of wage inflation in the 1984-1988 period can be attributed, at least statistically, to the growth of lump-sums over this period. The point estimates on the lump-sum share coefficient in columns (3) and (4) imply that a ten percentage point increase in the share of workers covered by lump-sum contracts reduces the annual rate of wage inflation by 0.3 or 0.4 percentage points. Given that the share of workers covered by contracts with lump-sum payment plans rose by about 50 percentage points over the period 1984 to 1988, the point estimates imply that by 1988 lump-sums acted to reduce wage

[5]Results for this specification and the other specifications in the table were unchanged by using a union unemployment rate (estimated from unemployment rates for major industrial sectors, weighted by union coverage in those sectors), or including productivity growth or minimum wage measures. Similarly, results were qualitatively unchanged in models in which the lag on price changes was not constrained to unity.

inflation by about one-and-one-half percentage points from what it otherwise would have been. The estimates in column (4) show, moreover, that the 1984-1988 shift of the Phillips curve disappears once account is taken of the changes in the share of workers covered by lump-sums, although the coefficient of the lump-sum share becomes statistically insignificant.[6]

In columns (5) and (6) the share of workers with profit sharing provisions is added to the equation, instead of the lump-sum share. The estimates in column (5) imply that the growth of profit sharing has had an effect on union wage inflation of a similar magnitude to the effect of the growth in lump-sums; a ten percent increase in the percentage of workers covered by lump-sums leads to a 0.3 percentage point reduction in wage inflation. The estimates in column (6), however, show that the profit share variable is less strongly related to the structural shift of the Phillips curve than was the lump-sum share. This is attributable to the lower share of workers covered by profit sharing contracts in nonmanufacturing, and the tapering off of these contracts (in manufacturing) in the last few years of the sample period when the shift of the Phillips curve was most pronounced.

In sum, the estimates in Table 2 suggest that the growth of lump-sums, and to a lesser extent profit sharing, may explain a portion of the structural shift of the Phillips curve in the union sector. There are however, several alternative explanations for the observed aggregate relationship.

First, the spread of lump-sum payments could lead wage inflation measures increasingly to understate true labor cost inflation in the economy, particularly given that lump-sum plans were often partial substitutes for base wage increases in union contracts. In this environment

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[6]Given that there is little variation in the share of workers covered by lump sums prior to 1984, this result is hardly surprising; the lump-sum share variable entered in columns (3) and (4) is not much different from the post-1983 dummy variable.

any labor cost measure that excluded lump-sums and profit sharing plans might understate the true growth in labor costs. Indeed, the Employment Cost Index (ECI) for wages and salaries, which was used in the Phillips curve estimates in Table 2, explicitly excludes lump-sum payments. One way to gather partial evidence on this mismeasurement hypothesis is to consider the ECI for total compensation for union workers. This latter index has been compiled since 1980, and includes lump-sum payments, as well as other components of compensation costs such as fringe benefits. Although this provides only a very short time series for comparison, it may nonetheless be instructive to compare Phillips curves estimated with the wages and salaries ECI to Phillips curves estimated with the compensation ECI.

Although plausible in theory, the mismeasurement hypothesis is unlikely to account for large differences between wage and salary growth and compensation growth, because lump-sum payments represent a very small component of non-wage and salary employment costs. Beginning in 1988 the BLS has published the components of non-wage and salary compensation in the ECI for union and nonunion workers. In both years, non-wage and salary costs accounted for 27.3 percent of total compensation costs. The share of bonuses (which are not exclusively lump-sums) in non-wage and salary costs in the union sector was very small, equal to 0.4 and 0.5 percent in each of 1988 and 1989, respectively (U.S. Department of Labor, 1989).[7] Given the magnitude of these figures, it seems unlikely that mismeasurement could

[7]The size of non-production bonus payments in these data may, however, be understated. Using actual contract data, Erickson and Ichino (1989) have tabulated characteristics of contracts with lump-sum provisions for manufacturing, over the 1982-1988 period, for firms with over 500 workers. Their figures indicate that for these firms, lump-sum payments averaged between 1.6 and 3 percent of the base wage over the life of the contract. Multiplying these estimates by the 72.7 percent share of compensation costs going to wages and salaries (in 1988), as reported in the ECI, and then halving these estimates to reflect the approximately 50 percent of workers who received lump-sum payments in 1988, yields estimates in the range of 0.6 to 1.1 percent. The differences between these estimates and the ECI estimates may be because the value of lump-sum payments are lower in non-manufacturing.

account for a majority of the overprediction in the aggregate wage equations.

In Table 3 we examine the mismeasurement hypothesis by reestimating the Phillips curve using the Employment Cost Index for compensation, a data series that includes lump-sums. For purposes of comparison, column (1) reports estimates of the Phillips curves using the wages and salaries ECI for the shorter period during which both ECI wage and salary and ECI compensation measures are available. Despite the shorter sample period, the overprediction of wage and salary inflation in 1984-1988 persists. In column (2) this equation is reestimated using the compensation ECI. In contrast to the prediction of the mismeasurement hypothesis, the extent of overprediction is actually somewhat higher in the compensation series than in the wages and salaries series. Given the relatively small weight of bonuses in total compensation, and given the empirical results from the Phillips curve equations, it seems unlikely that a shift from wage to nonwage labor costs is driving the aggregate relationship between alternative pay plans and wage inflation moderation.

A second alternative to the view that lump-sums and profit sharing plans have led to a downward shift of the Phillips curve is that their introduction has increased labor market flexibility, and thereby rotated the Phillips curve. While profit sharing plans have an obvious performance-related component given that payments are contingent on the performance of the firm, lump-sums may enhance flexibility in less explicit ways. Unlike base wages, lump-sum payments do not enter into the calculation of worker overtime, fringe benefits, or pensions. Firms may be more willing to increase the size of the lump-sum payment when profits rise, since any increase will go unfactored into base wages and hence benefits, and therefore may be easier to reduce if firm performance falters. Finally, the payment of lump-sums is sometimes explicitly contingent on profits exceeding some pre-announced target level (Bell, 1990). In this regard, the spread of lump-sums (as well as profit sharing) could lead to a more vertical

Phillips curve, as wage flexibility is increasingly substituted for employment stability.

Although theoretically appealing, the suggestion that greater flexibility caused a rotation of the Phillips curve that led to wage moderation in the latter half of the 1980s seems empirically questionable. The implication of a clockwise rotation in the underlying Phillips curve is that wage inflation is *underpredicted* at levels of unemployment below the natural rate. For example, it seems reasonable to posit that the economy was operating at levels at or below the natural rate of unemployment in the relatively low unemployment period from 1984-1988, in which case greater flexibility would have implied *greater* wage inflation. Only if the natural rate was also declining over this period (*i.e.*, only if the Phillips curve shifted downward as well), could the pattern of residuals observed above be reconciled with the flexibility hypothesis.

To explore the possibility that the Phillips curve became more vertical, while simultaneously allowing for a vertical shift (or decline in the natural rate), a specification of the Phillips curve in which lump-sums and profit sharing can affect both the natural rate of unemployment, as well as the slope of the Phillips curve (independently of the natural rate) was estimated.[8] The specification is given by:

$$w_t = \sum_i \alpha p_{t-i} + \beta_1 (UR_t - (\delta_0 + \delta_1 SHR_t)) + \beta_2 (UR_t - (\delta_0 + \delta_1 SHR_t)) \cdot SHR_t + \epsilon_t.$$

where w_t and p_t are the rates of wage and price inflation, UR_t is the unemployment rate, SHR_t is the share of workers covered by lump-sum or profit sharing provisions, and $(\delta_0 + \delta_1 SHR_t)$ is the natural rate of unemployment. As in Table 2, the price inflation term is a geometric distributed lag of past price inflation, with the sum of the coefficients constrained to unity. The

[8]This specification was developed in Neumark (1989).

prediction that lump-sums or profit sharing increase labor market flexibility implies that β_2 should be negative, so that the spread of lump-sums or profit sharing steepens the Phillips curve. If δ_1 is constrained to zero, then lump-sums or profit sharing affect the slope of the Phillips curve without affecting the natural rate of unemployment, which is given by δ_0. Alternatively, if δ_1 is not constrained to zero, lump-sums or profit sharing may also influence the natural rate.

Non-linear least squares estimates of this specification are reported in Table 4. Columns (1)-(3) report estimates with the lump-sum variable entered, while in columns (4) and (5) the profit sharing variable is entered. In column (1), β_2 is constrained to zero. This specification is observationally equivalent to that in column (3) of Table 2. The difference is that now what is being estimated is the effect of lump-sums on the natural rate, and not their direct effect on the rate of wage inflation.[9] As before lump-sums appear to have a statistically significant effect in lowering wage inflation (via lowering the natural rate).

Column (2) constrains δ_1 to equal zero, and thereby reports estimates of the impact of lump-sums on the slope of the Phillips curve, leaving the natural rate unaffected by lump-sums. In contrast to the prediction of the flexibility hypothesis, the estimate of β_2 is positive, not negative, and is statistically significant. This suggests that, if anything, the spread of lump-sums is associated with a slight flattening of the Phillips curve. To attempt to distinguish between the two potential effects of lump-sums, column (3) reports estimates of the unrestricted model. The positive effect of lump-sums on the slope of the Phillips curve, and the negative effect on the natural rate, persist, although the slope shift parameter (β_2) becomes statistically insignificant.

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[9]To recover the estimated effect on wage inflation (in Table 2), the estimate of δ_1 must be multiplied by the estimate of β_1.

Columns (4) and (5) repeat this analysis for profit sharing, with similar results. Column (4) reveals a negative impact of profit sharing on the natural rate, although in this parameterization the effect is not significant. As for lump-sums, the estimates reported in column (5) do not support the flexibility hypothesis, since the slope coefficient, while statistically insignificant, is positive. (Estimates of the unconstrained model corresponding to column (3) did not converge.)

In sum, the aggregate results do not support the hypothesis that the spread of lump-sums or profit sharing in union contracts has led to increased labor market flexibility. Instead, the results suggest that alternative compensation schemes of this sort have led to a vertical downward shift of the Phillips curve for wages. To the extent that this represents a new stable relationship between wage inflation and unemployment, it suggests that alternative pay plans of this sort may have led the economy towards a lower natural rate of unemployment.

IV. The Relation Between Lump-Sums, Profit Sharing, and Labor Costs: Evidence from Firm-Level Data

Firm-level data can be used to assess whether labor costs grew more slowly at firms with lump-sums or profit sharing, or instead grew more slowly at all firms in the period in which lump-sums and profit sharing expanded. Because lump-sums and profit sharing plans were increasingly common in the latter part of the 1980s when wage moderation was strongest, cross-sectional within-year firm-level data can provide a valuable supplement to the evidence from the aggregate data. The firm-level data are also used to examine whether lump-sums or profit sharing are associated with faster employment growth or increased labor market flexibility in firms that have adopted these alternative pay plans.

In order to evaluate the link between wage moderation and lump-sums and profit

sharing at the firm level, the collective bargaining data used in Table 1 were matched to firm data from Standard and Poor's Compustat data base. The Compustat data base contains detailed financial information on all publicly-held firms. Not every firm in the bargaining data set is included in Compustat, and the matching between the two data bases reduced the number of establishments from 1,241 to 304. In terms of location, length of contract, and payment terms the matched subsample is quite similar to the full collective bargaining data set. By industry, the subsampled matched data set is more heavily weighted toward manufacturing industries.[10] The observations retained are the contract-firm pairs for the years in which the contracts were negotiated. Intermediate years were not retained because contract-firm pairs could not be matched consistently for non-contract years.[11]

It must be emphasized that the data are far from ideal. Although the Compustat data base contains measures of employment and labor costs at the firm level, these data cover all employees of the firm, not exclusively the unionized workers to whom the contract data refer. In addition, data on labor costs and employment are missing frequently in the Compustat data base.

Table 5 reports descriptive statistics for the subsample of matched firm-union pairs for which relevant data are not missing. The table shows that firms in which a lump-sum or profit sharing plan was negotiated had lower labor cost growth than firms with neither type of plan.[12,13] Of course, the negative association between lump-sums or profit sharing and labor

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[10]This data base was initially developed for use in Bell (1989). Further details on its construction are given in her paper.

[11]It is an anomaly of the Current Wage Developments data that firm-union pairs often "disappear" from the data for certain contract cycles.

[12]For clarity, we will usually refer to lump-sum or profit sharing *firms*, rather than *observations*, although firms may have contracts with lump-sums or profit sharing in only a

cost growth may be attributable to other factors, such as the performance of the firm. First, firms with lump-sums or profit sharing also had lower sales growth and productivity growth, both of which may lower labor cost growth. Second, firms with lump-sums or profit sharing were concentrated in the latter part of the sample (consistent with Table 1), when labor costs overall grew more slowly.[14] A test of the influence of lump-sum and profit sharing plans on labor cost growth at the firm level must control for these types of differences.

Table 6 reports regression estimates that evaluate the extent to which lower labor cost growth in firms with lump-sums or profit sharing persists when various controls are added. In all cases random effects estimates are reported,[15] as well as test statistics for random effects *vs.* fixed effects (Hausman, 1978). In no case was random effects rejected in favor of fixed effects.[16] These regressions should not be interpreted as reduced form or structural estimates of labor demand equations; in unionized firms, it would be more reasonable to estimate labor demand equations with wages as the exogenous variables, since it can be argued that unions typically negotiate over wages and not directly over employment. Rather, the regressions simply explore the association between labor cost growth at the firm level and the existence of

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subset of the years for which they are in the data set.

[13]In addition to salaries and wages, labor costs in the Compustat data base are defined to include: (i) incentive compensation, (ii) other benefit plans, (iii) payroll taxes, (iv) pension costs, and (v) profit sharing. Specifically excluded from the labor cost measure are commissions.

[14]For this sample, annual labor cost growth averaged 10.7 percent in 1978-1983, and 4.0 percent in 1984-1987.

[15]LIMDEP routines for panel data estimators with unbalanced panels were used (Greene, 1990).

[16]The failure to reject random effects in favor of fixed effects is probably attributable to the specification of the regressions in terms of changes in labor costs; it seems unlikely that firms could differ persistently over time in growth rates of labor costs.

lump-sum or profit sharing plans.

Column (1) of Table 6 reports results with the annual growth of labor costs as the dependent variable, and dummy variables for whether there was a lump-sum payment or profit sharing provision in the contract. Labor cost growth was 3.9 percentage points lower in firms that had a lump-sum payment plan in that year, and 8.0 percentage points lower in firms that had some sort of profit sharing arrangement.[17] Column (2) adds a control for the percentage change in productivity, using nominal sales per employee as a proxy. As expected, the change in productivity enters positively. But the lower labor cost growth associated with lump-sums or profit sharing persists. The same is true in columns (3)-(5), in which controls are added for percentage changes in employment, sales, and profits, in an attempt to control for the variables most likely to be correlated with overall firm performance. Finally, in column (6) industry dummy variables are included to control for industry specific effects at the two-digit level, with little statistical impact on the magnitude or significance of the association between labor costs and either lump-sums or profit sharing at the firm level. Together, columns (1)-(6) indicate that the lower labor cost growth in firms with lump-sums or profit sharing cannot be explained by differences in variables that play a role in standard microeconomic models of labor demand.[18,19]

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[17]The dummy variable on lump-sums and profit sharing is set to one if the firm has a contract with a lump-sum plan or profit sharing plan in the year over which labor cost growth is measured.

[18]Because there is a single labor cost measure in Compustat, which includes all components of compensation, the mismeasurement hypothesis cannot be explored directly. But because this labor cost measure is not restricted to wages and salaries, the pure measurement error hypothesis is contradicted by lower labor cost growth in lump-sum firms.

[19]Estimates indicate as well that the effect of lump-sum and profit sharing plans on labor cost moderation is independent of the initial level of the firm's base wage. Although base-year wage levels of firms entered with significant negative coefficients in the regression, their

Columns (7)-(9) test the alternative hypothesis that the negative association between labor cost growth and lump-sums or profit sharing arises solely from time series variation (given that lump-sum and profit sharing observations are concentrated in the later part of the sample when overall labor cost growth was lower), or alternatively, solely from the tendency of lump-sums and profit sharing plans to coincide with wage concessions. Adding a dummy variable for whether there was a wage concession, in column (7), reduces the magnitude of the negative relationship between lump-sum and profit sharing plans and labor cost growth, and makes the former insignificant, implying that an independent negative effect of lump-sums on labor cost growth cannot be inferred from these data.[20] Note that despite the inclusion of the wage concessions variable, profit sharing is still strongly negatively associated with lower labor cost growth. In column (8), individual year dummy variables are added to the regression. This also causes the association between lump-sums and labor cost growth to weaken statistically, but has only a small effect on the association between profit sharing and lower labor cost growth, which remains significant. As an alternative, in column (9) the annual rate of growth in the wages and salaries ECI for private industry workers is added instead of individual year dummy variables. The results are qualitatively unchanged. Overall, the estimates in columns (7)-(9) indicate that although the negative relationship between profit sharing and lower labor cost growth arises from profit sharing *per se*, the possibility that the lump-sum and labor cost

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inclusion did not affect either the sign or significance of the lump-sum or profit sharing variable.

[20]This contrasts with findings in our earlier paper (Bell and Neumark, forthcoming), in which, excluding controls for profit-sharing provisions, including the wage concession dummy variable did little to reduce the negative association between lump-sums and labor cost growth. This is presumably attributable to observations with both lump-sum and profit sharing provisions, and relatively low labor cost growth.

association arises solely from the time series correlation cannot be rejected.[21]

To the extent that lump-sum and profit sharing plans affect labor cost growth they may affect employment growth as well. Specifically, the presumption is that profit sharing plans are likely to lead to enhanced employment growth relative to firms in which a profit sharing component of pay is absent (Weitzman, 1985, 1986). The same link may exist between lump-sums and employment if lump-sums have a performance-related component.

Table 7 examines the possibility that lump-sum and profit sharing plans lead to greater employment growth, linking employment growth by firm to a series of firm-specific performance indicators, and dummy variables indicating whether or not the firm had a lump-sum or profit sharing plan. The estimates in column (1) indicate that firms that had lump-sum and profit sharing plans as a part of their contract experienced, on average, higher employment growth, although the differences are not statistically significant. When the wage concession control is added in column (2) these differences grow, and the employment growth differential for lump-sum firms is statistically significant; the wage concession control probably acts to remove the influence of adverse conditions at the firm in the year in which the lump-sum or profit sharing plan was first negotiated. In columns (3) and (4) individual year dummy variables and the rate of growth of average annual payroll employment are included in the equation in order to remove the influence of the concentration of lump-sums and profit sharing in years with particularly high or low employment growth overall. This has little effect on the estimates. Finally, in column (5) industry dummy variables are added. This reduces the

[21]One explanation for this finding with regard to lump-sums may be that lump-sum payment plans are diverse across firms, varying in form, timing, and generosity of payment, and are therefore poorly measured in our data set, which treats lump-sum payments as a dummy variable without distinction to the type of lump-sum plan. The reduction in the estimated effect of lump-sums in columns (7)-(9) may therefore be attributable to a decline in the signal-to-noise ratio as time-series controls are added.

employment growth differentials considerably, but adding this set of dummy variables may strain the ability of the data to detect employment growth differentials. In sum, there appears to be weak evidence of higher employment growth in firms with contracts containing lump-sums or profit sharing.

Finally, lump-sums and profit sharing can enhance the flexibility of labor costs at the firm level, lessening downward rigidity (and presumably upward rigidity as well) and making labor costs more responsive to aggregate demand. Greater flexibility implies relatively higher labor cost variability, and lower employment variability, at firms with lump-sums and profit sharing plans.

The degree to which lump-sums and profit sharing are associated with greater flexibility at the firm level is explored in Table 8. In panel (1), the standard deviations of labor cost and employment growth for lump-sum firms, profit sharing firms, and the remaining firms are reported. These standard deviations do not reveal the expected pattern for either lump-sum or profit sharing firms. Lump-sum firms have lower standard deviations of labor cost and employment growth, while profit sharing firms have higher standard deviations for both variables.

In the next two panels of the table, the influences of overall trends in labor costs and employment, as well as industry differences in the variability of labor costs and employment, are removed. Panel (2) reports standard deviations of residuals from regressions of changes in labor costs and employment on year and industry dummy variables. Profit sharing firms have higher labor cost variability, and lower employment variability, consistent with greater flexibility in firms with profit sharing plans. Firms with lump-sum plans, in contrast, exhibit lower standard deviations of both labor costs and employment growth. In panel (3), the analysis is repeated using changes in the ECI (in the labor cost regression) and payroll

employment (in the employment regression) instead of individual year dummy variables. The results for profit sharing firms are strengthened slightly.

Panels (4)-(7) of the table control for firm-specific variables used in the preceding tables. Panel (4) adds the percentage change in employment to the panel (3) specification, and shows that profit sharing firms continue to exhibit greater flexibility as measured by wage growth variation while lump-sum firms do not. Panel (5) adds the percentage change in sales to the specification, with little change in the qualitative results. Finally, controlling for productivity and profit growth, in panels (6) and (7), reduces the variability of labor cost growth in profit sharing firms considerably; however, these specifications eliminate the independent source of variation in labor costs unique to profit sharing firms, and therefore do not contradict the basic flexibility result.

In sum, the firm-level results suggest that an association does exist between lower labor cost growth and the existence of a lump-sum or profit sharing plan at the firm level, although for lump-sum plans, this pattern may simply reflect the time-series association observed in the aggregate data. In addition, the evidence suggests that profit sharing plans are associated with greater labor cost flexibility while lump-sum plans are not.

V. Conclusion

This paper analyzes the relationship between lump-sums, profit sharing and labor costs in the union sector of the U.S. economy. There are four main findings to report:

First, lump-sum and profit sharing plans were increasingly prevalent in union contracts in the latter half of the 1980s. Moreover, the use of lump-sums in union contracts does not appear to have curtailed, although wage concessions and profit sharing plans became less prevalent. Second, the expansion of lump-sums, and to a lesser extent profit sharing,

coincides with the moderation of aggregate wage inflation in the union sector in this period, and including measures of the prevalence of lump-sums in standard Phillips curves greatly reduces the overprediction exhibited by Phillips curve equations in the latter half of the 1980s. This pattern does not appear to be illusory; the moderation of the growth of wages and salaries is echoed in overall compensation.

Third, firm-level data reveal a strong association between profit sharing and lower labor cost growth at the firm level. However, evidence of a significant within-year negative effect of lump-sums on labor cost growth is weaker.

Fourth, empirical findings from the firm-level data are consistent--although the evidence is weak--with two conjectures regarding the use of profit sharing. In years in which they had profit sharing provisions, firms exhibit somewhat larger employment growth, higher labor cost variability, and lower employment variability, relative to other firms (or relative to their own behavior in other years).

Overall, the combined results from the aggregate and firm-level data are somewhat mixed. On one hand, the firm-level evidence casts some doubt on the suggestion from the aggregate data that lump-sums are causally linked to the moderation of wage inflation in the union sector. Profit sharing plans, on the other hand, do appear to be causally linked to labor cost moderation at the firm level in ways consistent with theoretical predictions, and firms with profit sharing plans do seem to exhibit greater flexibility. Despite this fact, the limited extent of profit sharing in the union sector makes it unlikely that the growth of profit sharing plans offer more than a partial explanation of the moderation in union wage inflation in the aggregate.

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Table 1
Workers Affected by Lump-Sum Payments, Profit Sharing Plans, and Wage Concessions (percentage of all workers negotiating contracts in year): 1975:Q1-1988:Q2[1]

MANUFACTURING

	Lump-sum	Profit sharing	Wage concession	Lump-sum and wage concession	Profit sharing and wage concession
1975	1.4	0.0	0.9	0.0	0.0
1976	0.0	0.5	0.2	0.0	0.0
1977	0.0	0.1	0.2	0.0	0.0
1978	0.0	0.0	0.4	0.0	0.0
1979	6.4	41.6	0.1	0.0	0.0
1980	0.1	0.7	0.2	0.0	0.1
1981	16.6	16.7	2.6	1.4	0.7
1982	1.7	36.5	44.8	1.7	33.2
1983	5.9	11.5	40.1	5.5	8.4
1984	69.5	61.4	14.8	9.5	0.9
1985	56.5	12.1	70.0	44.0	1.7
1986	34.1	17.1	67.2	29.1	16.7
1987	75.4	18.0	20.5	13.4	4.3
1988	67.1	12.2	19.6	9.0	0.0

NONMANUFACTURING

	Lump-sum	Profit sharing	Wage concession	Lump-sum and wage concession	Profit sharing and wage concession
1975	1.4	0.0	0.7	0.0	0.0
1976	0.3	0.0	5.1	0.0	0.0
1977	0.0	0.5	0.2	0.0	0.0
1978	6.7	0.0	1.1	0.0	0.0
1979	0.8	0.2	0.0	0.0	0.0
1980	0.0	0.0	0.0	0.0	0.0
1981	1.8	0.0	6.5	0.0	0.0
1982	0.0	0.4	35.9	0.0	0.0
1983	0.7	7.9	12.9	0.4	2.8
1984	15.1	2.2	14.1	4.5	2.2
1985	22.7	1.8	17.2	10.4	1.3
1986	57.7	2.6	13.6	6.8	0.0
1987	49.8	2.1	24.4	17.4	1.8
1988	25.8	0.0	31.3	20.5	0.0

1. A wage concession is defined as a nominal wage freeze or reduction in the first year of the contract.

Table 2
Aggregate Union Wage Equations: 1975:Q4-1988:Q4[1]

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.72	2.27	2.45	2.48	1.87	2.29
	(.80)	(.70)	(.69)	(.70)	(.78)	(.70)
Prime-age UR[2]	-.35	-.36	-.38	-.38	-.32	-.35
	(.14)	(.12)	(.12)	(.12)	(.14)	(.12)
% Lump-sum[3]	...	...	-.03	-.04	...	...
			(.007)	(.03)		
% Profit-share[4]	...	...	...	...	-.032	-.01
					(.016)	(.01)
Post-1983	...	-1.41	...	.38	...	-1.31
		(.33)		(1.28)		(.35)
$\bar{R}^2$	.85	.87	.88	.88	.85	.87
D.W.	1.34	2.00	2.14	2.16	1.57	2.07

1. Dependent variable is quarterly change in the Employment Cost Index for union wages and salaries, at an annual rate. All specifications include a twelve-quarter geometric distributed lag of inflation in the personal consumption expenditures deflator, with the sum of the coefficients constrained to unity. Because the ECI is not seasonally adjusted, quarterly dummy variables are also included. Standard errors are shown in parentheses.
2. Prime-age male unemployment rate.
3. Percentage of workers signing contracts with lump-sum payments; varies annually, not quarterly.
4. Percentage of workers signing contracts with profit sharing provisions; varies annually, not quarterly.

Table 3
Aggregate Union Wage Equations: Wages and Salaries vs. Compensation: 1980:Q1-1988:Q4[1]

	ECI Wages and salaries	ECI Compensation
	(1)	(2)
Constant	.75	.81
	(1.27)	(1.22)
Prime-age UR[2]	-.21	-.14
	(.19)	(.18)
Post-1983	-.97	-1.24
	(.47)	(.45)
$\bar{R}^2$	.87	.89
D.W.	1.95	1.86

1. Dependent variable is quarterly change in Employment Cost Index for union wages and salaries (in columns (1)), and union compensation (in column (2)), at an annual rate. All specifications include a twelve-quarter geometric distributed lag of inflation in the personal consumption expenditures deflator, with the sum of the coefficients constrained to unity. Because the ECI is not seasonally adjusted, quarterly dummy variables are also included. Standard errors are shown in parentheses.
2. Prime-age male unemployment rate.

Table 4
Aggregate Union Wage Equations: Intercept Shift vs. Slope Shift:
1975:Q4-1988:Q4[1]

	Lump-sums			Profit sharing[2]	
	(1)	(2)	(3)	(4)	(5)
β_1	-.38	-.51	-.43	-.32	-.47
	(.12)	(.12)	(.12)	(.14)	(.23)
β_2	...	.02	.005	...	.01
		(.01)	(.003)		(.01)
δ_0	6.45	6.24	6.55	5.91	5.71
	(.95)	(.49)	(.86)	(1.28)	(1.01)
δ_1	-.08	...	-.14	-.10	...
	(.03)		(.07)	(.07)	
$\bar{R}^2$	.88	.89	.88	.85	.85
D.W.	2.14	2.29	2.15	1.57	1.40

1. Dependent variable is quarterly change in Employment Cost Index for union wages and salaries, at an annual rate. The equation estimated is

$$w_t = \sum_i \alpha p_{t-i} + \beta_1(UR_t - (\delta_0 + \delta_1 SHR_t)) + \beta_2(UR_t - (\delta_0 + \delta_1 SHR_t)) \cdot SHR_t + \epsilon_t ,$$

where SHR_t is the share of workers with lump-sum payments (in columns (1)-(3)), and the share of workers with profit sharing provisions (in columns (4)-(5)), and UR_t is the prime-age male unemployment rate. The distributed lag of price inflation is described in the footnotes to Table 1. Also, as in Table 1, quarterly dummy variables are included. Standard errors are shown in parentheses. Coefficients not reported in any column are constrained to zero.

2. The model with δ_1 and β_2 unconstrained did not converge for the profit sharing variable.

Table 5
Description Statistics for Matched
Compustat/Collective Bargaining Data Set: 1978-1987

	All observations (N=204)	Lump-sum (N=35)	Profit-share (N=17)	Neither (N=156)
Δ ln Labor costs[1]	.060	.026	-.012	.072
	(.005)	(.011)	(.022)	(.006)
Δ ln Employment	-.017	-.011	-.030	-.015
	(.007)	(.012)	(.029)	(.008)
Δ ln Sales	.057	.055	.010	.064
	(.008)	(.018)	(.031)	(.009)
Δ ln Productivity[2]	.075	.066	.040	.080
	(.007)	(.018)	(.028)	(.008)
Δ ln Profits[3]	-.357	.051	-1.118	-.354
	(.134)	(.217)	(.760)	(.147)
Wage concession[4]	.270	.714	.824	.128
1978	.005	.000	.000	.006
1979	.113	.029	.059	.135
1980	.103	.000	.000	.135
1981	.103	.057	.059	.115
1982	.098	.000	.000	.128
1983	.118	.029	.235	.122
1984	.113	.114	.059	.115
1985	.098	.229	.118	.071
1986	.196	.429	.294	.141
1987	.054	.114	.176	.032

1. Labor costs per employee.
2. Sales per employee.
3. Income/assets.
4. Nominal wage freeze or reduction in first year of contract.

Table 6
Labor Cost Growth Regressions for Matched Compustat/Collective Bargaining Data Set: 1978-1987[1]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lump-sum dummy variable	-.039 (.013)	-.036 (.012)	-.035 (.013)	-.034 (.011)	-.035 (.012)	-.032 (.011)	-.015 (.013)	-.011 (.011)	.011 (.011)
Profit-share dummy variable	-.080 (.017)	-.065 (.016)	-.080 (.017)	-.068 (.015)	-.066 (.016)	-.063 (.016)	-.049 (.016)	-.053 (.014)	-.054 (.014)
Δ ln Productivity	...	.332 (.040)	...	...	...	...	...	...	...
Δ ln Employment	...	...	-.276 (.052)	-.449 (.053)	-.474 (.059)	-.487 (.058)	-.485 (.041)	-.458 (.040)	-.431 (.039)
Δ ln Sales	...	...	...	.287 (.042)	.291 (.042)	.284 (.042)	.279 (.041)	.250 (.040)	.240 (.039)
Δ ln Profits	...	...	...	...	.003 (.003)	.000 (.003)	.001 (.003)	-.000 (.003)	.000 (.003)
Industry dummy variables						X			
Wage concession dummy variable	...	...	...	...	...	...	-.037 (.013)	...	...
Year dummy variables								X	
Change in ECI	...	...	...	...	...	...	...	...	1.098 (.181)
R^2	.122	.362	.246	.399	.402	.490	.426	.578	.498
Fixed effects vs. random effects[2]	.182	.175	.187	.163	.164	N.A.	.213	.164	.189

1. Random effects estimates. Standard errors are reported in parentheses. Dependent variable is Δ ln labor costs. There are 204 observations.
2. P-values.

Table 7
Employment Growth Specifications for Matched Compustat/
Collective Bargaining Data Set: 1978-1987[1]

	(1)	(2)	(3)	(4)	(5)
Lump-sum dummy Variable	.012 (.016)	.035 (.018)	.022 (.018)	.028 (.018)	.011 (.018)
Profit-share dummy variable	.007 (.022)	.023 (.022)	.021 (.022)	.023 (.022)	.004 (.021)
Wage concession	...	-.040 (.017)	-.042 (.017)	-.040 (.016)	-.016 (.016)
Year dummy variables			X		
Change in payroll employment	...	...	...	.917 (.256)	.901 (.244)
Industry dummy variables					X
R^2	-.003	-.002	.117	.084	.241
Fixed effects vs. random effects[2]	.486	.403	.449	.445	N.A.

1. Random effects estimates. Standard errors are reported in parentheses. Dependent variable is Δ ln employment. There are 204 observations.
2. P-values.

Table 8
Variability (Standard Deviations) of Labor Costs and Employment in Matched Compustat/Collective Bargaining Data Sets: 1978-1987

	Δ ln Labor costs	Δ ln Employment
(1) Raw data:		
Lump-sum	.066	.070
Profit-share	.091	.118
Remainder	.070	.101
(2) Residuals from regressions on year and industry dummy variables:		
Lump-sum	.050	.058
Profit-share	.071	.074
Remainder	.061	.086
(3) Residuals from regressions on changes in ECI or payroll employment and industry dummy variables:		
Lump-sum	.051	.057
Profit-share	.074	.075
Remainder	.063	.090
(4) Add change in employment to panel (3) specifications:		
Lump-sum	.050	...
Profit-share	.071	...
Remainder	.053	...
(5) Add change in sales to panel (3) specifications:		
Lump-sum	.051	.055
Profit-share	.068	.068
Remainder	.060	.081
(6) Add change in productivity to panel (3) specifications:		
Lump-sum	.053	...
Profit-share	.045	...
Remainder	.053	...
(7) Add change in profits to panel (3) specifications:		
Lump-sum	.052	.065
Profit-share	.062	.051
Remainder	.060	.081