

PROFIT SHARING AND GAINSHARING:
A Review of Theory, Incidence and Effects

by

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I. INTRODUCTION

The productivity slowdown that has plagued the U.S. economy since the early 1970's has increased interest in group incentive compensation schemes such as profit sharing and gainsharing, which might improve productivity by inducing workers to work harder, by lowering absenteeism and quits, and encouraging workers to share information with management. Interest in profit sharing also arose from the work of Martin Weitzman (e.g., 1983, 1984), who argued that an economy populated by profit sharing firms would exhibit greater employment stability than an economy in which firms compensate their workers by paying a fixed wage. However, the hypotheses that group incentives enhance productivity and that profit sharing stabilizes employment have been criticized by some economists.

In this paper, our main objective is to review some of the theoretical and econometric work on the effects of profit sharing (PS) and gainsharing (GS) on productivity and the stability of employment.¹ Prior to turning to our review, we discuss some ambiguities and problems concerning what exactly is meant by profit sharing and gainsharing and then summarize some indicators of the prevalence of PS and GS in the U.S. and internationally.

Ben-Ner and Jones (1991) develop a conceptual framework to define and differentiate diverse forms of employee ownership. Their framework is based on the idea that ownership of an asset is commonly viewed in the legal and economics literature as a

¹See Kruse (1993) for a review of previous work on these issues as well as the determinants of the incidence and adoption of profit sharing.

bundle of rights to: (i) financial or physical returns from the asset, and/or (ii) control the use of the asset. They note that ownership rights may be shared among different agents and that ownership arrangements can be described as combinations of these two rights. When this conceptual framework is applied to PS and GS, by definition, PS schemes are restricted to the first type -- participation in economic returns². That is, in PS plans at least part of the compensation for non-executive employees in an establishment or company is dependent on company performance. However beyond this basic feature of PS there is still room for disagreement as to what constitutes "profit sharing". In particular we can distinguish between a *broad* definition, which does not require a PS formula (and is used by many, e.g. Kruse, 1993), and a more *restrictive* definition of PS, which does require an explicit formula (and is also favored by many, including participants at the International Congress on PS in 1889). Additionally, the profit sharing bonus can be paid as cash or deferred by being placed in a pension plan trust (or perhaps consist of both a cash payment and a deferred contribution). In practice, there are noticeable differences in schemes that are classified as profit sharing, including in some instances plans in which the bonus is independent of the firm's profitability

²However, PS frequently overlaps or coexists or is even subordinate to other institutional arrangements in the overall compensation scheme, especially other human resource management practices (HRMPs) that provide for employee participation in control, such as quality circles and joint consultation committees. This makes for great difficulties in trying to get accurate and consistent data on the scope and extent of PS.

(Kruse, 1993).³

In contrast to PS, gainsharing plans often provide for a modest degree of participation in control as well as for participation in economic returns. Indeed in Scanlon Plans employee participation is a central feature. But in the other two main forms of GS, Rucker and Improshare, there is no set procedure for participation, though usual some form of participation is an important feature of the plan (Cotton, 1993). With GS the focus is on improvements in labor productivity (rather than profits) and employees share in the cost saving, typically as a salary supplement soon after the labor productivity improvements are determined. Most GS plans require an explicit formula and plans usually operate plantwide and include all hourly employees. However, differences among GS schemes include: (i) the scope of the group that is covered (normally all non-management employees, but possibly restricted to a few groups); (ii) the formula for cost sharing; (iii) the specific issues on which employees may make suggestions.

We conclude this section by providing some evidence of the nature and prevalence of PS and GS in the U.S. and around the globe. Since space restrictions mean that we cannot provide a comprehensive survey, instead we concentrate on those countries

³For example, Kruse notes that the employer's contribution to some 401k pension plans depends only on the size of the employee's contribution to the plan. However, these pensions plans are classified as a deferred profit sharing.

about which most is known.⁴

Several sources exist from which we can gauge the prevalence of profit sharing in the U.S. Based on the Employee Benefits Survey conducted by the U.S. Chamber of Commerce⁵, the proportion of firms with PS rose steadily from 13% in 1955 and reached 22% by 1969. Since then it has remained between 20% and 23%. For every year from 1979 through 1985, Hewitt Associates report the proportion of the top 250 firms that adopted deferred forms of profit sharing. Their figures are similar to those reported by the Chamber of Commerce. Using a survey of small firms, Chelius and Smith (1990) report that the proportion of small firms with profit sharing was 28% in 1987-- close to what the aforementioned Chamber of Commerce data report for the same year (23%). For rapidly growing public firms, Smith (1988) reports a somewhat higher figure --33% in 1984. The main survey which records an incidence of PS that is noticeably higher was undertaken by Mitchell, Lewin and Lawler (1990). They report that close to 40% of 500 responding business units had profit sharing. However, the low response rate of 6.5% to this survey makes one suspicious of the representativeness of the sample.

A recent study by Kruse (1993) provides information on the

⁴For more extensive reports there are several recent surveys. These include: Uvalic (1990), Perry and Kegley (1990), Rosen, Dorso, and Rothblatt (1990), Ben-Ner and Jones, 1991, and Jones and Pliskin, 1994.

⁵Since 1955, they have conducted annual surveys and have used the survey responses to calculate the proportion of firms that adopt broadly defined profit sharing including both cash and deferred plans.

characteristics of U.S. profit sharing. For 253 public firms with profit sharing, Kruse finds that typically almost 80% of employees were covered by a PS plan. Deferred plans were most common (50% of all plans), followed by cash plans (about 40% of plans) with the remaining 10% a combination of the two types.

In Canada, PS has also grown rapidly: whereas in 1984 bonuses and profit sharing amounted to 1.7 percent of total payroll costs, this figure rose to 3.1 percent two years later (Current Industrial Relations Scene in Canada, 1988). However, much of this growth is explained by the growth of performance-based compensation plans targeted primarily towards executives. Thus in 1985, whereas for executives 24 percent of compensation typically was in the form of contingent incentives, for other managers the corresponding figure was 8.5 percent and for other employees only 4 percent.

Uvalic (1990) has assembled a considerable body of relevant information for firms in the European Economic Community. This study suggested that, while in some countries (Belgium, Spain, Portugal and Greece) PS is only a marginal phenomenon, elsewhere it has assumed a significant presence. In both cash and deferred forms, PS seems to be most common in France: whereas in 1971 there were only 219 cash based PS schemes (covering about 100000 employees), by 1988 there were 4,600 known plans covering almost one million workers (Uvalic, 1990, pp.82-93). The role of PS increased in France during the 1980's from about 3 percent to 4.1 percent of average earnings. Most French firms that share profits

with employees are smaller and tend to be concentrated in services and trade, and transport. As with other forms of PS, the incidence of deferred PS is greatest in France with about 4.5 million workers covered in over 12,000 companies in 1988. Under these plans the average employee receives an amount equal to about 3.5 percent of wages.

Spurred by various tax concessions, PS has also grown rapidly in the U.K. Whereas in 1979 only 78 schemes of a deferred nature were recorded, by 1990 there were more than 7,000 such plans in operation covering more than 2 million employees (Perry and Kegley, 1990). In other Western European countries outside the EEC, the limited data suggest that the phenomenon is not widespread (see Jones, 1991, for Sweden). While this is apparently the case in Eastern Europe too, there is evidence of recent growth (Vaughan-Whitehead, 1994).

The Japanese bonus system has long attracted attention as a form of profit sharing.⁶ The system existed before the Second World War, though the chief beneficiaries were white collar workers in high positions. The present system was introduced in the late 1950's and early 1960's. Bonuses, payable to regular employees, both blue and white collar and in all job categories, were introduced as part of the postwar system democratizing the workplace (Shirai, 1983). The system was actively supported by trade unions.

⁶As we discuss later, there is an ongoing debate over whether the Japanese bonus payment system is a form of profit sharing or a disguised wage.

Presently the bonus system is extensive and important in Japan. Fully 97% of firms that employ 30 or more employees pay bonuses twice a year to regular employees (Ohashi, 1989 p. 451). For most workers, bonuses amount to at least one quarter of pay and on average a regular worker receives bonuses amounting to 3.5 months pay. Thus in firms with more than 30 workers, both in general as well as in manufacturing, the percent of annual total cash earnings paid in bonuses has ranged from 24%-26% from 1981-87 (Hashimoto, 1990 p. 82). Even in smaller establishments (between 30 and 99 employees) over 20% of a regular worker's total cash earnings was in the form of bonus payments (Ohashi, 1989 p. 452). Lastly, in the aggregate, total bonuses paid to employees range from 42% to 76% of company profits (Freeman and Weitzman, 21987 p.170).⁷

However, while the use of bonus payments is virtually universal, only 24.6% of firms have a formal profit sharing plan. For larger firms (employing more than 1000) only 13% have a formal plan (Ohashi, 1989 p. 453-54).

While profit sharing seems to be quite rare elsewhere, there are important exceptions. Thus there is evidence that the practice of PS is deeply rooted in other Asian countries, for example Korea and Singapore. There are also important examples in less developed countries. Thus in rural industries in China, it seems that about 13 percent of firms used a compensation system

⁷For a more extensive discussion of these and other points see Jones and Kato in Vaughan-Whitehead, 1994.

in which bonuses or dividends supplemented fixed wages (Byrd and Lin, 1990. p. 244).

Turning to GS, the 1987 survey by the American Productivity Center (O'Dell and McAdams, 1987) found that the main forms of GS--Rucker, Scanlon and Improshare-- existed in about 13 percent of firms in the US. Two years later the Hewitt Associates (1989) survey revealed that 16 percent of firms surveyed had GS. In both cases GS was found to be more prevalent in manufacturing than in service industries, in larger than in smaller firms, in the Midwest and Northeast (compared to other regions) and in nonunion rather than in unionized settings. About one in three plans includes all employees. Also there is evidence that the idea of GS is catching on with larger firms in Canada (Booth, 1987, and Mitchell Lewin and Lawler, 1990).

The available evidence indicates that GS appears to be practically non-existent outside of North America. In view of the importance of both GS and PS within North America, the virtual absence of GS elsewhere (especially in places where PS is prevalent) is most improbable. It is more likely that there is pronounced underreporting. This might be attributable to a number of factors. For one thing, unlike with other types of HRMPs, especially PS and employee stock ownership, there do not appear to be many advocacy organizations for different forms of GS. Also there does not appear to be any legislation that promotes or provides fiscal incentives for firms to adopt GS. In turn these considerations would lead to diminished pressures for both

government and private sponsored surveys of GS, thus helping to account for what may be substantial "measurement error".

II. THE PRODUCTIVITY EFFECTS OF PROFIT SHARING AND GAINSHARING

Profit sharing and gainsharing are group incentives whose effects on productivity can be analyzed using the same notions that underlie the analysis of other compensation practices. Much of the recent theoretical work on compensation focuses on how to motivate a firm's employees to work harder when it is difficult to monitor their effort.⁸ Compensation practices differ in their ability to induce greater effort and to lower absenteeism and turnover, in their effect on how workers allocate their time across different tasks, and in their costs. Moreover, the effectiveness of a practice is likely to vary with firm characteristics such as size, the nature of the production process, and its human resource management policies, which helps explain the variety of compensation policies employed across firms. For example, when workers are unable to adjust their effort because of the nature of the production process (e.g., machine-paced production), they would likely be paid an hourly wage or a salary.

Firm may use explicit individual incentives such as piece rates, commissions, and merit pay to motivate their workers. In addition, compensation may be linked to individual performance

⁸Many argue that larger firms and larger establishments have greater difficulty monitoring their workers (see, for example, Polachek and Siebert, 1993).

even when workers receive hourly wages or salaries (Polachek and Siebert, 1993). For example, in some models, efficiency wages (payments to workers that exceed their alternative wages) induce greater effort either by functioning as a penalty if the worker is dismissed for shirking or by increasing a worker's loyalty to the firm. Similarly, upward-sloping wage-tenure profiles provide workers with an incentive not to shirk if workers' marginal products rise at a slower rate than their wages. A similar incentive is provided by pensions that are not fully vested.

Group incentives such as profit sharing and gainsharing are often more suitable than individual incentives when measuring an individual worker's output is difficult or when there is team production. However, group incentives potentially suffer from a free rider problem, except when the group is very small. A worker may not increase his or her effort because the incentive bonus generated by the additional effort must be shared with the other workers in the group, thereby diluting the worker's incentive. Since all workers face the same decision problem, they may all work at the same pace as they would absent a group incentive scheme, thus attempting to free ride on the greater effort of the rest of the group. But if they all make this same decision, the group incentive scheme will have no effect on productivity.

Although each worker has an incentive to free ride, except when the group is small, group schemes may induce greater effort either because of "self-monitoring" arising from increased

loyalty to the firm or because of "horizontal" monitoring of workers by other workers. But Lazear (1991) and Kandel and Lazear (1992) argue that horizontal monitoring and other forms of peer pressure are unlikely to arise except in small groups. Cooke (1994) notes that horizontal monitoring might be less effective in unionized firms because union members might be reluctant to report shirking by other members to management. In contrast, Fitzroy and Kraft (1987) offer a more optimistic assessment of the possibility for peer pressure to operate. The likelihood that peer pressure will emerge in medium and large firms may depend on the firm's industrial relations style or corporate culture; as Weitzman and Kruse (1990) and Jones and Pliskin (1991a) have argued, firms in which labor and management cooperate are more likely to realize productivity gains from adopting profit sharing. In particular, participation of workers in decision making is expected to increase the effectiveness of profit sharing⁹. In addition, the free rider problem of group incentive schemes is often diminished in a repeated game model (Weitzman and Kruse (1990), implying that profit sharing and gainsharing may be more effective if worker turnover of workers is low.

In contrast to the free rider argument which implies that productivity should be the same in profit sharing firms and conventional firms, Alchian and Demsetz (1972) argue that managerial shirking that arises from managers sharing profits

⁹However, Jensen and Meckling (1979) argue that the cost of monitoring workers increases as the number of monitors increases.

with workers may result in lower productivity in profit sharing firms than in conventional firms. According to Alchian and Demsetz, efficient monitoring requires that the monitors receive the firm's profits. However, Bonin and Putterman (1987) and Putterman and Skillman (1988) point out that peer monitoring promoted by various participatory policies may be more effective than monitoring by managers in some instances.

Profit sharing firms may invest less than conventional firms if owners receive only a fraction of the return on investment projects (see, for example, Meade, 1986). However, this proposition assumes that it is not possible to adjust the bonus to account for the profits generated by new equipment and structures.¹⁰

Econometric tests of the hypothesis that profit sharing¹¹ enhances firm productivity have primarily relied on an augmented production function framework: output is assumed to be a function of labor, capital, various firm characteristics, and measures of

¹⁰Improshare gainsharing plans, which share the cost reductions arising from greater worker effort equally between owners and workers, allow owners to keep 90% of the cost savings that result from capital expenditures.

¹¹In part, space limitations prevent consideration of the productivity effects of gainsharing. However, most studies have been case studies. While there has been some econometric work (e.g., Kaufman, 1992), they are not based on the same augmented production function framework that has been used to study profit sharing. In Kaufman's case, this reflected his inability to obtain data on output and the capital stock for the firms who participated in his survey.

profit sharing.¹² Econometric issues that arise include the choice of appropriate controls, measures of key variables, and the sample frame and the possible simultaneity of profit sharing and output.

First, profit sharing may be adopted by firms with superior management, and the failure to control for managerial ability might falsely attribute to profit sharing the effects of managerial ability (Wadhvani and Wall, 1990). Since data on managerial ability is often unavailable, a possible remedy when the sample is panel data is to include firm specific fixed effects to control for differences across firms in managerial ability insofar as they are constant over the time period of the sample.

Second, as noted above, the effects of profit sharing on output should depend on firm characteristics. In particular, profit sharing is more likely to be effective when the firm is small so that the free rider problem is less acute and peer pressure is more likely to operate, when the production process is not machine-paced, and when the firm has a corporate culture characterized by cooperation between labor and management, especially including worker participation in decision-making. One approach to capture these differences is to interact the

¹²The productivity effect of profit sharing is estimated from the coefficients on the profit sharing variables. However, this is implicitly measuring differences in the levels of production of profit sharing and conventional firms for common levels of employment and capital stock. But, if profit sharing lowers investment, profit sharing firms will operate with a smaller capital stock than conventional firms.

profit sharing measure with indicators of labor relations and measures of worker participation, employment and perhaps the firm's capital stock if the capital-labor captures important features of the firm's production process.¹³ Alternatively, it would be useful to examine if the estimated effects of profit sharing are robust when the production functions are estimated over samples stratified by the relevant firm characteristics (e.g., size).

Third, profit sharing is only one of the possible compensation systems that firms may adopt. Ideally, the econometric specification should account for the use of piece rates, efficiency wage pay scales, employee share purchase plans, and other compensation schemes. Moreover, the use of these alternative compensation schemes makes the definition of the productivity gains of profit sharing ambiguous: Is the productivity gain relative to a fixed wage scheme that does not have an efficiency wage or deferred compensation component or relative to some other compensation practice?

Fourth, profit sharing has been measured by a dummy variable, the proportion of workers covered, the average bonus per worker, and the ratio of the bonus to wages or total compensation. While measures that capture differences in the

¹³Cable and Wilson (1989, 1990) and Jones and Pliskin (1991b) estimated production functions with these interaction terms. Wadhvani and Wall reported production functions with the capital stock interacted with profit sharing. Cooke (1994) interacted his measure of group incentives (profit sharing or gainsharing) with a measure of participation (work teams) and with unionization.

importance of profit sharing in pay would seem to be preferred, they are more likely to involve simultaneity bias than a profit sharing dummy variable (see below). Additionally, it would be useful to investigate how the effectiveness of profit sharing varies with characteristics of the PS scheme such as whether it is cash-based or deferred and perhaps the age of the plan.

Fifth, studies have used both sales and value added as measures of output. Clearly, the latter is more appropriate, especially when the production function does not include purchased materials as one of the inputs.

Finally, most econometric work assumes that the profit sharing variable is predetermined. If this assumption is false, then the resulting coefficient estimates are biased and inconsistent and the usual test procedures are invalid. We suspect that the simultaneity bias is most serious when profit sharing is measured by the ratio of the bonus to wage or by the average bonus per worker. It is highly questionable that the current bonus is determined independently of current output. On the other hand, it may be justifiable to regard a dummy variable indicating whether or not the firm has profit sharing as predetermined. Clearly it would be useful to test the assumption that the profit sharing measure can legitimately be treated as predetermined and to use an instrumental variables estimation procedure when the test indicates simultaneity may be a problem. Of course, instrumental variables estimation assumes that there are good instruments available.

Econometric evidence overwhelmingly favors the hypothesis that profit sharing enhances productivity.¹⁴ Weitzman and Kruse's (1990) review of econometric studies found that the median increase in productivity is 4.4% (based on the average amounts of profit sharing practiced by the firms that offered profit sharing) with 50% of the estimates falling in the interval from 2.5% to 11%.¹⁵ However, the available econometric evidence does not clearly identify under what conditions profit sharing would be expected to offer large productivity gains. We now briefly review some studies that provide some evidence on possible conditions.

Kruse (1993) used a panel of 500 U.S. firms to examine how the effectiveness of profit sharing varied with characteristics of the plan. He reported that cash plans tend to enhance productivity whereas deferred plans do not, while the use of an explicit formulae is found to have no bearing on the productivity effects of profit sharing. Weak forms of profit sharing (defined as the shared profit constituting less than 4% of total compensation) do not improve productivity.

The evidence is mixed on the effects of firm size and features of the firm's technology on the effectiveness of profit

¹⁴It is not clear whether profit sharing has a statistically significant effect on profitability. One difficulty in determining the effect on profitability from studies based on estimated production functions is that one has to assume or estimate the effect of profit sharing on labor compensation.

¹⁵This review included studies of worker cooperatives that examined how output varied with the degree that workers shared in their cooperative's surplus.

sharing. The positive productivity effects of profit sharing tend to be greater for smaller firms according to the results obtained by Kruse (1993) for U.S. firms and by Jones and Pliskin (1991b) for firms in the British clothing industry, thereby confirming the view that the free rider problem is less serious for smaller firms. However, Wadhvani and Wall (1990), Cable and Wilson (1990, 1991) and Jones and Pliskin (1991b) for British footwear firms did not find that firm size was statistically significant.¹⁶ The productivity gains from profit sharing were estimated to vary inversely with the firm's capital intensity for firms in the British footwear industry (Jones and Pliskin, 1991b). In contrast, Wadhvani and Wall (1990) found that the output elasticity of capital is increased by profit sharing. Capital intensity did not significantly affect the productivity gains of profit sharing in the samples used by Cable and Wilson (1990, 1991) and in the British clothing industry.

The proposition that the productivity effects of profit sharing are enhanced by worker participation programs has not received strong empirical support. Using meta-analysis of 38 published studies, Doucouliagos (1993) found that the association between profit sharing (and individual ownership) is greater in labor managed firms than in more conventional firms, which is consistent with worker participation increasing the productivity

¹⁶Cable and Wilson's estimates of the effect of firm size are not precisely estimated because they interacted their profit sharing dummy variable with numerous firm characteristics. Jones and Pliskin (1991b) results for British printing firms was sensitive to the specification estimated.

gains from profit sharing. In contrast, individual econometric studies do not provide much support for the view that profit sharing and participation are complementary. Kruse (1993) found no evidence that human resource management policies alleged to ease the free rider problem such as information sharing and team production reinforce the productivity effects of profit sharing. We believe that this last finding should be considered preliminary because of somewhat unsatisfactory measures of these policies¹⁷. Cooke (1994) estimated that work teams increased the effectiveness of profit sharing by a modest amount in nonunionized firms and reduced the effectiveness in unionized firms.¹⁸ According to Jones and Pliskin (1991b), worker directors did not enhance the effectiveness of profit sharing. However, worker representation on the board of directors might be a poor proxy for the sort of participation that would induce cooperation between workers and management. In addition, the estimated productivity effect of profit sharing is greatest in the footwear industry, which has more extensive employee representation on the board of directors than either the clothing and printing industries. This might suggest that worker participation enhances the effectiveness of profit sharing. Alternatively, the larger productivity effects in the footwear industry could reflect the

¹⁷Morishima (1991) and Kleiner and Bouillon (1988) use more careful measures of these policies. However, they did not examine the complementarity of profit sharing and these policies.

¹⁸It is impossible to determine from Cooke's reported results if these differences are statistically significant.

relatively small size and low capital intensity of footwear firms.

III. PROFIT SHARING AND EMPLOYMENT STABILITY

The view that employment fluctuations might be moderated by profit sharing (or any scheme that increased the flexibility of compensation) was advanced during the Great Depression (Mitchell, Lewin, and Lawler, 1990 and George, 1993). Since compensation would respond more quickly to unanticipated aggregate demand or aggregate supply shocks under profit sharing than under a fixed wage system in which wages are set by long-term contracts, a profit sharing firm should exhibit less employment *variability*.

Weitzman (1983, 1984) extends the analysis of greater flexibility of pay to a 'share economy' in which most or all firms have adopted profit sharing and contrasts this economy to one consisting of conventional firms that do not adjust wages in the short-run. In a share economy in which firms compensate workers with both a base wage and a share of profits, labor shortages may arise because firms in the short-run will want to hire workers to equate the value of the marginal product of labor to the base wage (the marginal cost of labor) rather than to total remuneration.¹⁹ If the base wage is set sufficiently low,

¹⁹By contrast, in the long-run, profit sharing firms will view total compensation per employee as the marginal cost of hiring an additional worker, and consequently, the long-run equilibrium of a share economy will be identical to that of a economy populated by conventional firms, assuming profit sharing affects neither productivity nor investment.

demand for labor would exceed the available supply, which is determined by total remuneration. Thus, profit sharing firms will often be characterized by an excess demand for labor, which implies that a negative aggregate demand shock would increase unemployment in a share economy by a smaller amount than under a fixed wage system. A positive demand shock will yield the same employment increase in the two systems if the shock occurs at full employment, while a positive demand shock that reverses the effects of a negative demand shock (i.e., a recovery) would induce a smaller employment increase in a share economy (Kruse, 1993).

Weitzman's theoretical case for profit sharing has been criticized for its sensitivity to a number of its assumptions, especially whether the base wage or total remuneration is the marginal cost of labor (e.g., see Estrin, Grout, and Wadhvani, 1987). If firms view total remuneration as the marginal cost of labor, perhaps because of tight labor markets, Weitzman's employment effects will not arise.²⁰

A key assumption underlying the stability hypothesis is that a worker's pay varies with the firm's demand conditions. Thus, the effects of deferred profit sharing and cash plans should be similar if the profit sharing bonuses are equally responsive to

²⁰There are a number of studies testing the validity of the hypothesis that in the short-run, the firm does not regard the profits distributed to workers to be part of the marginal cost of labor. See, for instance, Kruse (1993) for the U.S. and Freeman and Weitzman (1987), Brunello (1991), and Ohashi (1989) for Japan.

variations in the firm's profitability.

To test the stability hypothesis, researchers need to investigate if profit sharing firms respond differently to shocks than conventional firms. Additionally, it is useful to examine separately the employment changes induced by positive and negative demand shocks. The magnitude of the employment changes should depend on the size of the shocks, the degree of flexibility of employee compensation, and the proportion of workers whose pay is flexible. In addition, a test of Weitzman's share economy hypothesis would ideally be based on identifying firms with an excess demand for labor because these are the firms which should exhibit the weakest response to declines in demand.²¹ One difficulty is selecting an appropriate indicator of the demand shocks facing the firm. Both aggregate (economy-wide or industry-specific) and firm-specific measures have been used as proxies. The use of a firm-specific measure such as sales or value added might yield misleading results insofar as profit sharing also stabilizes output as well as employment (Kruse, 1993). The use of economy-wide measures such as the unemployment rate or GDP (or GNP) requires an assumption that firms in different industries respond identically to changes in the measure after controlling for the profit sharing status of the firm. Perhaps an indicator of industry output is best; however it

²¹See Kruse (1993) for an attempt to test the stability hypothesis using estimates of firm's excess demand for labor. The results from this study that we report below are based on a simpler specification that are based on these excess demand estimates.

is useful to examine if findings on the employment stability hypothesis are sensitive to the demand shock proxy. It is expected that employment stability should vary with the degree of flexibility of employee compensation. Finally, if a substantial fraction of a firm's workforce is not covered by a PS scheme, PS firms might behave like conventional firms and layoff workers whose pay is rigid. This concern is especially important if the workers who are not covered by profit sharing are those with less seniority or otherwise more likely to lose their jobs in difficult times.

The view that profit sharing stabilizes employment has received considerably weaker support in econometric studies than the positive findings on the productivity enhancing effects of profit sharing. Moreover, a comparison of previous work is hindered because these studies have implicitly examined three distinct stability hypotheses. The one that seems closer in spirit to the theory we just summarized is that the response of employment to demand shocks is weaker in profit sharing firms than in conventional fixed wage firms.²² The second and third stability hypotheses are that after controlling for the effects of demand (and other factors) on employment, profit sharing firms

²²This hypothesis is examined using an employment equation (or a change in employment equation) which includes measures of negative and positive demand shocks and these measures interacted with the "profit sharing" variable. If profit sharing firms respond to negative shocks differently than conventional firms, the coefficient on the interaction term involving the PS variable and the negative demand shock measure would be statistically significant.

are characterized by more stable employment (second hypothesis) and experience faster employment growth (third hypothesis).

The first hypothesis was tested by Kruse (1991, 1993) and by Wadhvani and Wall (1990). Kruse provided some evidence that the response of employment to negative demand shocks is weaker in profit sharing firms. Kruse (1991) found that profit sharing firms in the manufacturing sector exhibited a statistically weaker response to negative aggregate demand shocks (proxied by measures based on the U.S. unemployment rate, GDP, or industry shipments) than other firms in the manufacturing sector when the proportion of employees who participated in the firm's largest PS plan is used as the measure of profit sharing. (When profit sharing is captured by a dummy variable, the stability hypothesis is supported only when GDP is used to proxy a negative demand shock.) There is no statistically significant difference between PS firms and other firms in the manufacturing sector for positive demand shocks and for nonmanufacturing firms for both demand shocks. Kruse (1993) found that firms that adopted profit sharing during his sample period adjusted their employment to a decline in GNP less than conventional firms.²³ However, firms that had adopted profit sharing prior to the start of the sample did not differ significantly than conventional firms in their response to demand shocks. Also, Kruse did not detect a statistically significant difference between conventional firms and profit

²³Kruse limited his sample of profit sharing firms to those that covered at least 90% of their workers. Thus, a reduction in employment would likely include workers whose pay is flexible.

sharing firms when firm sales was used to measure demand shocks and for positive demand shocks. In contrast to Kruse, Wadhvani and Wall (1990) found that profit sharing firms did not exhibit a different response to aggregate demand shocks (proxied by industry output) than conventional firms.

The second employment stability hypothesis was examined by Bell and Neumark (1993), who regressed the absolute value of the residuals from an employment growth equation on a profit sharing dummy variable and other controls. This is equivalent to examining if the standard deviation of the disturbance term of the employment growth equation depends on the profit sharing status of the firm. While their estimated coefficients on the PS dummy variable are negative, none is statistically significant (the t statistics are "near one").²⁴

Finally, Chelius and Smith (1990) found that among small firms that experienced a decline in sales, profit sharing firms were estimated to have experienced a 4% smaller fall in employment than conventional firms after controlling for the decline in sales, the change in wages, and other firm characteristics. The estimated drop in employment is independent of the size of the firm's sales decline, which is why we consider their result to be a test of the third stability hypothesis rather than the first.

²⁴The hypothesis tests are not strictly valid since Bell and Neumark did not correct for heteroskedasticity in the regression involving the absolute value of the residuals.

IV. CONCLUSION

Our partial survey of recent econometric work on the effects of profit sharing and gainsharing indicates that these alternative forms of labor compensation often affect the economic performance of firms. However, we sometimes find that studies obtained conflicting results. In part this reflects the diversity of alternative sharing arrangements for PS and GS. But also, without careful planning, studies will be likely to suffer from selection bias, inappropriate sampling frames, inability to control for unobservable firm heterogeneity in the absence of sufficiently long panel data sets, and measurement problems.

In view of the several shortcomings of the available evidence, trying to derive definitive conclusions on effects of PS and GS on productivity and employment stability from this work is a hazardous undertaking. Clearly more research on these issues is needed. Moreover, particular results often depend on the specific characteristics of the particular scheme as well as firm characteristics. Thus there is some evidence that the productivity effects of profit sharing are greater in small firms and when the scheme is cash-based rather than deferred. Although individual econometric studies provide only weak support for the view that profit sharing schemes have a stronger impact when they are accompanied by provisions for some employee involvement, a meta-analysis of published studies suggests that profit sharing and worker participation are complementary.

In addition, there are other important areas where there has

been even less econometric work. These include the issue of the determinants of the incidence and adoption of different forms of PS and GS (e.g., Kruse, 1993 and Jones and Pliskin, 1994), the survivability of PS schemes (e.g., Hatton, 1988), and the effect of PS on investment (e.g., Estrin and Jones, 1992).

In designing future applied work, care must be taken to respond to the aforementioned shortcomings of many existing studies. In addition, recent studies (e.g., Nuti, 1993, Levine and Tyson, 1990) have indicated that aspects of the economic environment within which firms operate are of crucial importance for the design and economic effectiveness of different human resource management practices. Consequently, and perhaps especially in cross-national studies, ways must be found to be capture differences in the economic environment. Finally, a potentially most useful approach, especially in helping to isolate the characteristics of successful versus unsuccessful forms of HRMPs are laboratory experimental methods.²⁵

²⁵For example, see the work of Cooper et al (1992) and Frohlich and Oppenheimer (1990). Their work points to the importance of fairness and participation in the design of successful programs.

Notes

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