

Profit Sharing and Workplace Productivity Growth in Canada: Does Teamwork Play a Role?

Partage des bénéfices et croissance de la productivité au Canada : Le travail d'équipe joue-t-il un rôle ?

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Résumé de l'article

L'objectif de cette étude est de contribuer à la connaissance de la participation aux bénéfices en utilisant une analyse avant-après de données recueillies au moyen d'un panel afin d'évaluer si les effets de l'adoption de la participation aux bénéfices sur la croissance de la productivité varient selon qu'on utilise ou non des équipes de travail, cela tout en contrôlant les nombreuses variables qui peuvent affecter ces résultats au sein d'un échantillon soigneusement construit d'établissements canadiens. À notre connaissance, il s'agit de la première étude à examiner le rôle modérateur du travail d'équipe dans la relation entre la participation aux bénéfices et la croissance de la productivité. Outre les implications pour la participation aux bénéfices, déterminer si les équipes de travail constituent des pratiques complémentaires aura des implications importantes pour comprendre comment développer des équipes de travail plus efficaces, un sujet d'intérêt permanent.

Nous avons utilisé un plan de recherche longitudinal afin de comparer la croissance de la productivité au sein d'entreprises au cours de périodes de trois et cinq ans suivant l'adoption d'un « Plan de participation aux bénéfices » à celle d'entreprises n'en ayant pas adopté au cours des mêmes périodes. Dans l'ensemble, nos résultats suggèrent que le recours à la production en équipe joue un rôle modérateur important dans le succès de la participation aux bénéfices des salariés, du moins en termes de croissance de la productivité sur le lieu de travail. Les établissements ayant adopté la participation aux bénéfices ont enregistré une augmentation substantielle et très significative de la productivité sur le lieu de travail au cours des trois et cinq années qui ont suivi son adoption, mais seulement s'ils y avaient des équipes de travail.

Ces résultats sont conformes à l'idée que les équipes de travail contribuent à atténuer les comportements de non-participation dans les entreprises ayant un « Plan de participation aux bénéfices » (Freeman, Kruse et Blasi, 2010) et ils sont également conformes à l'argument selon lequel les équipes de travail constituent un mécanisme efficace pour aider à traduire les prétendus avantages motivationnels et autres de la participation aux bénéfices en gains de productivité tangibles (Heywood et Jirjahn, 2009).

Profit Sharing and Workplace Productivity Growth in Canada: Does Teamwork Play a Role?

Tony Fang, Morley Gunderson and Richard J. Long[†]

Using panel data, we examined whether adoption of an employee profit-sharing plan was related to subsequent productivity growth in Canadian establishments, and whether this relationship was affected by the use of work teams. We utilized a longitudinal research design to compare within-firm productivity growth during the three-year and five-year periods subsequent to profit-sharing adoption and within-firm productivity growth during the same periods in firms that had not adopted profit-sharing. We found significant positive effects of profit-sharing adoption on workplace productivity growth in firms that had work teams in place when profit-sharing was adopted, but not in firms without work teams. Our results highlight the complementarity of profit-sharing and teamwork.

KEYWORDS: profit-sharing, work teams, productivity growth, Canada.

Introduction

Employee profit-sharing (PS) is a pay practice with a long history (Coates, 1991), and one that many firms continue to adopt (Andrews *et al.*, 2010; Kalmi *et al.*, 2005, 2012; Kato and Morishima, 2003; Long and Fang, 2015; Parent, 2002). Although there may be numerous motives for adopting profit-sharing, an important one is the belief that it increases company productivity (Long, 1997). While the research evidence is quite clear that employee profit-sharing does increase company productivity on average (Blasi *et al.*, 2010; Jana and Petera, 2013), the evidence is equally clear that it does not do so in all cases (Kruse, 1993; Lucifora and Origo, 2015; Magnan and St-Onge, 2005; Robinson and Wilson, 2006). Therefore, a key issue is to identify the conditions under which

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this relationship holds, but such conditions have never been empirically verified (Bayo-Moriones and Larraza-Kintana, 2009).

A variable has frequently been proposed as one such condition: team-based work (Heywood and Jirjahn, 2009; Jones *et al.*, 2010). However, there has been very little empirical investigation into whether teamwork does indeed play a role in determining how employee profit-sharing affects company productivity growth. To our knowledge, this is the first study to examine the moderating role of teams in the relationship between profit-sharing and productivity growth.

Using panel data from a large sample ($n=1,540-2,200$) of Canadian establishments, we examined whether, during the same period, workplace productivity growth was greater in workplaces that had adopted profit-sharing than in those that had not, and whether it was even greater in those that also utilized teamwork. We conducted a before-and-after analysis of panel data to assess whether the effects of profit-sharing adoption on a within-firm measure of productivity growth varied depending on whether the establishment had work teams, while controlling for numerous variables that may affect the results, including the union status of the workplace—given the potential effect of unions on productivity. Ascertaining whether profit-sharing and work teams are complementary practices would have important implications for understanding how to develop more effective work teams, a topic of ongoing interest (Barnes *et al.*, 2011; Firth *et al.*, 2015; Lanaj *et al.*, 2013).

Profit-Sharing, Teamwork and Relationship to Productivity

Profit-Sharing

Profit-sharing can affect productivity in three main ways: by making wages more responsive to the firm's financial conditions through substitution of profit-sharing payments for fixed wages (Weitzman and Kruse, 1990); by attracting, developing and retaining a higher quality of human capital (Azfar and Danninger, 2001; Green and Heywood, 2011; Kruse *et al.*, 2010); and by serving as an incentive mechanism to align the workers' interests with the firm's (Blasi *et al.*, 2010). Such alignment may prompt desirable worker behaviours, including increased employee motivation and effort, enhanced cooperation among employees and between employees and management, increased self- and mutual monitoring of worker behaviour, more positive workgroup norms and development of more efficient work methods (Kruse, 1993).

While profit-sharing may help align the workers' interests with the shareholders', its effectiveness in motivating workers may be limited by the "free rider" or "1/N problem" (Alchian and Demsetz, 1972; Jensen and Meckling, 1976; Olson,

1971; Squires and Elnahla, 2020). All else being equal, if more workers participate in a profit-sharing scheme, each worker will receive a smaller proportion of any profit increase attributable to his or her extra effort and will therefore have less incentive to make extra effort. Because an individual worker receives little benefit by increasing his or her effort in a collective reward system, like profit-sharing, such systems are often thought to facilitate “free riding” by workers. Obviously, if all workers under profit-sharing react the same way, profit-sharing will not increase worker effort.

Teamwork

Teamwork has increased as a workplace practice because of its positive effects, many of which relate to its being a component of participatory workplace practices and employee involvement. The positive effects identified in the literature include: 1- increased collaboration and a supportive network that encourages group learning, upward problem-solving and decision-making (Apostolou, 2000; Freeman and Kleiner 2000; Jones *et al.*, 2017); 2- improved work attitudes due in part to getting away from the monotony of the old assembly-line process (Leana *et al.*, 1992); 3- improved employee well-being, trust and collaboration due to a feeling of being part of a team (Freeman and Kleiner, 2000); -4 efficient use of different skills and multi-skills training for multitasking (Gallie *et al.*, 2012); -5 empowerment, job satisfaction, creativity, commitment and motivation, as well as intention to stay (Apostolou, 2000); and 6- increased employee productivity due to the above outcomes (Jones *et al.*, 2010). The last outcome is the focus of our analysis.

While team production can have these positive effects, there can also be negative effects. Akin to the 1/N problem with profit-sharing, teams may encourage “free riding” or even “shirking” whereby workers actually reduce their job effort (Jones, 1984). Such reduction can occur because teams can reduce “task visibility,” thus making it difficult for supervisors to ascertain the level at which individual team members are performing in their jobs. Knowing this, employees will receive no upside benefits for good performance and no downside punishments for poor performance. Research has shown that a reduction in task visibility does, on average, lead to decreased employee performance, a phenomenon known as “social loafing” (George, 1992). However, while the performance of individual employees may be less visible to supervisors when employees are part of a team, the performance of individual employees might be *more* visible to co-workers when they are working together on the same team. But it is doubtful whether team members would be willing to relay information about the performance of teammates to management (as will be discussed shortly); if so, task visibility would remain low, and team members might feel able to shirk with impunity.

Conversely, team members who perform well may feel that this information will not reach management, and that their good performance will go unrecognized. Their motivation will accordingly be reduced.

Potential negative effects of teams could also occur if team members focus on their team's interests and may be loath to divert much effort to coordinating their work with other teams. This inward focus can be a concern if there is a high degree of interdependence among teams in achieving organizational objectives and when teams are compensated with team-based rewards (Firth *et al.*, 2015). For example, in the well-known case of Continental Airlines (now merged with United Airlines), baggage handlers were given team-based rewards to improve the on-time departure rate of flights. The on-time departure rate did increase dramatically, but so did the rate of "lost" or delayed luggage, since baggage-handling teams would simply leave baggage behind if loading it would delay departure (Lawler, 2000). We know that the type of incentive provided to work teams will determine the behaviour of their members (Barnes *et al.*, 2011).

Profit-Sharing and Team Complementarities

While profit-sharing and teamwork can both have positive or negative effects, their interaction with each other may produce additional complementary effects, in part by offsetting some of their potential negative effects (discussed previously) when they exist on their own.

Teamwork can potentially enhance profit-sharing effects on workplace productivity in a number of ways. First, working on a team with decision-making rights can enhance employee empowerment, job satisfaction, creativity, commitment and motivation. It can also encourage employees to buy into implementation of profit-sharing, facilitate information-sharing and communication between management and employees about profit-sharing plans and thus improve the effects of the plans on productivity (Heywood and Jirjahn, 2009; Poutsma *et al.*, 2006).

Second, the rewards from profit-sharing plans may reinforce innovation and creativity through the synergy of teamwork, encourage information-sharing and enhance cooperation among employees and between employees and management, increase self- and mutual monitoring of worker behaviour, foster positive workgroup norms and develop more efficient work methods (Kruse, 1993). In other words, profit-sharing may cause members on the team to "work harder" and "work smarter" and therefore may boost workplace productivity.

Third, in a team setting, profit-sharing may encourage anti-shirking behaviour in a variety of ways. Shirking is more apparent on a team than in a context where employees perform their work in isolation from one another. In an interdependent context, shirking behaviour has the potential to impede the

productivity of other workers, or to make their jobs harder, thus multiplying (in the eyes of workers) its detrimental effects. These factors may cause teams to develop group norms and to engage in “mutual monitoring” to discourage shirking (Freeman *et al.*, 2010). Workers on teams have an incentive to support an intervention by one of their members to deter shirking behaviour, and potential interveners are far more likely to take anti-shirking action if they feel supported by their team members. In essence, teams may mitigate the free rider or $1/N$ problem of profit-sharing.

Fourth, profit-sharing may provide an incentive for helping behaviour in the form of informal training and coaching by co-workers (Green and Heywood, 2011). It can also facilitate formal worker training because there is more opportunity for the training to affect performance, due to the interdependence inherent in teamwork (Gielen, 2011),

Some empirical evidence supports the complementarity of teams and profit-sharing. Jones *et al.* (2010) found strong evidence of complementarity between group and organization-based performance pay and work teams in their study of worker productivity in a Finnish food-processing plant. Heywood and Jirjahn (2009) found a significant negative relationship between firm size and the presence of profit-sharing among German establishments that did not use team production, but not among those using team production. This finding suggests that the German firms without team production were less likely to believe that profit-sharing would be beneficial to them. Green and Heywood (2011) found that the combination of profit-sharing and team-based production increased informal training in a sample of UK firms, and Gielen (2011) found the same for formal training in a sample of British firms. Based on US firms, Freeman *et al.* (2010: 79) found that “workers are most likely to take action against shirkers in workplaces where employees are paid by some form of ‘shared capitalism’ [e.g., profit-sharing]... and where they participate in decisions or work in team settings.”

Methodology

Dataset Construction

In conducting this research, we utilized a longitudinal panel of data, drawn from the *Workplace and Employee Surveys* (WES) conducted by Statistics Canada from 1999 (the first year of the WES) to 2006 (the last year of the WES). The surveys, described in detail in Statistics Canada (2004, 2006), were designed to be representative of the total population of “workplaces” in Canada, while excluding business locations in Canada’s three sparsely populated territories and in government and religious services, road, bridge and highway maintenance

and agriculture and fishing. The WES followed the same workplaces over time, although replacements were made every third year for workplaces that had dropped out of the survey. Statistics Canada defines a “workplace” as a business unit located at a single geographic location. It is analogous to the term “establishment,” which is frequently used in survey research, and which we use here. The response rates for our selected years (1999, 2001, 2004 and 2006) of workplace surveys were 95.2%, 85.9%, 81.7% and 74.9% respectively. Most of the “non-responders” were owner-operators with no paid employees and would have been excluded from our analysis in any case (as discussed subsequently). The declining response rates likely reflect survey fatigue and plant closures, since by 2006 many of the workplaces had been surveyed for seven consecutive years.

From the WES data files, we constructed two panels of longitudinal data—one based on a three-year period subsequent to profit-sharing adoption, and the second based on a five-year period subsequent to profit-sharing adoption. The three-year panel was constructed by first taking the 1999 WES sample and eliminating workplaces if they had fewer than ten employees (since many of our variables are not meaningful in very small workplaces), or if they were not-for-profit enterprises or if they were absent from the 2001 and 2004 surveys. We also eliminated workplaces that reported having profit-sharing in 1999 because the purpose of our longitudinal design was to examine the productivity growth, during the period following adoption, of profit-sharing *adopters* compared to *non-adopters* during the same period, thus allowing us to make a causal inference—something that is seldom possible in large-scale studies of profit-sharing. For those workplaces that had adopted profit-sharing prior to 1999, no data were available on *when* that adoption had occurred. Inclusion of such cases would have diluted our research design.

We also eliminated workplaces that adopted profit-sharing during the period after 2001 (to ensure that all adoptions occurred during the 1999-2001 window), as well as those adopters that did not report the presence of profit-sharing in the later surveys, so that all of our adopters actually had profit-sharing during the entire study period. We used a similar method to create our five-year panel, including only those adoptions occurring during 1999-2001, but using a five-year period (2001 to 2006) to track productivity growth. This method resulted in 1,690 workplaces in our three-year panel, and 1,540 in our five-year panel.

The rationale for our approach is that we wished to identify recent adopters of profit-sharing (i.e., those that had adopted it between the 1999 and 2001 surveys), and then follow the growth in workplace productivity within each workplace during the three-year 2001-2004 period and during the five-year 2001-

2006 period subsequent to the adoption period (1999-2001) for those workplaces that had or had not adopted profit-sharing. Our research design enabled us to use workplace productivity growth as our dependent variable—rather than productivity itself. We could thus assess the impact of profit-sharing adoption on productivity changes in each establishment over time, while minimizing problems of endogeneity through our use of a within-firm measure of productivity growth.

Regression Analysis

We used multiple regression analysis to regress our dependent variable of productivity growth on our key independent variable of profit-sharing adopters versus non-adopters, while incorporating numerous control variables (as measured in 2001 and further discussed in more detail). Using interaction analysis, we also assessed whether profit-sharing adoption had different productivity growth effects when adopted by workplaces with or without work teams in place.

In choosing appropriate time periods of three and five years for assessment of the productivity effects of profit-sharing adoption, we wanted to allow enough time to pass for the possible effects to materialize, but not so much time that too many exogenous events could occur. When assessing the effects of human resource practices on organizational outcomes, Osterman (2000) chose a five-year period, and this choice seemed reasonable to us as our outer limit.

We looked into the possible selection bias that may have occurred if establishments that had adopted profit-sharing differed in unobserved ways from those that had not. First, we used a substantial number of control variables that may also capture the unobserved heterogeneity. Second, we used a two-stage least squares regression model to obtain an estimate of the predicted probability of adopting profit-sharing for the second-stage productivity growth equation. Third, because we used panel data that followed the same establishments over time, unobservable factors were likely fixed within the establishments. The profit-sharing variable could thus be identified for the same firm that had adopted profit-sharing during 1999-2001.

As recommended by Statistics Canada, we weighted each establishment in accordance with its proportion of the general population. The results were thus broadly representative of the Canadian population of establishments. Because larger establishments tended to be over-represented in our sample, the effect of weighting was to apply higher weights to smaller establishments. We did try the analysis using unweighted data, and found somewhat stronger effects, but for this paper we adopted the more conservative approach recommended by Statistics Canada.

Variable Measures

Our dependent variables, main independent variables and control variables are outlined in this section. Means, standard deviations and correlations for our main independent variables are given in Table 1 and discussed in the text.

Dependent Variables

Our dependent variables were productivity growth (percentage change in productivity) during a three-year window (2001-2004) and a five-year window (2001-2006) after the adoption of profit-sharing within the pre-adoption window of 1999-2001. Employee productivity was calculated as gross revenues at a workplace divided by the number of full-time equivalent employees. For the three-year window, the 2001 estimates were subtracted from the 2004 estimates for each workplace, and then divided by the original 2001 estimates to obtain the productivity change during that period. The same was done for the 2006 estimates to get the five-year post-adoption panel. These comparisons over time were based on “within firm” comparisons, with productivity in each workplace compared to productivity in the same workplace either three or five years after 2001, when an establishment was deemed to have adopted or not adopted profit-sharing.

This measure of workplace productivity growth has some major advantages: it can be applied to establishments in many different sectors; it is based on objective data; and virtually all establishments have such data. One drawback is that this metric is a proxy for the quantity of goods or services- their revenue value, which is of course sensitive to the selling price per unit of output. Nonetheless, this measure is regarded as a useful and widely accepted metric for comparing productivity in large, diverse samples (Black and Lynch 1996, 2001) such as ours, where there are few, if any, practical alternatives. We do note that price variation over time is typically industry-specific, and we have included controls for thirteen industry sectors in our regression analyses. This approach may therefore ameliorate the price issue to some degree.

Key Independent Variables of Profit-Sharing and Teamwork

For the key profit-sharing independent variable, an establishment was deemed to have adopted employee profit-sharing if respondents to the 2001 WES responded “yes” to the following question: “Does your compensation system include ... [a] profit-sharing plan? (Profit-sharing plan is any plan in which employees receive a share of the profits from the workplace.)”

Any plans that applied *only* to managers were eliminated from the panel because they were not deemed to be profit-sharing plans for *employees*. We made the judgement call that it would be cleaner to eliminate the manager-only PS

companies from the sample, rather than include them as companies without profit-sharing because “manager-only” profit-sharing is not the same as broad-based profit-sharing available to ordinary employees. It was hard to tell whether it would still have some motivational effect (but only on managers, “1” category) or have no motivational effect as in the no-PS companies (“0” category), so we removed such companies from the sample. All remaining cases were designated “0” (no profit-sharing adoption) or “1” (profit-sharing adoption). As noted in Table 1, of the 1,717 establishments that did not have employee profit-sharing in 1999 (our main dataset for this paper), 247 (14.4%) had adopted it by 2001.

For the teamwork variable, respondents were asked to indicate whether the workplace had “Self-Directed Work Groups” for their non-managerial employees on a formal basis. These were described as “Semi-autonomous work groups or mini-enterprise work groups that have a high level of responsibility for a wide range of decisions/issues.” This is a stringent definition of work teams and should ensure that workplaces with teams in name only were not counted as having work teams.

Responses were coded as either “1” (yes) or “0” (no). We recognize that it may have been preferable to have some measure to assess the extent to which work teams permeated a given workplace, but such data were not available. Thus, a workplace would be counted as having teamwork even if it had only one such group that possibly covered only a small proportion of the employees at that workplace.

That problem is alleviated to some extent because our unit of analysis was not the firm but the workplace, which represents operations at a single location. For a large firm with multiple workplaces, we were assessing the existence of teamwork at each location rather than for the firm as a whole—a much more precise approach than using this metric on an organization-wide basis. Use of the workplace also made the average size of our unit of analysis quite small (an average of 45 employees at each workplace, as noted in Table 1), so that the use of even one work team at a workplace might well comprise a significant proportion of the workforce in that workplace.

Besides the main effect of profit-sharing adoption, we also included an interaction term between profit-sharing adoption and teamwork by multiplying the profit-sharing adoption variable in 2001 by the teamwork variable measured in 2001 so as to capture the complementarities.

Control Variables

Thirteen industry control variables were included with “retail” as the omitted reference category. The relative compensation variable was measured as the ratio

of the workplace compensation to the industry average, to capture a possible efficiency wage effect on productivity for workplaces that paid above the industry norm. A further set of performance pay controls was used to control for the possible effect of performance pay plans other than profit-sharing. A series of dummy variables was included to control for the presence of individual incentives, merit pay, gain sharing and employee stock plans. Such individual incentives have long been found to be positively associated with employee performance and workplace productivity (Lazear, 2000; Mitchell *et al.*, 1990; Parent, 2002; Park and Sturman, 2016). Gain sharing and stock plans could be considered to be a form of profit-sharing, but they are not directly tied to the firm's profitability, as is the case with profit-sharing. That is also why they are dealt with in separate survey questions rather than as part of a single question.

A wide range of establishment characteristics was also included to control for their possible effects on productivity. These characteristics included union density (the proportion of total employees at a given establishment covered by a collective bargaining agreement), establishment size (the total number of full-time equivalent employees at a given establishment), changes in technology as measured by the change in the percentage of computer users over time and the introduction of workplace innovation through new products, new processes, improved products and improved processes.

The percentage change of employment was also included to control for any failure to make layoffs commensurate with declining demand for products and services. Such a failure could reduce reported productivity through hoarding of redundant workers, and such hoarding could vary in degree across different types of establishment. It is well documented in the literature that profit-sharing firms are less likely to lay off employees during economic downturns, especially if the firms have teamwork (Chelius and Smith, 1990; Fang, 2016). The Canadian economy did have a minor downturn from 1999 to 2001. To the extent that profit-sharing firms with teams are more likely to engage in hoarding of redundant workers, this practice could have led to declining productivity in such firms during the 1999-2001 period (and in fact it did, as shown in Figure 1).

Results

Table 1 shows the means, standard deviations and bivariate correlations for the overall sample. As indicated, the different incentive plans are fairly common, ranging from 44% for individual incentives to 11% for employee stock plans. They are also positively correlated with profit-sharing. Larger establishments and establishments that offer higher wages are significantly more likely to adopt profit-sharing, while establishments with higher union density are significantly less likely. The difference likely reflects the reluctance of unions to take on the risk of

TABLE 1
Means, Standard Deviations and Correlations^a

Variable	Mean	s.d.	1	2	3	4	5	7	8	9	10
1. Profit-Sharing Adoption	.14	.35	-								
2. Teamwork	.07	.21	.12***	-							
3. Union Density	.22	.35	-.10***	.09***	-						
4. Establishment Size (00's of emps.)	.45	.13	.03	.11**	.12***	-					
5. Cash Emp. Earnings 2001 (\$000's)	40.58	22.53	.11***	-.03	.03	.03	-				
6. Individual Incentives	.44	.50	.20***	.15***	-.06***	.05**	.08***	-			
7. Merit Pay	.31	.46	.08***	.04*	-.02	.08***	-.01	.36***	-		
8. Gain Sharing	.20	.40	.17***	.15***	.03	.03	.01	.33***	.10***	-	
9. Employee Stock Plan	.11	.32	.09***	.18***	.11***	.09***	.01	.29***	.31***	.21***	-

Notes: ^a $n = 1,717$. * $p < .10$; ** $p < .05$; *** $p < .01$; two-tailed tests.

having worker incomes based on such variable factors as profitability (Kochan, Katz and Mower, 1984). The correlation of these factors with profit-sharing highlights the importance of controlling for them in our multiple regression analyses in order to isolate the independent effect of profit-sharing.

The bottom of Table 2 presents our regression estimates for the main effects and the interaction effects for both the three- and five-year panels with those full controls. A significant positive interaction (in both panels, $p < .10$, $p < .05$) is reported when profit-sharing adoption is combined with teamwork. It is notable that profit-sharing by itself has no significant effect on productivity. Only when combined with teamwork does it have a positive effect.

To illustrate the specific nature of the interaction between profit-sharing and teamwork in influencing productivity growth, we constructed an interaction graph, depicted in Figure 1. Average productivity of establishments for each of the four conditions (profit-sharing adopters with no teams, profit-sharing adopters with teams, non-adopters with no teams and non-adopters with teams) was plotted for 1999, 2001 and 2006. The slope of each line indicates the growth in productivity across the three points in time. The 1999-2001 period was the time when some firms adopted profit-sharing, and the 2001-2006 period was the time when no new profit-sharing plans were adopted. Therefore, the effect on productivity growth during the second period should reflect the adoption of profit-sharing during the first period.

TABLE 2
Multiple Regressions Predicting Workplace Productivity Growth 2001-2004 and 2001-2006^a
(Using Profit-Sharing Adoption Probability as Independent Variable, Including Interaction Terms)

Variable	Workplace Productivity Growth	
	2001-2004 (1)	2001-2006 (2)
Constant	.180(.159)	.289*(.148)
Industry Controls (retail omitted reference group)		
Resources	1.301***(.493)	1.062*(.551)
Labour-Intensive Mfg.	.225 (.176)	-.013 (.117)
Primary Product Mfg.	.255*(.132)	.180 (.128)
Secondary Product Mfg.	.053(.130)	.108 (.131)
Capital-Intensive Mfg.	.112(.135)	.006 (.133)
Construction	.016(.120)	.107(.109)
Transport/Wholesaling	.457*(.235)	.425**(.208)
Communications/Utilities	.550**(.237)	.637**(.303)
Finance/Insurance	.076(.121)	-.126 (.186)
Real Estate	.192**(.093)	.163 (.137)
Business Services	.161(.158)	.125 (.117)
Education/Health Services	-.182(.159)	-.011 (.134)
Info/Cultural Services	.652(.535)	.644 (.542)
Performance Pay Controls		
Individual Incentives	-.012 (.104)	.084 (.087)
Gain Sharing	-.113(.082)	-.075 (.078)
Merit Pay	.156(.179)	.083 (.133)
Employee Stock Plan	.229 (.164)	.462**(.206)
Relative Employee Earnings	-.031 (.047)	-.053 (.053)
Establishment Controls		
Union Density	-.146 (.118)	-.170*(.100)
Establishment Size (00's employees)	.096 (.271)	-.124 (.279)
Productivity 2001 (\$000's)	-.393*** (.139)	-.490***(.140)
Change in Size 2001-2004/06	-.260***(.090)	-.168* (.087)
Process Improvement 2001	-.208**(.094)	-.235**(.108)
Product Improvement 2001	-.025 (.085)	.028 (.101)
New Process 2001	.021 (.097)	.084 (.100)
New Product 2001	-.025 (.085)	.055 (.084)
Process Improvement 2004 (2006)	-.451*(.266)	.293**(.122)
Product Improvement 2004 (2006)	.498 (.335)	-.265**(.119)
New Process 2004 (2006)	.162 (.136)	-.284**(.128)
New Product 2004 (2006)	-.187(.195)	.181**(.092)
Percentage Change in PC Users (2001-2004/06)	.297*(.175)	-.068(.131)

TABLE 2 (suite)

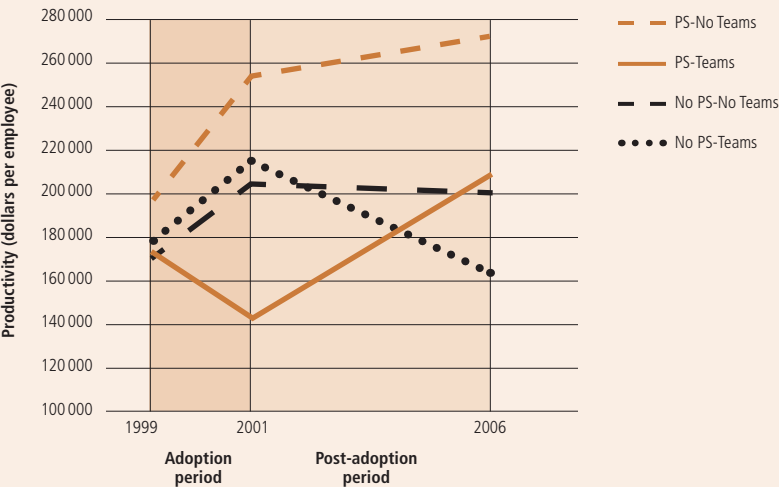
Variable	Workplace Productivity Growth	
	2001-2004 (1)	2001-2006 (2)
Key Independent Variables		
Profit-Sharing Adoption	-.074 (.082)	.087 (.090)
Teamwork	-.106 (.122)	-.388* (.221)
PS X Teamwork Interaction Term	.658* (.385)	1.854** (.934)
Cases	1,690	1,540
R²	.176***	.190***

Notes: *p<.10; **p<.05; ***p<.01; two-tailed tests.

* OLS specification (unstandardized regression coefficients) are used. Standard errors in brackets.

In 1999, none of the establishments in our constructed data panels had profit-sharing. The 1999 data points should therefore show the state of productivity before any establishments had adopted profit-sharing. By 2001 (indicated by the vertical line at 2001), some of them had adopted profit-sharing and would continue to report having profit-sharing in 2003 and 2005 (“profit-sharing adopters”). Some of these profit-sharing adopters (about eight percent) had work teams at the time of profit-sharing adoption but most did not. The remainder of the establishments continued not to have profit-sharing—neither in 2001 nor in

FIGURE 1
Interaction Graph



2003 or 2005—and were deemed “non-adopters.” Some of these non-adopters (about seven percent) had work teams (in 2001) but most did not.

A change in the slope of each line after 2001 (compared to the 1999-2001 period) indicates a change in the productivity growth rate depending on whether profit-sharing had been adopted during the previous 1999-2001 period. That change varied depending on whether the establishment had teams. For example, establishments that did not go on to adopt profit-sharing—regardless of whether they had work teams—nonetheless showed substantial productivity growth between 1999 and 2001. Such growth is not surprising, since economic conditions were very robust during that period, and demand for goods and services was high. Firms achieved higher productivity simply through higher sales for their goods and services, as well as through economies of scale. After 2001, however, those non-adopters that had not introduced profit-sharing experienced productivity declines or stagnation. The productivity declines between 2006 and 2001 were approximately 24% $[(210k-160k)/210k]$ for non-adopters with teams, and approximately zero % $[(200k-200k)/200k]$ for those with no teams.

In contrast, the profit-sharing adopters showed sharp increases in productivity after adopting profit-sharing in 2001. The productivity increase between 2001 and 2006 was approximately 50% $[(210k-140k)/140k]$ for profit-sharing adopters with teams, and approximately 8% $[(270k-250k)/250k]$ for those with no teams. Clearly, profit-sharing matters, especially when combined with teamwork. Especially stark is the contrast between the productivity increase of 50% for teams that had profit-sharing and the decline of 24% for teams that did not. Team-based production requires team-based compensation. This finding highlights the well-known importance of combining workplace practices into complementary bundles (Nyberg *et al.*, 2018; Ichniowski, Shaw and Prennushi, 1997; McDuffie, 1995).

As discussed previously when we outlined the control variables, productivity declined during 1999-2001 in profit-sharing establishments with teams only because such establishments tend to retain redundant workers during periods of declining demand, as in 1999-2001. It might also be the case that profit-sharing (which was introduced within the 1999-2001 window) is disruptive to team performance in the short run, i.e., during its introduction, but is beneficial once it is up and running. For example, the prospective introduction of profit-sharing may lead team members to seek a greater role in decision-making, but they need time to learn decision-making skills, which might reduce their productivity during the learning stage. Team-based firms may devote more time to preparing their teams for profit-sharing, i.e., through training in group processes, in how profit-sharing works and in the ways each team might contribute to increased profitability. The more that is done, the higher the cost of implementation (especially the cost of

worker time diverted away from production towards other tasks, such as the time spent on training). That start-up cost may well reduce productivity (therefore causing negative productivity growth) in the short run—but may strongly enhance productivity in the longer run.

The results in Figure 1 are certainly consistent with the explanations above. Whatever the reasons for the productivity decline in team-based firms prior to the adoption of profit-sharing, it is clear that their high rate of productivity growth after adoption was not based on a pre-existing productivity growth trajectory.

Robustness Check by Expanding the Sample Size Based on Users and Non-Users

Because our group of profit-sharing adopters with work teams was relatively small (about 8% of adopters), this sample size may call into question the robustness of our findings. As a robustness check, we conducted regression analysis on productivity growth over the full 1999-2006 period in terms of whether an establishment reported the *presence* of profit-sharing in 1999 or did not (profit-sharing “Users”). This sample contained approximately twice as many profit-sharing firms (as well as twice as many profit-sharing firms with teamwork) as did our previous profit-sharing panel of “Adopters” and “Non-Adopters”. An additional advantage was that this procedure created an entirely separate sample of profit-sharing firms, since our previous profit-sharing “Adopter/Non-Adopter” sample excluded any establishments that had profit-sharing in 1999. This procedure allowed us to verify independently the results from our analysis of the profit-sharing “Adopter/Non-Adopter” data panels.

While our profit-sharing “User/Non-User” sample was much larger than our previous profit-sharing “Adopter and non-adopter” sample, we had no way of knowing exactly when the profit-sharing “User” establishments had adopted profit-sharing; nor did we know what the characteristics of those particular users were at the time of adoption. As such, if a main effect were to be found in the profit-sharing “User and Non-User” sample, we could not rule out reverse causality, i.e., the profit-sharing firms in this sample had higher productivity growth prior to profit-sharing adoption. Thus, by using a larger sample, we gained additional degrees of freedom but at the cost of possible endogeneity in that sample.

Table 3 gives the results for the larger sample of profit-sharing “Users and Non-Users.” The first column shows the effect of the profit-sharing variable on its own with no interaction, and the second column shows its main effect and interaction with teamwork. As indicated in column 1, profit-sharing appears to have a positive effect on productivity. However, as indicated in column 2, this effect

TABLE 3
Multiple Regression Estimates Predicting Workplace Productivity Growth` 1999-2006^a
(Using Profit-Sharing Presence as Independent Variable, Including Interaction Terms)

Variable	No Interaction (1)	With Interaction (2)
Constant	.111(.125)	.210(.136)
Industry Controls (Retail omitted reference group)		
Resources	.799**(.384)	.755*(.389)
Labour-Intensive Mfg.	.051(.108)	-.010(.114)
Primary Product Mfg.	.145(.119)	.121(.122)
Secondary Product Mfg.	.006 (.118)	.045(.112)
Capital-Intensive Mfg.	-.054(.098)	-.064(.105)
Construction	.191*(.111)	.122(.115)
Transport/Wholesaling	.292*(.172)	.320*(.172)
Communications/Utilities	.669**(.267)	.660**(.266)
Finance/Insurance	-.075(.178)	-.048(.178)
Real Estate	.256(.169)	.222(.165)
Business Services	.063(.123)	.020(.119)
Education/Health Services	-.021(.107)	-.123(.115)
Info/Cultural Services	.417(.364)	.402(.369)
Performance Pay Controls		
Individual Incentives	.028 (.080)	.041 (.079)
Gain Sharing	.041 (.074)	.042 (.073)
Merit Pay	.072 (.107)	.072 (.111)
Employee Stock Plan	.221(.142)	.228 (.147)
Relative Employee Earnings	-.090(.051)	-.063 (.043)
Establishment Controls		
Union Density	-0.078(.089)	-.133 (.092)
Establishment Size (00's employees)	-.138(.264)	.030 (.215)
Productivity 2001(\$000's)	-.468***(.106)	-.462***(.105)
Process Improvement 2001	-.259***(.097)	-.228 **(.095)
Product Improvement 2001	.145(.094)	.129 (.093)
New Process 2001	.056(.083)	.036(.078)
New Product 2001	-.007(.085)	.005(.083)
Proportion of Computer Users	.073(.126)	.066 (.126)
Key Independent Variables		
Profit Sharing Presence	.591**(.296)	.015(0.080)
Teamwork	.039(.213)	-.296 (.320)
PS X Teamwork		1.497*(.912)
Cases	2,200	2,200
R ²	.114***	.111***

Notes: * p<.10; **p<.05; ***p<.01; two-tailed tests.

^a OLS specification (unstandardized regression coefficients) are used. Standard errors in brackets.

only occurs because of the interaction with teamwork. On its own, profit-sharing has no main effect. This larger and completely separate group of profit-sharing “User and Non-User” firms—assessed over a somewhat longer (seven-year) productivity time span—yields a similar result to that of our “profit-sharing “Adopter and non-adopter” sample: no main effect on its own, but a significant positive interaction between profit-sharing and teamwork on productivity growth.

Discussion, Strengths and Limitations

Discussion

Overall, our results suggest that use of teamwork, as part of employee involvement/employee participation practices, plays an important role in the success of employee profit-sharing—at least in terms of workplace productivity growth. Establishments with teamwork that adopted profit-sharing showed substantial and highly significant growth in workplace productivity over both the three-year and five-year periods subsequent to adoption, while those establishments without teamwork that had adopted profit-sharing showed much smaller—and statistically insignificant—growth.

These findings are in line with the notion that work teams can encourage employees to buy into profit-sharing and facilitate information-sharing and communications between management and employees, especially when unions are present (Heywood and Jirjahn, 2009; Poutsma *et al.*, 2006). Our results are also consistent with the notion that work teams serve as an effective mechanism to help translate the purported motivational and other benefits of profit-sharing into tangible productivity gains, reinforce innovation and creativity from the synergy effects of teamwork, encourage cooperation among employees and between employees and management, increase self- and mutual monitoring of worker behaviour and more positive workgroup norms and develop more efficient work methods through the rewards from profit-sharing plans (Kruse, 1993)—in other words, profit-sharing may cause team members to “work harder” and “work smarter” and therefore enhance workforce productivity (Heywood and Jirjahn, 2009). Finally, these findings are also consistent with the argument that teamwork helps mitigate potential free riding and shirking behaviour in profit-sharing firms (Freeman *et al.*, 2010).

An intriguing finding is that establishments with teamwork but no profit-sharing showed a substantial decrease in productivity during the 2001-2006 period. This is in sharp contrast to the substantial increase shown by those team-based establishments that had adopted profit-sharing, and in contrast to those firms without teams that had not adopted profit-sharing and experienced no significant change in productivity. This finding is consistent with the

argument that team-based work needs to be combined with some type of collective performance pay in order to ensure that teams are working toward organizational goals (Lawler, 1992). Our significant positive interaction between profit-sharing adoption and teamwork highlights that team-based production requires team-based compensation, a finding consistent with the well-known importance of combining workplace practices, including compensation, into complementary bundles (Nyberg *et al.*, 2018; Ichniowski, Shaw and Prennushi, 1997; McDuffie, 1995).

However, unlike in the case of profit-sharing adoption—where we can infer causality—we cannot conclude that teamwork itself reduced productivity among profit-sharing non-adopters during the study period, since the study was not designed to have a before-and-after research design in regard to teamwork.

Strengths of the Analysis

As with all empirical studies, our study has both strengths and limitations. Strengths include use of a dataset that comes from a large-scale sample, has a very high response rate and is carefully designed to be representative of Canadian for-profit establishments. The workplace level of analysis allows for more precise measurement of the study variables than do the corporate-wide measures that are often used in this kind of research.

A key strength is that the dataset allowed for longitudinal analysis, enabling us to utilize a before-and-after within-firm design to assess productivity change over a substantial period subsequent to profit-sharing adoption, while also controlling for many variables that may affect our hypothesized results. Finally, we were able to utilize a separate, larger sample of profit-sharing Users and Non-Users (rather than new adopters and non-adopters) to replicate our findings of a positive significant effect of interaction between profit-sharing and teamwork in workplace productivity growth.

Limitations of the Analysis and Suggestions for Further Work

Limitations of our analyses include the possibility that we may not have controlled for all possible relevant variables in predicting productivity growth, in spite of the extensive list of control variables. This possibility is highlighted by our modest R-squared of 0.11 in Table 3 and 0.18 and 0.19 in Table 2, although such modest R-squareds are common in cross-sectional data in the social sciences.

Second, a potential problem for all types of survey research is data reliability. Gerhart *et al.* (2000) found reliability to be a major concern for survey data from a single respondent, as is the case with the WES. However, the single respondent

issue may not pose as much of a concern for the WES as for other surveys. First, the WES format is designed to enhance reliability of response, through preparation of the respondents and use of interviews for actual data collection. This procedure helps clarify both the questions and the answers. In addition, the trained Statistics Canada interviewers had no vested interest in the outcomes of studies based on the survey information.

Furthermore, Gerhart *et al.* (2000) note that establishment-level surveys are likely more reliable for study of HR practices than are corporate-level surveys. Because the units of analysis are smaller, the managers are responsible for implementing HR practices and thus more familiar with them. HR practices are also more homogenous. Gerhart, Wright and McMahan (2000) do indeed find higher reliability at the plant level than at the company level. Further research by Wright and his colleagues (2001) concluded that single-respondent surveys should use a single business or single location as the unit of analysis, as is true for the WES. As a result of its careful design and data collection procedures, the WES dataset is regarded as an appropriate vehicle for research on human resource practices (Zatzick and Iverson, 2006).

Finally, all empirical studies are bounded by their temporal, national and institutional contexts. Our analysis is based on data from a survey that ended in 2006 and has been discontinued. It thus cannot be updated. The survey took place in Canada during the good economic conditions of 1999-2000, the economic meltdown of 2001 and the gradually improving economic conditions thereafter until the end of our study period in 2006. While these conditions have not been replicated precisely, there have been similar conditions since that time: good economic conditions in 2006-2008; an economic meltdown in 2008-2009; and improved economic conditions since that recession until the current pandemic associated with COVID-19. In essence, our study period, while dated, does cover changing economic conditions that have re-occurred and that are likely to continue to re-occur. Further studies in other countries—likewise using a longitudinal design that allows causal inference—would be necessary to assess the extent to which our findings extend beyond the Canadian context.

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SUMMARY

Profit-Sharing and Workplace Productivity Growth in Canada: Does Teamwork Play a Role?

The purpose of this study is to contribute to knowledge of profit-sharing by utilizing a before-and-after analysis of panel data to assess whether the effects of profit-sharing adoption on productivity growth vary, depending on whether a profit-sharing adopter utilizes work teams or not, while controlling for numerous variables that may affect these results within a carefully constructed sample of Canadian establishments. To our knowledge, this is the first study to examine the moderating role of teamwork in the relationship between profit-sharing and pro-

ductivity growth. Besides the implications for profit-sharing, ascertaining whether profit-sharing and work teams are complementary practices would have important implications for understanding how to develop more effective work teams, a topic of ongoing interest.

We utilized a longitudinal research design to compare within-firm productivity growth during the three-year and five-year periods subsequent to profit-sharing adoption and within-firm productivity growth during the same periods in firms that had not adopted profit-sharing. Overall, our results suggest that use of team-based production plays an important moderating role in the success of employee profit-sharing—at least in terms of workplace productivity growth. Establishments that had adopted profit-sharing showed a substantial and highly significant increase in workplace productivity over both the three-year and five-year periods subsequent to adoption, but only if they had work teams.

These findings are in line with the notion that work teams help to mitigate potential shirking behaviour in profit-sharing firms (Freeman, Kruse and Blasi, 2010) and are also in line with the argument that work teams serve as an effective mechanism to help translate the purported motivational and other benefits of profit-sharing into tangible productivity gains (Heywood and Jirjahn, 2009).

KEYWORDS: profit-sharing, work teams, productivity growth, Canada.

RÉSUMÉ

Partage des bénéfices et croissance de la productivité au Canada : Le travail d'équipe joue-t-il un rôle ?

L'objectif de cette étude est de contribuer à la connaissance de la participation aux bénéfices en utilisant une analyse avant-après de données recueillies au moyen d'un panel afin d'évaluer si les effets de l'adoption de la participation aux bénéfices sur la croissance de la productivité varient selon qu'on utilise ou non des équipes de travail, cela tout en contrôlant les nombreuses variables qui peuvent affecter ces résultats au sein d'un échantillon soigneusement construit d'établissements canadiens. À notre connaissance, il s'agit de la première étude à examiner le rôle modérateur du travail d'équipe dans la relation entre la participation aux bénéfices et la croissance de la productivité. Outre les implications pour la participation aux bénéfices, déterminer si les équipes de travail constituent des pratiques complémentaires aura des implications importantes pour comprendre comment développer des équipes de travail plus efficaces, un sujet d'intérêt permanent.

Nous avons utilisé un plan de recherche longitudinal afin de comparer la croissance de la productivité au sein d'entreprises au cours de périodes de trois et cinq ans suivant l'adoption d'un « Plan de participation aux bénéfices » à celle d'entreprises n'en ayant pas adopté au cours des mêmes périodes. Dans l'ensemble, nos résultats suggèrent que le recours à la production en équipe joue un rôle modérateur important dans le succès de la participation aux bénéfices des salariés,

du moins en termes de croissance de la productivité sur le lieu de travail. Les établissements ayant adopté la participation aux bénéfices ont enregistré une augmentation substantielle et très significative de la productivité sur le lieu de travail au cours des trois et cinq années qui ont suivi son adoption, mais seulement s'ils y avaient des équipes de travail.

Ces résultats sont conformes à l'idée que les équipes de travail contribuent à atténuer les comportements de non-participation dans les entreprises ayant un « Plan de participation aux bénéfices » (Freeman, Kruse et Blasi, 2010) et ils sont également conformes à l'argument selon lequel les équipes de travail constituent un mécanisme efficace pour aider à traduire les prétendus avantages motivationnels et autres de la participation aux bénéfices en gains de productivité tangibles (Heywood et Jirjahn, 2009).

MOTS-CLÉS : partage des bénéfices, équipes de travail, croissance de la productivité, Canada.