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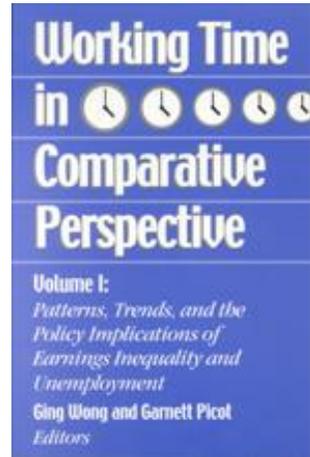
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# Economic Activities and the Demand for Work Sharing in Canada

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# 11

## **Economic Activities and the Demand for Work Sharing in Canada**

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Work sharing refers to work-time arrangements in which all members of a work group reduce their hours of work to prevent the layoff of some members of the group. The reduction in working time and the associated reduction in income are thus redistributed over the entire work unit, rather than being concentrated on a few workers. In Canada this arrangement is formalized as the work sharing program under the authority of the Unemployment Insurance Act. Canadian work sharing was introduced as a pilot program in 1977 and was modeled on similar programs in effect in Europe. In 1981, in response to growing numbers of layoffs, the program was fully implemented and has been available since that time.

The work sharing program is based on the premise that it is better to keep workers employed than to have them experience a period of unemployment. Thus, its main objective is to maintain local, regional, and industrial employment levels during periods of short-term adverse economic conditions. Work sharing also has secondary objectives for both firms and employees. For firms, the program aims to assist them in retaining intact their skilled workforces and to help them avoid the costs associated with temporary layoffs such as recruiting and training

new employees. For employees, the program aims to improve the level of income for workers who would otherwise be laid off and to assist workers in maintaining their skill levels and work motivation and reducing dislocation and uncertainty.

Under a work sharing agreement, layoffs are averted or postponed by reducing the workweek of employees in the designated core work group. An employer who intended to lay off 20 percent of employees for three months may use work sharing to reduce working hours of all employees by 20 percent over the same three-month period. Lost wages due to reductions of regular working hours are partially compensated by unemployment insurance (UI) benefits. Approximately 60 percent of lost wages are covered by UI benefits, charged to the UI Account. A UI-approved work sharing agreement is made between three parties: management, a majority of the affected workers, and Human Resources Development Canada (HRDC). Workers who apply for UI under work sharing do not have to serve the usual two-week waiting period for benefits. Employers must maintain fringe benefits for the duration of the work sharing agreement. Work sharing agreements may last for 26 weeks and may be extended to 38 weeks under special circumstances. A major evaluation of the program was completed in 1993, covering the years 1989 and 1990. The evaluation examined a sample of firms that used work sharing. Comparison firms were pre-screened and included in the sample if they had seriously considered laying off at least 20 percent of the members of one of their business units due to adverse economic circumstances. This procedure identified a sample of comparison firms who met the work sharing eligibility criteria but did not participate in work sharing.

The evaluation found that work sharing clearly avoids layoffs. However, in some cases layoffs may have been avoided without the work sharing program. Analysis of comparison firms showed that 7 percent of these firms did not lay off any employees. Further, in 29 percent of the work sharing cases, layoffs which should have been avoided by the program were merely postponed by the program, as these employees were laid off in the six months following program participation. Of these layoffs, 75 percent were of a permanent nature. Thus, in total, 64 percent of the layoffs that should have been averted by participation in work sharing can be said to have been avoided as a result of the program. Comparison with the 1984 evaluation of the

same program found that the program was somewhat less successful in avoiding layoffs in 1989–1990 than it was in 1983.

The evaluation also found significant benefits of work sharing participation for workers. Participants who would have most likely suffered a layoff did much better than their comparison group counterparts who were laid off, experiencing a 19 percent reduction in income versus a 47 percent reduction of the layoff group. The work sharing group displayed much higher levels of morale, better attitudes to work and management, better social relations, and better physical and psychological health vis à vis those in the layoff situation.

Firms also experienced benefits from work sharing participation. They maintained the work sharing unit intact and expended \$800–\$1,800 less per layoff equivalent than comparison employers. They also returned to full production sooner than firms that laid off employees. However, there was no longer-term profitability or productivity advantage for these firms. This may suggest that work sharing is an appropriate tool to help firms deal with cyclical fluctuations in demand, but not for those firms facing fundamental, structural changes.

Work sharing was found to be more expensive for the UI fund than the layoff alternative. Costs were 33 percent higher for work sharing due to three factors: the waiver of the two-week UI waiting period for work sharers, the fact that 30 percent of layoffs never collected UI, and the incidence of layoffs in the post-work sharing period.<sup>1</sup> However, to balance these additional costs, there were also significant social benefits. The evaluation estimated that work sharing helped avoid costs related to the stress of unemployment, avoidance of costs related to unemployment scarring, and financial benefits to participating firms. Overall, the evaluation estimates a benefit-to-cost ratio of about 2.6:1.

While the 1993 evaluation answered many of the questions about the program, it did not examine the relationship between the potential demand for work sharing and economic conditions. For example, if the unemployment rates in the late 1980s were higher than the historical rates, what would have happened to the demand for UI-subsidized work sharing? What would have been the associated cost? Could the UI fund of the late 1980s have absorbed the additional cost?

This chapter concludes that the demand for work sharing is indeed sensitive to changes in economic activities. If the total unemployment rates were 1.37–1.50 percentage points higher in 1988–1990, then the

demand for work sharing participation would have been 9 percentage points higher than it actually was in 1990. The estimated cost for the additional demand is \$13.7 million. In relative terms, the worsening of economic conditions would have increased work sharing's share of total UI program expenditure in 1990 from 0.43 percent (actual) to 0.53 percent. Obviously, within a reasonable range of demand shocks, any increased demand for work sharing would have been too small to create a serious financing problem for the UI account.

### **THE LIKELIHOOD OF PARTICIPATION IN THE WORK SHARING PROGRAM**

From our recent survey of the existing literature on work sharing, we have learned that the theoretical development in this field is primarily concerned with work sharing's effectiveness as a policy measure for alleviating the unemployment problem during recession.<sup>2</sup> In most of the theoretical discussions, the demand for work sharing has been taken as an inevitable phenomenon: during an economic downturn, some firms prefer to use work sharing to layoffs as an adjustment mechanism. Thus, other than relating demand for work sharing to business fluctuation, the existing literature is not very helpful in providing theoretical guidelines for specifying the demand for work sharing equation. In Canada, this problem is further complicated by the lack of useful time series for a comprehensive empirical investigation on this topic. Although the administrative files contain some aggregate time series on the number of work sharing applications approved, number of individuals in the program, and program expenditures, they have hardly any information on the behavior and characteristics of work sharing participating and nonparticipating firms. Thus, the idea of deriving a demand for work sharing equation from existing theories and estimating it directly from available data do not presently seem to be a feasible approach.

Recognizing the problems mentioned above, the quantitative work of this study circumvents the difficulty by working mainly with the cross-sectional data collected for Employment and Immigration Canada's 1993 evaluation.<sup>3</sup> Because these data have certain limitations, a

specific methodology has to be developed to deal with them. The quantitative work includes four related components:

- 1) estimating a logistic equation that describes a firm's probability of participating in the work sharing program,
- 2) creating a relatively depressed scenario for the late 1980s (1987–1990) from a full-system econometric model simulation,
- 3) calculating the number of firms that would have become work sharing participants in the more depressed scenario, and
- 4) calculating the cost of the additional demand and its impact on the UI account.

### **The Logistic (Program Participation) Equation as a Demand Function**

This study uses a logistic equation to estimate the probability of a typical firm that would participate in the work sharing program in 1990. The microdata are primarily from a special survey that Employment and Immigration Canada (EIC) used to conduct its 1993 evaluation on the work sharing program. The data consist of 310 participating and 256 nonparticipating firms in 1990.<sup>4</sup> The participating employer sample was selected from an administrative file that contained the names of work sharing firms during 1990. Members of the comparison group sample were selected from the EIC Record of Employment file; these firms were selected on the basis of their comparability to work sharing firms in characteristics and activity experience<sup>5</sup> (e.g., members of the comparison group must have laid off workers in 1990). In carrying out the econometric estimation, the procedure requires full information (no missing data points) for the dependent and independent variables. Because of missing values for selected variables, 43 firms have to be excluded from the sample. Thus, the final econometric estimation is based on the information from 289 participating firms and 234 members of the group of comparable employers.

Ideally output or sales data for periods immediately prior to the firm's applying for work sharing participation (program participants) or laying off workers (members of the comparison group) should be used as a measure of the firm's business fluctuation. Unfortunately, the

survey was not designed to deal with the demand issue and did not collect any output or sales data. This forces us to search for a suitable proxy. The proxy used is the unemployment rate of the UI region where the firm is located. This variable is chosen for two reasons. First, even though the UI regional unemployment rate, by definition, cannot claim to be a unique economic activity indicator of the firm, it is specific to the economic climate where the firm operates. Second, the time series for this variable is available. The data are from Statistics Canada's Labour Force Survey unpublished worksheets. We have the UI region data on labor force, employment, unemployment, and unemployment rate dating back to 1979. The availability of these time series is operationally very important because it allows us to introduce a dynamic element into the specification of the equation specification (see the discussion below).

Even if one accepts the UI regional unemployment rate as a reasonable proxy for approximating economic downturns, proper timing and functional form remain crucial to the specification of the probability of program participation equation. First, using the regional unemployment rate of 1990 as an explanatory variable would present a serious technical problem. In 1990, the participating firms were already in the work sharing program. If the program was effective in lowering unemployment, then the UI regional unemployment rate of 1990 would also be dependent upon the extent of program participation within the UI region. This simultaneity bias presents an interpretation problem because the estimated equation would have mixed the program's effects on regional unemployment with the influence of economic activities on the demand for work sharing. Second, if a firm uses UI-subsidized work sharing as an adjustment mechanism for the decline in the demand for its products, then the proxy variable should probably be in the first difference form rather than level form. This line of reasoning suggests that the proper variable for explaining a firm's probability for program participation should be the change in the unemployment experience of the UI region prior to the firm's decision to join (or not to join) the work sharing program.<sup>6</sup> This specification would not have been operational if the time series for the UI regional unemployment rate is not available. Symbolically, the specification for the program participation equation may be summarized as follows: the probability of firm  $i$  participating in the work sharing program is

$$\text{Probability}_i = f(\Delta\text{URATE}_{i,t-1}, \mathbf{X}_{i,t}).$$

$\Delta\text{URATE}_{i,t-1} = \text{URATE}_{i,t-1} - \text{URATE}_{i,t-2}$ ,  $\text{URATE}_i$  denotes the unemployment rate of the UI region where firm  $i$  is located,  $t$  refers to the current period, and  $t - 1$  the period prior to participating in the work sharing program.  $\mathbf{X}_i$  represents a vector of firm specific attributes, including the average skill rating of the firm's employees, percentage of employees unionized, organization structure (whether the firm operated at one single location, multiple locations in one province, multiple locations across Canada, or multiple locations internationally), the firm's industrial affiliation, the firm's years of operation, etc.

The logistic equation, when estimated, serves certain purposes. First, it tests the hypothesis that the demand for work sharing depends on changes in economic activities. If the estimated coefficient for the  $\Delta\text{URATE}_{i,t-1}$  variable is positive and statistically significant, it would confirm that more firms would like to become program participants as the economic climate worsens. Second, it provides the reader with some information on which other exogenous forces influence a firm's program participation decision. Third, the estimated equation provides us a means of calculating a firm's probability of participating in the work sharing program under various unemployment conditions. This last function is crucial to the theme of this study and will later become apparent. The estimated coefficients and essential statistics are shown in Table 1.

In addition to the explanatory variables listed above, earlier versions of the estimated equation also included type of organizations (private sector, public or nonprofit organizations), number of full-time workers employed by the firm, and provincial dummies on the right-hand side of the equation. They were subsequently dropped for various reasons. The effects of provincial differences were conceptually and empirically reflected in the recent changes in the UI region unemployment rate variable.<sup>7</sup> Therefore, it was not necessary to include provincial dummies as additional explanatory variables. The other variables were excluded because they were statistically insignificant and their exclusion did not noticeably affect the estimated coefficients of the other explanatory variables.

Although our main interest is in the "recent changes in the UI region unemployment rate" variable, the estimated coefficients of other

**Table 1 Estimated Logistic Equation**

Dependent variable: employer program participation (1=Yes, 0=No)				
Number of firms included in the analysis: 523				
-2Log likelihood	651.791			
Goodness of fit	525.196			
	$\chi^2$	df	Significance	
Model $\chi^2$	67.446	12	0.0000	
Improvement	67.446	12	0.0000	
Variable	Coefficient	Standard error	Wald	Significance
Employee's average skill rating	0.2122	0.0710	8.9247	0.0028
Recent change in the UI region unemployment rate	0.2777	0.1370	4.1089	0.0427
Organization operations				
Single location	0.2517	0.2907	0.7499	0.3865
Multiple (across Canada)	0.0630	0.4005	0.0247	0.8750
Multiple (international)	-1.1829	0.5089	5.4041	0.0201
Multiple (one province)	0.0000			
Type of industry				
Primary	-0.9615	0.5581	2.9682	0.0849
Heavy manufacturing	0.1080	0.2558	0.1784	0.6728
Construction	-1.3049	0.3497	13.9260	0.0002
Trade	0.4674	0.2830	2.7285	0.0986
Other	0.4110	0.3381	1.4778	0.2241
Light manufacturing	0.0000			
Percentage of employees unionized	-0.0036	0.0019	3.5111	0.0610
Years of operation	0.0079	0.0046	2.9362	0.0866
Constant	-0.9074	0.4469	4.1226	0.0423

explanatory variables are also of some relevance. Since the estimated coefficients of the logistic equation cannot directly tell us the effects of the explanatory variables on a firm's probability of program participation, as an illustrative example we have calculated the possible impact of each explanatory variable on participation probability by holding all other explanatory variables constant at specific values. Appendix A reports the results.

"Employee's average skill rating" significantly influences a firm's probability of using the work sharing program.<sup>8</sup> All other things being equal, a firm with many highly skilled workers tends to use the UI-subsidized work sharing as the demand adjustment mechanism more often than firms that employ a relatively large number of unskilled workers. This is consistent with the notion that the option of work sharing participation rests mostly with employers. It is the cost-minimization conditions that determine this behavior: Laid-off workers of relatively high skills are more likely not available for subsequent rehiring when the firm's business starts to pick up; training new workers to fill these positions would be a relatively costly option to the firm.

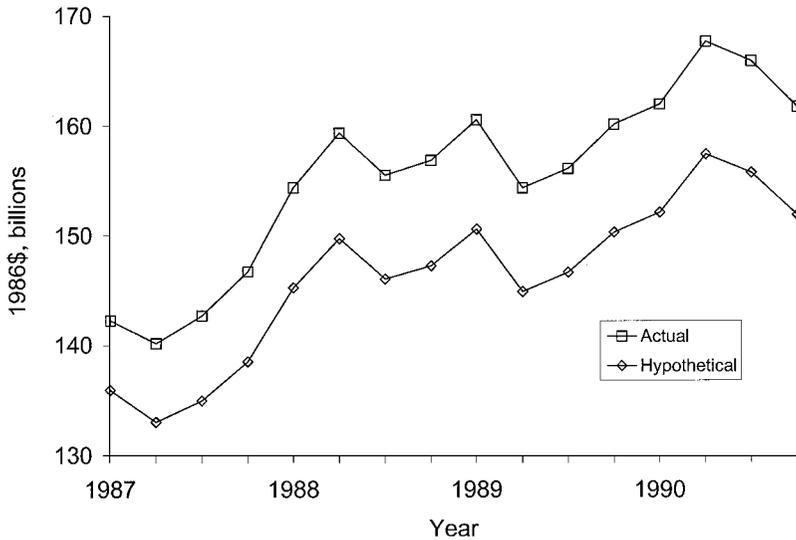
The age of a firm's establishment (in terms of their years of operation) also seems to have a positive influence on the firm's program participation decision, but this result is not statistically persuasive. (The estimated coefficient is statistically significant at the 10 percent level but not at the 5 percent level.) How long the firm has been in business should not greatly affect its present profit-maximization (or cost-minimization) conditions. Thus, the estimated coefficient of this variable is meaningful only if it is an approximation of the firm's outlook of future business prospect. In other words, a more established firm tends to be more optimistic of its future than the relatively new companies. Therefore, it is more willing to use work sharing to maintain its labor force during business slow-downs. The unionization of workers exerts a negative influence on the firm's participation probability. The statistical result, however, is not as strong as expected. While most of the local unions prefer work sharing to worker layoffs during economic downturns, very few centralized unions endorse the work sharing option because it erodes the seniority principle. These two opposite forces are probably sufficient to prevent this variable from becoming statistically very strong. The organization and industry dummies present a mixed bag of results. Some are highly significant and some

are not significant at all. As a principle, we keep all of them in the estimated equation, even though dropping the insignificant dummies would not have noticeably affected the rest of the estimated coefficients.

The estimated coefficient for the “recent change in the UI region unemployment rate” variable is 0.2777 and is statistically significant at the 4 percent level. Although the estimated coefficient corresponds to the dependent variable in a log (odds) form<sup>9</sup> and therefore cannot directly tell us the impact of this variable on the probability of program participation, the positive coefficient confirms our *a priori* expectation. Later in this section we will provide some impact estimates based on the estimated equation and simulation techniques.

### **Different Economic Scenarios, 1987–1990**

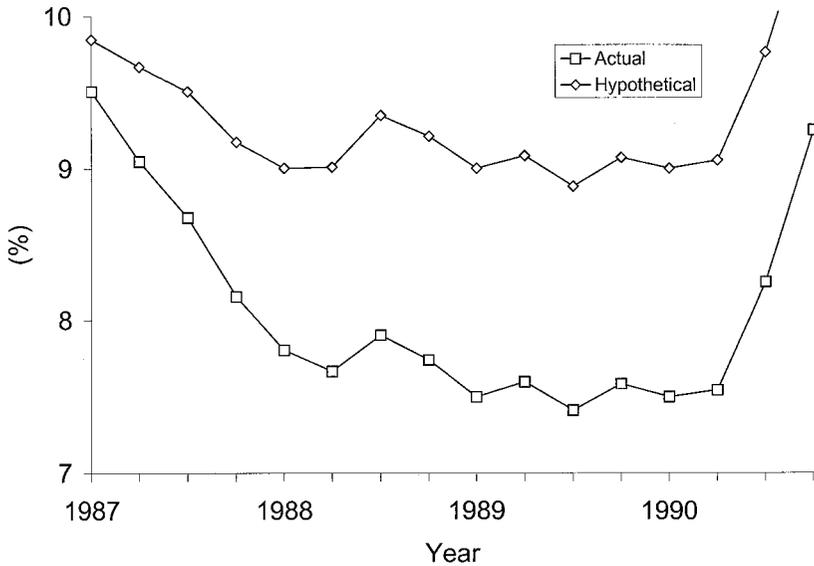
The logistic equation by itself is still not capable of answering the questions posed in the introductory section of this paper. For example, the estimated logistic equation would show that if the expansion phase of the business cycle of the 1980s ended earlier than it did, more firms would probably have wanted to join the work sharing program. This does not give us a quantitative estimate of the size of the additional demand that could have resulted from a more depressed economic climate in the late 1980s. Apparently, one cannot obtain such a quantitative estimate without specifying the deterioration of economic activities in quantitative terms. The simplest way to meet this information requirement is to assume that the total unemployment rates in the late 1980s were higher than their historical counterparts by certain percentage points. These figures can then be distributed proportionally to the UI regions to yield a set of hypothetical UI regional unemployment rates, which can in turn be fed into the logistic equation for further investigation. In this study, we prefer a more plausible hypothetical scenario than the arbitrarily assumed one. The hypothetical (more depressed) scenario used in this study is from the solution of a full-system econometric model,<sup>10</sup> in which Canadian exports, including automobiles and parts but excluding other manufactured goods and mining products,<sup>11</sup> in 1987–1990 were assumed to be 10 percent less than they actually were historically (see Figure 1). In this hypothetical setting, because of the decline in aggregate demand resulting from the assumed

**Figure 1 Canadian Exports, 1987–1990**

drop in exports, more individuals were expected to become unemployed. The additional unemployed individuals can then be distributed to the UI regions according to their labor force shares. From these new unemployment figures we may calculate the UI regional unemployment rates for the hypothetical scenario.

The end result is that, in the hypothetical scenario, more individuals would have been unemployed and the impacts on the total unemployment rates were noticeable (0.70, 1.37, 1.49, and 1.50 percentage points higher than the historical figures in 1987, 1988, 1989, and 1990, respectively). The unemployment rates for the actual and hypothetical scenarios are graphically presented in Figure 2.<sup>12</sup> Furthermore, we have distributed the additional unemployed individuals (not shown here but available in the solutions of the model simulations) of the hypothetical scenario across 49 UI regions, according to the labor shares of the UI regions, and recalculated the UI regional unemployment rates for the more depressed (hypothetical) scenario.

Although this macrosimulation is not essential to the quantitative work of this study, we have decided to use it. The model solution generates a reasonably realistic but more depressed economy than the

**Figure 2 The Unemployment Rate, 1987–1990**

actual experience of 1987–1990. It also illustrates that exogenous forces could have easily ended the expansion phase of the 1980s business cycle much earlier than it did.

### **Expected Number of Participating Firms under Different Economic Scenarios**

The estimated logistic equation, the actual UI regional unemployment rates, and the UI regional unemployment rates for the hypothetical scenario provide us with the required tools and information for calculating the probability of program participation for each firm for two scenarios (base-case and the hypothetical). First, for the base-case, we obtain a set of probability estimates for all firms (including participants and members of the comparison group) by inserting the actual values of all explanatory variables into the unscrambled logistic equation.<sup>13</sup> Similarly, for the hypothetical scenario, by replacing the actual UI regional unemployment rates with their hypothetical counterparts while keeping the actual values of other explanatory variables

unchanged, we may calculate a set of estimates for the firms' chances of participating in the work sharing program under the more depressed economic climate. The first set of estimated figures shows each firm's probability of participation, with the values of all explanatory variables identical to their actual (historical) values. This may be labelled as the base-case probability. The second set is similar to the first, except that the calculation replaces the actual UI regional unemployment rates with the hypothetical scenario's UI regional unemployment rates. In other words, the second set shows each firm's probability of participation under the more depressed economic conditions of the hypothetical scenario, while holding all other things constant.

The estimated probability provides us with the information concerning a firm's chance of becoming a program participant, but it still does not tell us whether or not the firm would indeed be in the program. After all, even a firm with a probability of 90 percent participation still has a slim chance of not being a participant. In this study we use the random-draw simulation technique to determine whether a firm is *in* or *out* of the work sharing program. The procedure is identical to drawing a "chip" randomly from a hat. For example, the participation probability for a certain firm was usually 70 percent (the base-case), but under the more depressed economic climate of the hypothetical scenario its probability increased to 71 percent in 1990. To determine whether or not this firm would become a program participant in the base-case and in the hypothetical scenario, we create two separate hats. The first hat would have 70 chips marked "in" and 30 marked "out," while the second hat would have 71 chips marked "in" and 29 chips marked "out" to reflect its slightly higher probability of program participation. We would then randomly draw one chip from each of the hats and record the results of the random draws. Repeat the same procedures for all firms in the sample. The difference between the total numbers of "in" firms in the two scenarios (base-case and hypothetical) would be taken as the estimated impacts of the more depressed economic climate on the demand for work sharing. This is, however, only the result of one random-draw experiment. The results in Table 2 are the averages of 10 experiments.<sup>14</sup>

**Table 2 Results of Random-Draw Simulations (based on a sample of 523 firms)**

Total number of participating firms (base-case)	Total number of participating firms (hypothetical)	Difference (hypothetical/base-case)
277	302	25

The simulated figure for the base-case underestimates the actual number of participants in 1990 by 12 firms (an error of 4 percent). Since the estimated logistic equation cannot be expected to predict the probability of participation perfectly and the random-draw experiments have been conducted only 10 times, the goodness of fit appears to be acceptably close.

The simulation results suggest that under the influence of a worse economic climate, as specified by the hypothetical scenario, the demand for work sharing participation would have been 9 percentage points higher than it was in 1990. Since the results reported are based on a sample of 289 participating and 234 nonparticipating firms, we have to mark up the total number of participating firms (work sharing applications approved) in 1990 by 9 percent to yield an estimate of participating firms for the total economy; that is,

hypothetical scenario: number of participating firms, total economy, 1990 =  $6,297 \times (1 + 0.09) = 6,873$ ,

where 6,297 is the actual total number of work sharing applications approved in 1990. In other words, the more depressed economic climate of the hypothetical scenario would have induced 576 more firms to participate in the work sharing program in 1990. This estimate should, however, be taken as an illustrative example rather than a definitive answer. First, aside from the imperfection of the econometric and simulation techniques, the analysis is based on a relatively small sample size and the data were not originally collected to test the sensitivity of work sharing demand to economic activity fluctuation. In the future, evaluators should probably take the demand dimension as an integral part of the evaluation framework and revisit this topic. Second, the estimate depends directly on the degree of activity slowdowns created by the macromodel simulation. The deterioration outlined in the hypo-

tical economy is only one of the many plausible scenarios. A different hypothetical scenario would, of course, yield different results.

## **ASSOCIATED COSTS, IMPACTS ON THE UI ACCOUNT, AND IMPLICATIONS**

There are at least three remaining questions that we should attempt to answer: 1) What is the cost of the additional demand for work sharing? 2) What is its impact on the UI Account? 3) How would the government have reacted to the additional applications for the work sharing program?

### **Costs and Impacts on the UI Account**

From the administrative data, we know that a participating firm in 1990 cost the government an average of \$9,798.<sup>15</sup> However, this would be, *a priori*, a downward biased estimate for calculating the associated costs for our purposes. It fails to account for the additional utilization of work sharing among firms already in the work sharing program when unemployment increases. The available data do not allow us to calculate this downward bias accurately. In this study, we use the 1990 administrative data to approximate the relationship between UI regional work sharing expenditure and the UI regional unemployment rate (weighted by the region's employment share). The estimated equation suggests that the average cost for a participating firm would have been about 11.9 percent higher than the actual average cost in the hypothetical scenario.<sup>16</sup> Based on this information, we may approximate the cost of the additional demand for program participation in the hypothetical scenario as follows:

- (i) Estimated cost of additional demand = increased cost for firms already in the work sharing program in 1990 + cost for financing 576 additional participating firms resulting from the worsening of economic conditions in the hypothetical scenario
- $$(\$9,798 \times 0.119 \times 6,297) + (\$9,798 \times 1.119 \times 576)$$
- = \$13.66 million.

(ii) Actual work sharing program expenditure in 1990 = \$61.7 million.

(iii) Total UI expenditure in 1990 = \$14,355 million.

Ratio A =  $100 \times (i)/(iii) = 0.095\%$ .

Ratio B =  $100 \times (ii)/(iii) = 0.429\%$

Ratio C =  $100 \times [(i)+(ii)]/(iii) = 0.525\%$ .

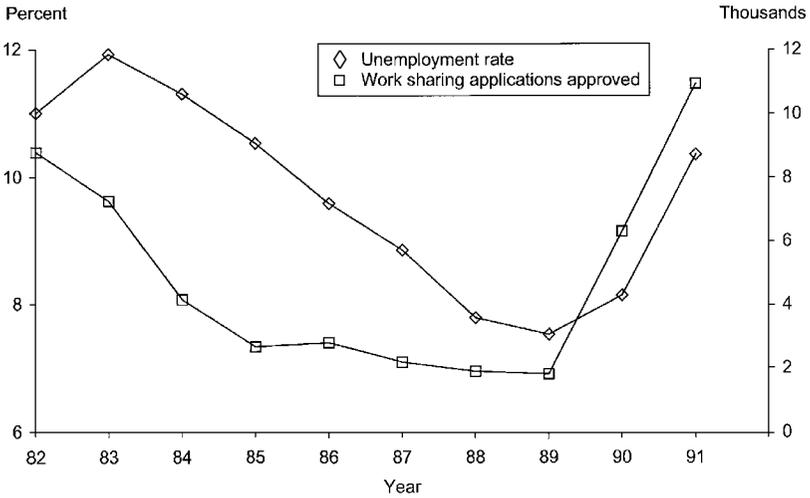
In 1990, the total Unemployment Insurance Developmental Uses (UIDU) were substantially below the maximum of 15 percent allowed by law (Bill C-21). Work sharing expenditure in this year accounted for less than 18 percent of the total UIDU expenditure. These statistics, along with the fact that work sharing was a relatively small program option,<sup>17</sup> suggest that the government could have easily absorbed the additional demand for work sharing of the hypothetical scenario by a minor reallocation of UI funds while keeping the total UI program expenditure of 1990 unchanged.

### **Government's Response to the Demand for Work Sharing**

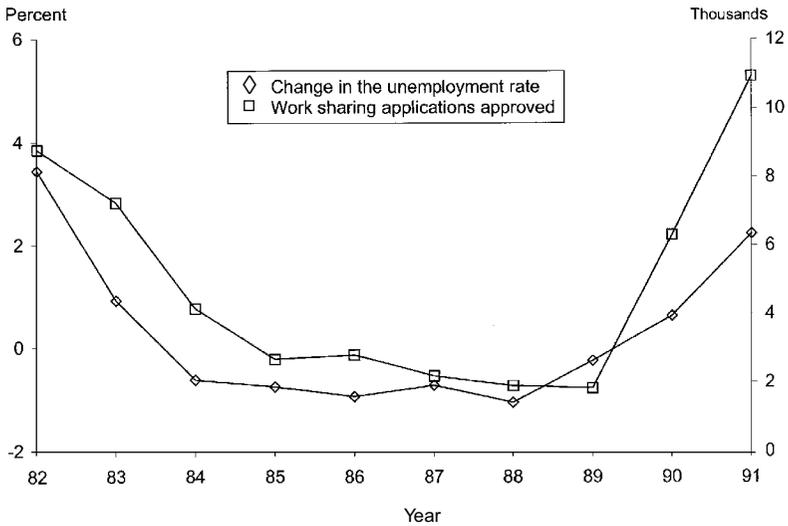
Figure 3 shows the relationship between the unemployment rate and work sharing applications approved. The correlation between them is positive but statistically insignificant. (The simple correlation coefficient for the variables equals 0.53, which is not even statistically significant at the 10 percent level.<sup>18</sup>) Figure 4 presents the graph for the change in the unemployment rate<sup>19</sup> and work sharing applications approved. It becomes obvious that the two variables are closely correlated with each other. The simple correlation coefficient is 0.90, which is statistically highly significant. As contended earlier, firms' demand for work sharing is related to the change in economic activities rather than the level of activities. In this examination of the aggregate time series, we have found other indirect, circumstantial evidence to support this contention.

If the "work sharing applications approved" series is interpreted as the locus of the equilibrium points between the demand for and supply of work sharing with the government adopting a 100 percent accommodative policy,<sup>20</sup> then the data should reflect the demand and supply information equally well. The existing data seem to suggest that government's policy has been quite "accommodative." In 1982–1983, the

**Figure 3 The Unemployment Rate and Work Sharing Applications Approved**



**Figure 4 Change in the Unemployment Rate and Work Sharing Applications Approved**



average change in the unemployment rate was 2.18 percent; the average number of applications approved was 8,009 per annum. From 1984 through 1989, a period of uninterrupted economic expansion, the average change in the unemployment rate was  $-0.733$  percent, and the annual average of applications approved declined to 2,573 firms. In 1990–1991, the change in the unemployment rate became positive again (the average change was 1.42 percent), and the number of work sharing applications climbed to 8,613 per annum. This sensitivity to changes in the unemployment rate suggests that had the economic climate in the late 1980s become worse than it actually was, the government could have probably absorbed the additional demand.

Reid and Meltz (1983) and Pal (1983) note that the Canadian government's interest in work sharing has risen and fallen with changes in the unemployment rate. They argue that instead of implementing policy on the basis of careful long-run planning, the use of the program as an ad hoc response to the crisis of rising unemployment obviously leaves a lot to be desired. Their observation on the sensitivity of work sharing applications approved to changes in the unemployment rate has been quite accurate. In recent years, the sensitivity seems even higher. However, their criticism of the government's accommodative approach may have been too harsh. One would expect that the work sharing program, especially work sharing as a passive policy measure,<sup>21</sup> should always be responsive to the demand of firms. Whether or not the program could have played a more active role in the Canadian labor market is a moot question. Not only has France's experience of using work sharing as an active policy (job creation) not been convincingly successful, the relatively small size of the Canadian work sharing program does not suggest that it has the potential of creating a large number of jobs. Given the existing fiscal stance of the government, expanding the program for the sake of testing out the effectiveness of work sharing as a job creation policy must be rated as one of the most unlikely events in the foreseeable future.

## CONCLUDING OBSERVATIONS

In the last decade in North America, corporate restructuring has imposed some alternatives to conventional working time arrangements. The increased use of nonstandard forms of work, including part-time, contract, and outsourcing, is associated with such restructuring in the context of competitive cost reduction. At the same time, the Canadian unemployment rate increased dramatically to a 9.5 percent average in the 1980s and the 1990s.

Policy responses to the growth of nonstandard work are now just emerging, starting with the changes in the Canadian employment insurance scheme to make eligibility for benefits based on hours, not weeks. An hours-based system better reflects current work patterns, particularly the rise in part-time and multiple job hours.

The other major insurance policy response is the work sharing program, which, in its current design, is clearly a countercyclical measure to enable firms to hoard labor or for workers to share unemployment during downturns. In its design, the program is not available to subsidize corporate restructuring. Two formal evaluations of this program have shown that work sharing does make a difference in averting layoffs, and, despite being more expensive to the UI account than straight layoff benefits, the economic and social benefits accruing to participating firms and workers more than offset the program costs. This chapter extends the evaluation work by looking specifically at the relationship between changes in economic activities and the demand for work sharing.

To examine this relationship, this study uses microsimulation as well as macrosimulation techniques. In a full-system macrosimulation, a 10 percent reduction of Canadian exports of nonmanufacturing/non-mining products and exports of automobiles and auto parts in 1987–1990 would result in a 1.5 percentage point increase in the unemployment rate by 1990. This change in declining economic activity would increase work sharing participation by 9 percent, at a cost of an additional \$13.66 million in 1990 to a \$14.35 billion UI account for that year. Within the existing legislative and regulatory framework, such an increased demand of work sharing could easily have been absorbed.

The 1993 evaluation results suggest that the additional expenditures could have been cost-effective as well.

This finding, of course, is relevant to the program as it currently operates. It sheds little light on how work sharing might be extended under current rules or how it might be used in an aggressive redesign of working time or under different rules for active job creation purposes. Suggestions have been made by both policymakers and academics that work sharing agreements might reduce UI premiums to firms that create and finance new jobs to compensate for the reduction in working time of designated employees. Under these circumstances, work sharing may create job opportunities for youth and other unemployed groups back-filling designated positions. This chapter does not address this policy debate directly. What it shows clearly is that work sharing is sensitive to the change rather than the level of economic activity, and that the probability of work sharing participation is higher among firms with higher-level skilled workforces.

Job creation stimulation is more common at the entry skills level. This suggests that the present program is limited in its potential as a job creation initiative. Even if work sharing is a good investment, as the evaluation results show, the cost of providing it to all potential lay-off situations may be prohibitive. This chapter shows that an increased demand for work sharing can be accommodated as a relatively small program option under UIDU. In the current fiscal environment, it is difficult to imagine a proactive use of work sharing as a job creation mechanism without finding new monies or at least reprofiling UIDU expenditures at the expense of the other two major UIDU activities: UI-sponsored training and job creation partnerships. Finally, this chapter raises some questions about the appropriateness of work sharing as a job creation stimulus directed at firms that are primarily interested in maintaining a skilled workforce. Policymakers would need to take this present feature of work sharing participation into consideration if they were to redesign work sharing as both a job maintenance and job creation program. Before embarking upon this, however, it would be instructive to study more closely the work sharing experience in France in the 1980s and the reasons why the program reverted back from a job creation initiative to an employment maintenance scheme.

## Notes

We are grateful to Garnett Picot of Statistics Canada and Wayne Vroman of Urban Institute for their comments on various aspects of the work contained here. All errors and omissions remain, of course, our responsibility.

1. The 1993 evaluation study might have overlooked two other factors that could have contributed to the comparatively high cost of the work sharing program. First, relative to the layoff option, work sharing tended to include a higher share of senior workers. Since earnings and seniority are positively correlated, the average work sharing benefit would be higher than the average regular UI benefit. Second, work sharing would be more expensive than regular UI payments if the layoff conversion ratio was less than unity, i.e., the increase in work sharing weeks exceeded the decrease in layoff weeks.
2. See, for example, MaCoy and Morand (1984), and Owen (1989).
3. See Employment and Immigration Canada (1993).
4. The survey also contains information for the year 1989. Because of the time constraint, we have decided not to duplicate the empirical work for 1989. In the early stages of an economic downturn, firms are not sure whether dismissals and long-term layoffs are necessary; their demand for work sharing may be different from those at different points of the business cycle. Future work on this topic should probably investigate the sensitivity of work sharing demand at different points of the business cycle as well.
5. For a detailed description of survey design and characteristics of participating firms and members of the comparison group, see Employment and Immigration Canada (1993).
6. Empirically, when the level of regional unemployment rate enters the right-hand side of the equation, the coefficient is positive but statistically insignificant. On the other hand, the first difference of the regional unemployment rate is statistically significant, and the result seems quite robust. The inclusion or exclusion of other explanatory variables in the specification does not significantly alter the result.
7. This variable is defined as  $(URATE_{i,1989} - URATE_{i,1988})$ ;  $URATE_i$  denotes the unemployment rate of the UI region where firm  $i$  is located, and the second subscript refers to a specific year. When the variable is expressed in terms of relative change, [i.e.,  $(URATE_{i,1989} - URATE_{i,1988})/URATE_{i,1988}$ ], the estimated coefficient remains positive but the statistical result is substantially weakened. It is statistically different from zero only at the 12.6 percent level. The statistical results for the other estimated coefficients remain basically the same. This finding suggests that workers and employers take the absolute change in the unemployment rate as a change in economic conditions, but they are probably unfamiliar with the concept of the relative change in the unemployment rate.
8. In the survey, the employer was asked to rate the firm's employees' literary skills, numeracy skills, and technological literacy separately, with a rating of 1 denoting

extremely low in the category, 4 average, and 7 extremely high. The variable used in the logistic regression equation is the average of the three skill variables.

9. That is,  $\ln [p/(1 - p)]$ , where  $p$  denotes the probability of work sharing participation.
10. The econometric model consists of about 300 behavioral equations and identities. It is a modified and extended version of the Conference Board's PC-Canadian Model (PCCDN). See Conference Board of Canada (1989).
11. The exports of other manufacturing goods and mining products are endogenously determined in the full-system econometric model.
12. The difference between the base-case and the hypothetical scenario represents the impact of the assumption on total Canadian exports. In this report, for the sake of simplification and interpretation convenience, we add this difference to the actual data of the variable in question. This procedure allows us to compare the hypothetical scenario figures directly to the historical data in level form.
13. The dependent variable for the estimated logistic equation is in the form of  $\ln[p/(1 - p)]$ , where  $p$  denotes the probability of program participation. Feeding the values of the explanatory variables directly into the estimated equation would give us the  $\ln$  odds rather than the probability.
14. The random draw process is such that a participating firm may or may not be classified as "in" the work sharing program; similarly, a nonparticipant is not necessarily out of the program in the experiment. Since the final tabulation compares the simulated figures of the two scenarios (base-case and hypothetical), this lack of perfect fit should not present an interpretation problem. The errors are random and should be cancelled out in the process of calculating the differences.
15. This figure, which is the ratio of the total work sharing expenditures in 1990, to the number of applications approved in 1990, is only the short-run book value. It does not take into account the addition of UI benefits paid to work sharing workers who were laid off in the post-work sharing period. See Employment and Immigration Canada (1993).
16. The estimated equation:

$$\text{Work Sharing Expenditure}_i = 180.95 + 4170.22 \times \text{URate}_i \times \text{EShare}_i,$$

(0.76)      (5.31)

adjusted  $R^2 = 0.37$ ,

where a) figures in parentheses are  $t$ -statistics; b)  $i$ : UI region  $i$ ;  $\text{URate}_i$ : the unemployment rate of UI region  $i$ ;  $\text{EShare}_i$ : the employment share of UI region  $i$  (i.e., employment of UI region  $i$ /total employment).

17. Why did so few employers use the work sharing program as a means for adjusting workers hours? The answer to this question is not obvious, and is a research topic itself. Work sharing has always been a relatively small program in Canada. From 1982-1995, the total unemployment rate fluctuated between 6.2 and 10.7 percent, the ratio of "work sharing weeks paid to total UI benefits weeks paid" remained in the "0.3 to 2.9 percent" neighborhood.
18. We have only 10 observations for this calculation.

19. That is, the first difference of the unemployment rate,  $URATE_t - URATE_{t-1}$ .
20. This assumes that the government usually approves all legitimate applications for work sharing participation.
21. For a discussion on active and passive work sharing, see Tremblay (1989).

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**Table A1 Estimated Effects of Explanatory Variables on Program Participation Probability<sup>a</sup>**

Variable	Probability
Employee's average skill rating	0.052
Recent change in the UI region unemployment rate	0.068
Organization operations	
Single location	0.000
Multiple (across Canada)	0.000
Multiple (international)	-0.272
Multiple (one province) – reference case	0.000
Type of industry	
Primary	-0.228
Heavy manufacturing	0.000
Construction	-0.295
Trade	0.113
Other	0.000
Light manufacturing – reference case	0.000
Percentage of employees unionized	-0.001
Years of operation	0.002

<sup>a</sup> Each value denotes the marginal effect of one additional unit of the variable on a typical firm's program participation probability, evaluating at the mean of the variable and holding all other explanatory variables constant at their mean values. If the variable is a 0 or 1 dummy variable, then 0 is taken as the mean in the calculation. "Organization" and "industry" variables statistically insignificant at the 10 percent level are treated the same as their respective reference cases.

# **Working Time in Comparative Perspective**

## **Volume I**

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and  
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