Industrial Dislocation and the Private Cost of Labor Adjustment

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Abstract

In recent years there has been increased attention paid to the issue of labor adjustment. This paper examines the cost of labor adjustment in dislocated industries. SpeciBcally, a model is developed and estimated that measures the cost of adjustment for laid-off workers in the Canadian textile industry between 1974 and 1976. These costs take the form of estimates of expected income loss. Comparisons are then made between this private cost of adjustment and the cost from trade restrictionsfor the affected industry. In general, the private cost of adjustment is low enough, relative to the cost of protection, to lead the authors to recommend a policy of compensating the displaced workers directly.

Keywords: Labor adjustment, Private Cost, industry, Canada

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I. INTRODUCTION

In many countries, governments respond to the prospect of a decline in the activity of a major firm or sector by attempting to slow down or halt this adjustment process. One consequence of such actions is that many state-owned enterprises now present in developed and developing countries were formerly private enterprises threatened with bankruptcy. Other cases of potential industrial dislocation involve sectors which find that they no longer can compete successfully against imports. This usually elicits pleas from both the workers and owners for increased protection from imports. The response of governments is often to institute higher tariff rates, or impose quotas or other special measures to preserve artificially the market for the output of these declining sectors.

The rallying point for these government actions is usually the alleged adjustment costs which workers and the economy will suffer because of the termination of these jobs. Seldom are these dislocation costs quantified, while the costs incurred by the economy in the prevention of these once-and-for-all dislocation costs, have on occasions grown to such extreme sizes that their annual amounts have become as large as the wage bill for labor.[1]

Economists, almost without exception, have advocated moves towards trade liberalization to capture the long-run welfare gains from freer international trade. However, the reduction in tariff rates under the various rounds of Mutilateral Trade Negotiations since 1947 has been slow and reluctant. The recent rise in the "new protectionism," with its array of non-tariff barriers, emphasizes the need to analyze

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1. For the apparel sector in Canada, the total economic welfare cost of the protection of domestic producers has grown to approximately $15,000 annually (1979$) for each job saved in this sector through the use of import quotas (Jenkins, forthcoming).

and estimate adjustment costs. It also underscores the need to design effective policies to alleviate these costs, which tend to be concentrated in the labor market.

Two areas of general concern arise when one considers the response of labor to reduced trade protection. The first is the economic cost arising from workers' adjusting to a change in employment opportunities. These costs to the economy might be reduced by trade-adjustment-assistance policies which alter the speed, direction, or extent of labor adjustment.[2] The second area of concern is the magnitude of the private costs suffered as a result of trade liberalization and the methods of alleviating these costs. This paper focuses only on the labor market income losses suffered by workers directly affected by job loss arising from trade liberalization.[3]

The design of programs that compensate workers who lose their jobs is a critical element in achieving tariff reductions or resisting calls for protection in trade-affected sectors. Compensation in some form has to be offered to break up the political impasse that exists when politically significant groups of workers fear that they will be harmed by increased imports of the goods they now produce. While trade-adjustment-assistance programs have been used in the past, these have tended to be politically ineffective and economically inefficient. For example, under the 1962 Trade Expansion Act in the United States, the eligibility criteria were so exclusive that relatively few workers qualified to receive the Trade Readjustment Allowances and other benefits. In addition, the certification process that occurred after the loss of jobs was so slow that even those workers who were declared eligible had to wait over a year to receive any assistance. While improvements in the trade adjustment assistance provisions accompanied the 1974 Trade Act, such programs had already lost much of their political credibility as a means of "buying off" the opposition to freer trade.

Typically, trade-adjustment-assistance programs have offered compensation in the form of extending or enriching unemployment insurance benefits. The work disincentives arising from the tax-back provisions in this type of program result in economic costs that serve to reduce the gains captured by the move to freer trade.

To be politically effective while being efficiency neutral, compensation should be offered as lump-sum (or severance-pay-type) payments to the workers potentially at risk of losing their jobs at the same time (if not before) any trade policy change is announced or implemented. Eligibility criteria should err on the side of including workers whose job loss is not actually a result of reduced trade protection. As long as the compensation is awarded in a neutral fashion, the amounts offered also should be generous enough to allow for the risk premium that workers can be expected to attach to their being more vulnerable to job loss and having more uncertain future incomes. This *ex ante* approach to trade-adjustment-assistance policies requires policies to be predesigned and ready for rapid delivery to smooth the path towards a lowering of trade barriers or be available as an alternative to increasing trade protection when a sector experiences increased import competition. Estimates of the

2. See Glenday (1982), Bale (1976, 1977, 1979) for discussions of policies and their potential economic benefits.

3. The income loss of a displaced worker is generally expected to be less than the economic costs arising from the reallocation of labor as the latter include the labor market externalities such as income taxes and unemployment insurance benefits. The private loss depends upon the difference between the net-of-tax wage rate and the private opportunity cost of labor, while the economic cost depends upon the gross-of-tax wage rate and the economic opportunity cost of labor. For models and estimates of the economic opportunity cost of labor, see for example, Jenkins and Kuo (1978).

expected income loss of displaced workers is a critical element in the design of such compensation programs.

This paper reports on an attempt to estimate the private costs of adjustment arising from the layoff of workers by the textile sector of Canada between 1974 and 1976. During the past decade, this sector has faced increasing competition from imports. As a result, the government has given it special protection through higher tariff rates and quotas. It has also lobbied successfully for quantitative restrictions against imports of clothing into Canada in order to maintain the domestic market for its output. It has most of the classic features of a sensitive unemployment problem. The mills are located in towns where employment depends heavily on this sector. These towns, in turn, tend to be located in the poorer and slower growing regions of the country.

II. DATA BASE

The model derived and estimated in the appendix provides a measure of the private loss incurred by a worker if displaced from his employment. This private loss is the difference between the full income the worker could expect to receive if he remained in his present pattern of employment and that he can expect to earn if his job is terminated. The estimation of the private costs of adjustment requires the prior estimation of the parameters and variables outlined in appendix equations (6) and (7). The key variables are the proportion of time spent in employment before and after layoff, and the wage rate before and after layoff. The remaining variables, such as the marginal and average tax rate and the variables governing the rate of unemployment insurance benefits, are estimated from the provisions of the income tax and unemployment insurance systems.

The principal source of data for the estimation of the private costs of adjustment is the Labour Force Tracking Survey (LFTS) conducted by the Department of Industry, Trade and Commerce during 1977. This survey was designed to establish a data base on the reemployment experiences of a sample of 9,700 workers who suffered permanent job losses from companies undergoing shutdowns or major employment cutbacks. Data were collected on the personal characteristics and the labor force status of these workers over a five-year time profile (1972-77). The survey concentrated on regions in Ontario and Quebec and on workers separated from firms in the weaker and the more labor-intensive industries that were having difficulties remaining internationally competitive. While the survey covered the textile, clothing, electrical products, shipbuilding, and footwear sectors, the results presented in this paper will deal only with the case of displaced textile workers. Restricting our analysis to the textile sector reduces the size of our sample to some 2,400 workers. The vast majority of cutbacks and shutdowns that generated the job losses occurred between January 1974 and December 1976.

During the 1974-76 period, the manufacturing sector, in general, and sectors such as clothing and textiles, in particular, experienced marked contractions in employment generating the raw material for the LFTS. While a cyclical downturn in 1975 and rapid growth in real wages must have been contributory factors, it is generally felt that the Canadian dollar became overvalued, perhaps by as much as 15 percent, during this period (Shepherd, 1980). Exchange-rate overvaluation is equivalent to a loss in effective protection of total value added in import-competing sectors. It is worse than trade liberalization for displaced labor, however, as overvaluation does not have the expansionary effect on the exportable sectors expected from a tariff reduction.

III. ESTIMATION OF THE PRIVATE COSTS OF ADJUSTMENT

The estimation of the private income loss for four types of workers are carried out below. They are: (a) single males, 25 years of age, (b) married males, 40 years of age, (c) single females, 25 years of age, and (d) married females, 40 years of age. The other independent variables were set at levels consistent with the characteristics, as found in the sample populations for these four types of workers. The mean values of the independent variables for the estimations presented above were calculated for these types of textile workers losing their jobs in the Shawinigan region of Quebec and the Prescott region of Ontario. Both are typical of the regions that experienced a decline in textile activity in the early 1970s.

Using these sets of values for the four types of workers in the two regions, we solved the estimated equations. The results are presented in table 1. We find for all types of workers the expected proportion of time spent employed fell after they were displaced from their jobs in textile plants. This drop is more marked for females than males, and for the Shawinigan workers than the Prescott workers. Females also

TABLE 1

Parameter Values and Estimated Private Income Losses of Workers Laid Off from Textile Sector

Type of Worker	P^b	P^a	1978$ per month W^b	1978$ per month W^a	Relative Income loss over 5 years (%)	Maximum Income Loss (Constant 1978$)	Time to Reach Maximum Loss (Months)
Shawinigan							
(a) Single male, 25	.934	.592	$693.3	$798.8	-2.9	$ 126	8
(b) Married male, 40	.949	.674	$800.8	$929.0	-1.7	$ 261	11
(c) Single female, 25	.905	.382	$652.2	$577.8	21.5	$6,784	60
(d) Married female, 40	.942	.517	$709.7	$672.1	12.8	$4,625	60
Prescott							
(a) Single male, 25	.942	.801	$650.6	$799.6	-16.0	$ 10	1
(b) Married male, 40	.959	.861	$775.7	$930.2	-15.6	$ 25	1
(c) Single female, 25	.914	.603	$631.8	$580.3	14.1	$4,553	60
(d) Married female, 40	.951	.649	$687.5	$675.3	5.4	$1,972	60

P^b = proportion of time spent in employment before layoff

P^a = proportion of time spent in employment after layoff

W^b = wage rate before layoff

W^a = wage rate after-layoff

The values for P^a presented in this table are the estimated long-run equilibrium proportion of time spent employed after layoff based on the estimated probabilities of finding and losing jobs for each type of worker in each region.

The relative income loss is defined as the cumulative present value of the absolute loss in full income expressed as a percentage of the cumulative present value of the full income that would have been earned if the employment conditions before job loss were maintained. Income losses are defined as positive, gains as negative.

fared worse than males in their ability to maintain their wage levels. Females experienced slight declines in wage levels, while males on average experienced noticeable increases in wages.[4]

We estimated the expected full income of these types of workers both with and without job loss. Data from unemployment insurance records indicate that the rate of unemployment insurance benefits averaged 0.67 in the Prescott region and 0.70 in the Shawinigan region. The coefficient (B), which reflects the ratio of the marginal value of time while employed to that of being unemployed, is set at 1.2.[5] The values of the marginal and average tax rates are estimated from the personal income tax schedules for Ontario and Quebec given the income and family characteristics of the four types of workers. The private income losses are then estimated using appendix equation 8. These estimates are also presented in table 1.

The magnitude of the relative income loss, i.e., of the net present value of the absolute income loss expressed as a percentage of the net present value of the worker's full income before layoff depends on both the percentage change in the proportion of time employed and the percentage change in wage rates after layoff. Combining these two effects, we find that the wage gains by laid-off male textile workers largely offset the loss of employed time resulting in modest estimates of the maximum present values of private income losses of considerably less than $1,000. The losses in the Shawinigan region tended to exceed those in the Prescott region. In contrast, the female workers are found to suffer much higher losses ranging in these estimates from $2,000 to $7,000. Contrary to what is often expressed in the popular press, it is not the prime-age male who suffers significant private income losses from job loss in the textiles' sector. Rather, it is the female worker (who is perhaps less mobile, though generally has the alternative of household work) who suffers the largest income loss.

These income loss estimates assume that the observed changes in wages between jobs do not represent compensating differentials for changes in job conditions or the costs of moving. A second set of income-loss estimates was also made which set the change in wages at zero. These results reflect the extreme case where all wage changes reflect compensating differentials. Smaller relative wage changes may also be experienced if workers lose their jobs during a period of more normal growth rates in real wages. Under the extreme assumption of the wage after layoff equal to the wage before layoff, the present values of income losses by young and older males in Shawinigan rise to $1,639 and $853, respectively; in Prescott they rise to $792 and $807. For young and older females, the income losses in Shawinigan fall to $3,519 and $3,840, respectively; in Prescott they fall to $1,269 and $1,302.

4. This average wage may increase because textile workers tend to earn less than 80 per cent of the average manufacturing wage, and most displaced workers found alternative employment outside of the textile sector. Also, Ontario, and especially Quebec, experienced rapid growths in real wages over the 1974-76 period.

5. Setting B at 1.2 reflects the average union-non-union wage differential (MacDonald and Evans, 1980). The value of B can be increased by other market phenomena such as: minimum wages; high wage company policies; costs of employment such as commuting, and any positive compensating differential for unattractive work conditions. On the other hand, a negative compensating differential for work conditions would lower B.

IV. CONCLUSIONS

The above sensitivity analysis does not alter the general conclusions. First, the sizes of those income losses are very modest when compared with the economic costs Canada currently bears by providing the clothing and textile sectors with high levels of protection from imports. From a previous study it was found that the annual economic cost in 1979 dollars of maintaining an incremental person-year of employment in the clothing sector of Canada through the use of bilateral import quotas was $15,525 and the total cost to consumers was $35,457 per year. Hence, the total private labor-adjustment costs for the most immobile types of workers is not more than 50 percent of the economic costs that would be incurred by maintaining the individual's employment in the sector for one more year.[6] Our second conclusion is that the income losses per worker are small enough for the government to implement a targeted income-compensation program as an element in a trade adjustment assistance program without major budgetary consequences. The economic costs of failing to undertake such a program are much larger.

6. Jenkins (forthcoming).

APPENDIX A

AI. The Model of the Private Costs of Adjustment[1]

This appendix derives the model employed in the paper. Equations are developed for the full income of the worker both before and after job separation. From these the private cost of adjustment can be computed. In many occupational situations, periods of employment are punctuated by spells of unemployment. Therefore, prior to the final separation from a firm, a worker would expect to spend a proportion P^b of this time employed while spending $1 - P^b$ of his time laid off. During the time he is working, the gross-of-tax wage rate (including supplementary benefits) W^b measures the gross income received by the worker while $W^b(1 - T_{av})$ is the net-of-tax private earnings. The average rate of personal income tax, denoted as T_{av}, includes all federal and provincial income taxes plus payroll taxes. During the periods when the worker is laid off from a firm, he is eligible to collect unemployment insurance U^b until his benefit period runs out or he becomes reemployed. If we denote f^b as the proportion of time that a worker expects to receive unemployment insurance benefits while unemployed, we can express the value of expected after-tax unemployment insurance benefits as $f^b U^b (1 - T_{av})$. In addition to the unemployment insurance payments, the unemployed worker has time to engage in a variety of leisure and informal sector activities whose monetary equivalent value is denoted as V^b.

Combining all these elements of a worker's full income prior to the job termination, we have:

$$I^b = P^b W^b(1 - T_{av}) + (1 - P^b)[f^b U^b(1 - T_{av}) + V^b]. \tag{1}$$

The value of unemployed time V^b has been a parameter whose magnitude has generated some controversy. In a competitive (but distorted) labor market with no involuntary unemployment, a worker would be equating the value to him of employed time with unemployed time. Therefore, the net-of-marginal-tax wage would be equated with the expected net-of-tax value of the unemployment insurance benefits plus the equivalent monetary value of unemployment time or,

$$W^{bps}(1 - T_m) = f^b U^b(1 - T_m) + V^b \tag{2}$$

where T_m is the worker's marginal rate of income tax. However, in many regional labor markets, the wage rates are not set by local market forces alone, but typically wage floors are imposed by minimum wages or, in the case of particular skills, by collective bargaining agreements which cover more than the region in question. In such a case, involuntary unemployment may appear, and thus a worker values the net-of-tax wage rate more than the value of unemployment insurance payments plus the equivalent monetary value of his unemployed time. Hence, equation (2) can be written as,

$$W^b(1 - T_m) = B[f^b U^b(1 - T_m) + V^b] \tag{3}$$

where B is the coefficient reflecting the ratio of the marginal value of time while being employed to that of being unemployed. In a competitive labor market, B equals unity; if there is involuntary unemployment, B is greater than unity and would be expected to increase as the relative amount of involuntary unemployed time increases for a person. Solving equation (3) for V^b we have:

$$V^b = [W^b(1 - T_m) - Bf^b U^b(1 - T_m)]/B. \tag{4}$$

The unemployment insurance benefits in Canada, and in most other countries, are a function of the wage rate earned by a worker up to some maximum amount of insured earnings. If we denote the proportion of insured earnings that are paid to a worker who establishes an unemployment insurance claim as f_u^b and the proportion of gross wages prior to layoff that were insured as f_{cut}^b, then:

$$U^b = f_u^b f_{cut}^b W^b. \tag{5}$$

Substituting equations (4) and (5) into equation (1) and simplifying, we have the following expression for the full income of the worker prior to formal layoff:

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1. The theoretical analysis in this section follow Glenday (1979, 1982) which is similar to that used in Jenkins and Montmarquette (1979). Bale (1976, 1977), Jacobson (1976), McCarthy (1976) and Neumann (1976) have analyzed this issue for the United States.

(6) $$I^b = W^b \{P^b (1 - T_{av}) + (1 - P^b) [F^b(1 - T_{av}) + (1 - T_m) (1 - F^b B)/B]\}$$
$$\text{where } F^b = f^b f^b_u f^b_{cut}.$$

The estimation of the full income that a worker expects to receive after layoff I^a_t is based on a relationship that is essentially the same as that for I^b except all variables are based on the reemployment prospects of the worker. Superscript a is therefore substituted for b in (6) giving:

(7) $$I^a_t = W^a \{P^a_t (1 - T_{av}) + (1 - P^a_t) [F^a(1 - T_{av}) + (1 - T_m) (1 - F^a B)/B]\}$$
$$\text{where } F^a = f^a f^a_u f^a_{cut}.$$

A few differences between the nature of the relationships shown in equations (6) and (7) should be noted. First, the estimation of I^a_t focuses on the dynamics of the ability of the worker to regain and retain subsequent employment. Subscript t indicates that the variable changes with the time from job loss. The proportion of time that a worker expects to be employed at any point in time after job loss P^a_t is expressed as a function of time. P^a_t depends upon the ability of a worker to both find and keep jobs, and hence, is calculated from a Markov chain process that describes the transitions between states of employment and unemployment (or non-employment) over time. These states are broken down into time intervals according to the duration of an unemployment or employment spell. The transition probabilities are then estimates of the probabilities P^a_i $i = 1, \ldots, m$ that a worker finds a job in the interval, conditional upon not finding the job in the previous $i - 1$ intervals of the unemployment spell, as well as the probabilities L_i; $i = 1,\ldots, m$ that a worker loses a subsequent job in the ith interval, conditional upon not losing the job over the previous $i - 1$ intervals. P^a_t is then the sum of the probabilities of being in any of the m employment intervals at time t after job loss.[2]

The second distinction is that even though a worker receives a different wage rate in his subsequent jobs than he did before layoff, any unemployment insurance benefits following job loss are initially based on the wage rate in the job before layoff. A correction factor, therefore, is introduced such that expected unemployment insurance benefits are calculated on the basis of W^b for the period during which the worker would be eligible to establish a claim based on this wage rate; thereafter, it is based on W^a.

The model underlying all these estimations focuses on the states of being employed and unemployed. However, some people leave the labor force permanently through early retirement, while others have left only temporarily.[3] It will not be possible to estimate the value of a person's full income outside the labor force directly. But it seems reasonable to assume that if a person chooses not to work, his value of his time in this state must be at least as great as that of remaining in the labor force, that is, the expected value of his full income while in the labor force. In this analysis, however, this time outside of the labor force is assigned the same value as unemployed time. This generally imparts a slight upward bias to the income loss estimates.

The private income loss suffered by a worker permanently laid off from an activity is expressed as the present value of the losses, $L(n)$, he expects to incur in each period over some finite time horizon expressed as follows:

(8) $$L(n) = \sum_{t=1}^{n} (I^b - I^a_t)/1 + d)^t$$

where n is the time horizon of estimation, t is the time interval from job loss, and d is the private discount rate.

We do not rule out the possibility that I^a_t may at some point in the future become larger than I^b. Where sectors have been depressed for an extended period of time, workers often obtain higher wages in alternative sectors soon after being laid off permanently from the declining sector. The final termination breaks the workers' inertia, which has prevented them from leaving a familiar job to move to other ones which ultimately yield a higher level of income.

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2. Let us denote the conditional probability of keeping a job (or not losing a job) in interval i of an employment spell as $K_i = (1 - L_i)$. The probability of being at work in $t = 1$ is the conditional probability of finding work in the first interval of an unemployment spell, or $P^a_1 = P^a_1$. The probability of being employed in $t = 2$ is the probability of finding work in the second interval, given none was found in the first, plus the probability of keeping a job for the second interval of employment, given a job was found in the first or $P^a_2 = (1 - P^a_1) P^a_2 + P^a_1 K_1$. Similarly, for $t = 3$, $P^a_3 = (1 - P^a_1)(1 - P^a_2)P^a_3 + (1 - P^a_1) P^a_2 K_1 + P^a_1 K_1 K_2 + P^a_1 (1 - K_1)P^a_1$. The recovery path of P^a_t, $(t = 1,\ldots,n)$, is estimated using a Markov chain process, see Glenday (1982).

3. The model estimated in this study excludes those who leave the labor force permanently such as retirees. Those who withdraw from the labor force temporarily are included.

AII. Estimation of Probability of Being at Work After Layoff

The probability that an individual is at work after having been laid off depends on the probability of his first finding alternative employment (i.e., on the duration of his unemployment spells) and on the probability of his retaining the job (i.e., on the duration of his subsequent employment spells). The interval or conditional probabilities P_1^*, P_2^*, P_3^* of finding a job within various intervals of time since layoff (0-1 month, 2-3 months, and more than 3 months) are estimated using a probit model. Dependent variables EMPL1, EMPL2, and EMPL3 corresponding to the three time intervals are defined as 0 or 1 depending on whether the individual is still unemployed (0) or employed (1). When a person becomes employed within an interval, this observation is dropped from the sample for the analysis of subsequent intervals.

The probability of retaining a subsequent job, and hence, the duration of this employment is analyzed in a similar fashion. An employment spell is divided into two intervals (0-3 months, and more than 3 months) with corresponding dependent variables LOSE1 and LOSE2. In this case the dependent variable is set equal to 0 if the worker remains employed, and equal to 1 if he loses the subsequent job. Having become unemployed again, the worker faces a probability of finding yet another job, and so the pattern is repeated. The calculation of the probability of being at work P_t^* at a point in time t after separation from a firm is constructed as a Markov chain from estimates of the interval conditional probabilities of finding and losing jobs.

The probit analysis allows us to identify the key variables which determine the interval probabilities of finding or retaining employment. Personal factors related to the individual as well as local and general economic conditions will affect the interval probabilities. Among the personal factors affecting the probability of finding employment, we would expect that variables such as sex, age, education, skill level, marital status, labor force status of spouse, permanency of prior employment, and the reason for losing the job would potentially have an important influence. The local and general economic conditions are reflected by: a dummy variable indicating that the individual left the labor force during the period of unemployment; a dummy variable to measure whether the worker moved to another labor-market area; and the Canadian unemployment rate for prime age males.

The results of the estimations of the interval probabilities of finding employment (EMPL1, EMPL2 and EMPL3) using probit estimation technique are presented in table A1 for the former textile workers. The overall specifications are all highly statistically significant as indicated by the likelihood ratio tests. In general, the signs of the coefficients of the explanatory variables are as expected.

The results of the estimations of the interval probabilities of losing jobs (LOSE1 and LOSE2) using the probit estimation techniques are presented in table A2 for the prior textile workers. The overall specifications are also highly statistically significant. In interpreting these results, it is important to note that jobs can be lost for many reasons. Furthermore, the same factor can result in both increasing and decreasing the probability of losing a job, depending on the circumstances. Resigning and being laid-off are the two major reasons for leaving a job. When the UNEMPLOYMENT RATE increases, layoffs are expected to be higher, but fewer workers would be expected to resign. The more temporary workers in a sample, the more likely that the layoff effect will dominate. This sample tends to be characterized by workers with a history of permanent employment, and hence, the insignificant effect of the UNEMPLOYMENT RATE is not surprising. Similarly, economic pressure variables (MARRIED, prime age or AGE2) can affect a worker's behavior in two ways. A worker in a high-paying job would be expected to be under pressure to avoid losing such a job. Alternatively, if a worker had taken the first job that he could find after a layoff in order to maintain his monetary income, and this happened to be a relatively poor paying job, such a worker would feel under pressure to resign if another higher paying position is found.

Estimates are made of the factors determining the wage rates workers receive before job loss and in the alternative employment they find after job loss. A semi-log relationship is estimated using ordinary least squares in which the dependent variable is the natural logarithm of the monthly wage rate expressed in constant 1971 dollars.[4] The estimations of the wages before job loss are based on the LFTS data base generated for the probability of finding employment estimations. The sample sizes for the wage estimations are smaller in that only those workers that actually found a job before the survey data are included in either equation. This ensures that before and after job loss comparisons are made on the same sample of persons. The wage rates in all subsequent employment episodes before the survey date are included in order to check on the extent to which workers recover wage levels through job switching.

The results from the estimations of the wage rate before layoff W^b and for the estimations of wage rates obtained by former textile workers in alternative jobs W^a are presented in table A3. The signs of the coefficients of the variables are all as expected. Again, the overall specifications are highly statistically significant as indicated by the F-test statistics.

SEX stands out as the dominant explanatory variable. Wage discrimination against female workers is expected to explain much of the male-female wage gap. Economic pressure may also play a role. It is interesting to notice the large difference between the SEX coefficients in the before and after job loss estimates: the latter being over 19 percentage points higher than the former. This appears to indicate that wage discrimination is higher at the point of job entry than if a worker has been in the same job and/or firm for an extended period.

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4. For the appropriateness of this type of specification for estimating wages see J. Mincer, "The Distribution of Labor Incomes: A Survey," *Journal of Economic Literature*, March 1970, 8, 1-26.

TABLE A1

Estimates of the Factors Affecting the Probability of Finding Employment for the Workers Displaced from the Textile Sector

Independent Variables	Dependent Variables		
	EMPL1	EMPL2	EMPL3
CONSTANT	- .9829	-1.4204	- .7586
SEX	.6988 (10.78)*	.5004 (5.07)	.5543 (5.83)
MARRIED	.2186 (3.01)	.1078 (.90)	.1709 (1.49)
SPOUSE WORKING		- .2517 (-2.02)	- .2124 (-1.85)
AGE1 (0-30)	.0031 (.35)	- .0034 (- .26)	- .0112 (- .86)
AGE2 (30-45)	- .0087 (- .97)	.0010 (.76)	- .0076 (- .64)
AGE3 (over 45)	- .0275 (-2.22)	- .0726 (-3.23)	- .0424 (-3.07)
SCHOOLING	.0175 (1.11)	.0720 (3.15)	.0241 (1.15)
SKILL	.0431 (1.55)	.0238 (.56)	.0324 (.88)
RESIGNED	.8111 (12.99)	.0844 (.82)	- .0775 (- .73)
CHANGED LOCATION	.3410 (4.63)	.2976 (2.64)	1.9455 (8.83)
OUT OF LABOR FORCE		- .3927 (-3.21)	- .9091 (-8.46)
UNEMPLOYMENT RATE	- .1620 (-6.18)	- .1166 (-2.97)	- .0845 (-1.54)
MONTHS TO SURVEY DATE	----	----	.0538 (12.59)
D (New Brunswick)	- .0817 (- .51)	- .2640 (-1.18)	.3654 (1.93)
D (Prescott)	.3548 (2.28)	.5705 (2.63)	.4466 (1.81)
D (Toronto)	.4816 (1.89)	.8970 (2.39)	.5545 (1.08)
D (Kitchener)	.6609 (3.94)	.5133 (2.16)	.5962 (2.54)
D (Niagara)	- .1576 (-1.03)	.1640 (.89)	.0537 (.30)
D (Sherbrooke)	.0444 (.37)	.0188 (.11)	.0219 (.13)
D (Shawinigan)	- .0084 (- .08)	- .2787 (-1.83)	- .0078 (- .06)
D (Quebec City)	.1520 (1.18)	- .1844 (- .95)	- .2666 (-1.46)
D (St. Jean)	.2670 (2.07)	.1656 (.90)	.2445 (1.29)
D (Joliette)	.1097 (.59)	.0544 (.23)	.3188 (1.46)
Other Quebec Regions Excluded			
Likelihood Ratio Test (χ^2) (df)	550.2 (20)	148.2 (22)	589.8 (23)
Pseudo - R^2	.283	.160	.471
Positive Observations /Total Observations	819/2400 = .341	226/1581 = .143	662/1355 = .489

*t - statistics

Definition of variables:

SEX: (male = 1, female = 0) mean = .683.

MARRIED: (married = 1, otherwise = 0) mean = .496.

SPOUSE WORKING: (yes = 1, no = 0).

AGE: (age at time of job loss) mean = 26.7; AGE1, AGE2, AGE3 (Incremental increases in age) i.e. if AGE $\leq$ 30, then AGE1 = AGE, and AGE 2 = AGE3 = 0, or if 30 < AGE $\leq$ 45, then AGE1 = 30, and AGE2 = AGE - 30, and AGE3 = 0, also if AGE > 45 then AGE1 = 30, and AGE 2 = 15 and AGE3 = AGE - 45.

SCHOOLING: (years of primary and secondary training) mean = 9.4.

SKILL: (equivalent years of specific vocational preparation required for occupation) mean = .42 years.

RESIGNED: (resigned from job = 1; otherwise = 0).

CHANGED LOCATION: (changed location of job = 1, otherwise = 0) mean = .179.

OUT OF LABOR FORCE: (left labor force during unemployment spell = 1, otherwise = 0).

UNEMPLOYMENT RATE: (average Canadian prime age male unemployment rate during the employment interval upon which the probit estimate is based).

MONTHS TO SURVEY DATE: (months from job start to survey date for those still employed after 3 months.

D (New Brunswick, etc.): (locational dummy variables taking a value of 1 if person lost job in particular region).

TABLE A2

Estimate of the Factors Affecting the Probability of Losing a Job for Workers Displaced from the Textile Sector

Independent Variables	Dependent Variables			
	LOSE1		LOSE2	
CONSTANT	1.883		3.3388	
SEX	-.0011	(- .02)*	-.3138	(-4.33)
MARRIED	-.1779	(-2.69)	.2203	(2.87)
AGE1 (0-30)	-.0835	(-9.11)	-.0118	(-10.12)
AGE2 (30-45)	.0281	(2.97)	.0182	(1.86)
AGE3 (over 45)	-.0130	(- .91)	-.0217	(-1.47)
SCHOOL1 (0-9)	.0339	(1.26)	-.0489	(-1.58)
SCHOOL2 (over 9)	-.0236	(- .91)	-.1043	(-3.33)
SKILL	-.0509	(-2.69)	-.0416	(-2.09)
PERMANENCY (old jobs)	-.0069	(-3.89)	-.0030	(-1.21)
JOB ORDER	.1174	(2.07)	.1687	(2.36)
RESIGNED (old job)	-.1489	(-2.61)	-.1206	(-1.75)
CHANGED LOCATION	.5782	(7.60)	2.4706	(9.91)
UNIONIZED (new job)	-.1887	(-3.36)	-.3749	(-5.66)
UNEMPLOYMENT RATE	-.0179	(- .72)	-.0324	(- .77)
MONTHS TO SURVEY DATE	----		.0383	(11.64)
D (New Brunswick)	.3948	(3.21)	.1857	(1.09)
D (Prescott)	-.1404	(-1.08)	-.1015	(- .69)
D (Toronto)	-.1884	(- .72)	-.3965	(-1.66)
D (Kitchener)	-.4497	(-2.22)	-.1877	(-1.06)
D (Niagara)	-.1515	(-1.10)	-.3575	(-2.31)
D (Sherbrooke)	-.0225	(- .21)	-.2718	(-2.13)
D (Shawinigan)	.0234	(.30)	.0747	(.77)
D (Quebec City)	-.1072	(- .96)	-.2844	(-2.15)
D (St. Jean)	-.0182	(- .17)	-.2066	(-1.57)
D (Joliette)	-.1416	(- .91)	-.1084	(- .63)
Other Quebec Regions Excluded				
Likelihood Ratio Test (χ^2) (df)	383.95 (24)		661.67 (25)	
Pseudo - $\bar{R}^2$	.188		.379	
Positive Observations/Total Observations	769/2750 = .280		930/1981 = .470	

*t - statistics

Definition of variables:

PERMANENCY: Percentage of time a worker has been employed prior to losing his job.
JOB ORDER: If an employment spell is the second or subsequent job after losing a job from the key employer, then job order = 1, otherwise = 0.
UNIONIZED: If a worker is a member of a union while working for a new employer, then unionized = 1, otherwise = 0.
For definition of other variables see table A1.

The mean values of the variables in the above equations are: Sex, .745; Married, .469; Age, 27.6 years; Schooling, 9.8 years; Skill, .79 years; Permanency, 93.7%; Job Order, .363; Resigned, .175; Changed Location, .133; Unionized, .429; Unemployment rate, 4.22%.

TABLE A3

Estimates of Factors Affecting the Wage Rates Before and After Layoff for Former Textile Workers

Dependent Variable: Natural logarithm of monthly wage rate in constant 1971 dollars

Independent Variables	Before Layoff		After Layoff	
CONSTANT	5.5067		5.0004	
SEX	.1207	(9.73)*	.3147	(21.64)*
MARRIED	.0252	(1.88)	.0500	(3.41)
AGE	.0135	(4.17)	.0289	(7.74)
AGE SQUARED	-.00016	(-3.65)	-.00034	(-6.84)
SENIORITY (months)	.00015	(1.66)	----	
SCHOOLING	.0139	(4.73)	.0226	(6.58)
SKILL	.0880	(5.94)	.0418	(3.87)
SKILL SQUARED	-.0075	(-4.68)	-.00429	(-3.58)
UNIONIZED	.0036	(0.29)	.1823	(14.48)
INSTABILITY	-.0285	(-4.68)	----	
RESIGNED (old job)	----		.0415	(3.26)
CHANGED LOCATION	----		.0604	(3.26)
D (New Brunswick)	-.0416	(-3.24)	.0672	(2.37)
D (Prescott)	-.0914	(-1.92)	-.0745	(-2.48)
D (Toronto)	.0832	(1.92)	.0987	(2.05)
D (Kitchener)	.0022	(.07)	.0024	(.06)
D (Niagara)	.0399	(1.41)	-.0655	(-2.25)
D (Sherbrooke)	.0219	(.97)	-.0322	(-1.33)
D (Shawinigan)	-.0596	(-3.02)	-.0871	(-4.91)
D (Quebec City)	-.0115	(-4.57)	-.0948	(-3.80)
D (St. Jean)	.0993	(4.18)	-.0848	(-3.37)
D (Montreal)	----		-.0326	(- .91)
D (Joliette)	-.0078	(- .25)	----	
F-Test (df)	22.87	(20,1510)	47.32	(20,2487)
$\bar{R}^2$	.214		.210	
Observations	1531		2508 (1531 individuals)	

*t - statistics
Excluded region: Other Quebec regions.

Definition of variables:
INSTABILITY: Number of unemployment spells in excess of one month duration per year from January 1972 to losing job from employer. Other variables are defined in tables A1 and A2.

Mean values for variables in the before layoff equation are: Wages, $405.7; Sex, .715; Married, .459; Age, 26.7 years; Seniority, 45.8 months; Schooling, 9.6 years; Skill, .46 years; Unionized, .817; Instability, .228. In the after layoff equation, the mean values of the additional variables are: Wages, $458.3; Unionized, .434; Resigned, .372; Changed location, .130.

UNIONIZED workers appear to have a much greater wage advantage in new jobs than in previous jobs. The size of the UNIONIZED coefficient prior to layoff is probably dampened by the small proportion of non-unionized workers being highly paid skilled workers. Furthermore, the power of unions to raise wages is probably significantly weakened in sectors experiencing an extended period of decline.

The estimations of the percentage of time workers were employed before job loss P^b are based on the LFTS sectoral data base developed for the probability of finding employment estimations. The history of each worker from January 1972 to job loss from the key firm is included in the estimate of P^b. Using ordinary least squares techniques, estimates of the factors affecting P^b are made for the former textile workers and presented in table A4.

The signs are nearly all as expected. The overall specification is statistically significant as indicated by the F-statistic. As expected AGE, MARRIED, SENIORITY, SCHOOLING, SKILL and UNIONIZATION are all positively related to P^b. Old workers, however, given that they have trouble in finding work if they ever lose a job, can be expected to have lower P^b values. This is reflected in the negative sign of AGE SQUARED. However, in the case of textiles, neither age nor unionized has had a significant effect on the permanency of the employment experience prior to layoff.

TABLE A4

Estimates of the Factors Affecting the Proportion of Time at Work Before Job Loss for Workers in the Textile Sector in Canada

Independent Variables	Dependent Variable: Percentage of Time at Work	
CONSTANT	79.176	
SEX	.748	(1.03)*
MARRIED	2.162	(2.67)
AGE	.240	(1.36)
AGE SQUARED	- .0021	(- .95)
SENIORITY	.0364	(6.34)
SCHOOLING	.364	(2.01)
SKILL	1.937	(2.05)
SKILL SQUARED	- .159	(1.56)
UNIONIZED	.975	(1.02)
D (New Brunswick)	-12.350	(-6.93)
D (Prescott)	1.257	(.68)
D (Toronto)	5.273	(1.73)
D (Kitchener)	6.159	(3.04)
D (Niagara)	- .506	(- .31)
D (Sherbrooke)	1.456	(1.05)
D (Shawinigan)	.303	(.25)
D (Quebec City)	3.032	(2.05)
D (St. Jean)	3.995	(2.59)
D (Joliette)	3.842	(1.91)
Other Quebec Regions Excluded		
F-Test (df)	14.34	(19,2167)
$\bar{R}^2$	.104	
Observations	2187	

*t - statistics

Mean Values for variables used in equation are: Sex, .630; Married, .493; Age, 28.7 years; Seniority, 55.9 months; Schooling, 9.3 years; Unionized, .838.

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