The Impact of Worker's Experience Rating on Unemployed Workers

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Abstract

The most original legal change introduced in the *Employment Insurance Act* is arguably the introduction of a form of experience rating on unemployed workers. The new *Act* has introduced a reduction in replacement rates for repeat users of the insurance system. For every 20 weeks of benefits drawn from the system in the past 5 years, a claimant's replacement rate will be reduced through the "intensity rule" by 1 percentage point of insured earnings, up to a maximum of 5 points.

The introduction of the rating system has significantly reduced the cost of operating the EI system, which in itself is positive for the economy. There are many ways of reducing the operating cost of the system however. From a policy point of view, the decision to introduce experience rating will be justified if it helps to solve a problem of moral hazard — abuse of the system by some claimants, or a problem of cost shifting — some workers taking much more out of the system than they put in. This paper examines this aspect of the reform. In doing so, we shall take into account the fact that the slate was wiped clean for claimants when the reform was introduced. Benefits collected before June 30, 1996 will not be counted in the calculation of a claimant's replacement rate. This implies that this system will not be fully in place until 2001. Meantime, a claimant's actual history will differ from his or her "official" history.

We use data from the first seven waves of the Canadian Out of Employment Panel (COEP) Survey. Since our problem is essentially linked to Employment Insurance (EI) usage, special emphasis will be put on administrative data (especially the Status Vector). This collection of data is now well known, and no special description is required here.

For the purpose of this exercise, we extract from the Status Vector file all the claims filed by a COEP respondent between July 1995 and June 1997. Since July 1996 is the date in which weeks of benefits received started to be included in Human Resources Development Canada's (HRDC) calculation of past usage, these data will provide us with two groups of observations to compare: one year of claims filed before and one year of claims filed after the implementation of experience rating.

We found some evidence of a behavioural response to the introduction of a rating system in the EI program — the most obvious being an increase in the number of people leaving the EI just before their future benefits might be affected if they stayed another week. Although this change is statistically significant, its economic effect is minimal. We estimate the difference in the implied average usage caused by the intensity rule to be less than a quarter of a week.

The estimation of the structural model does not provide us with many more clues. Although women appear to be behaving differently with respect to usage, they do not appear to have reacted differently to rating (these results are not shown here). The model also shows that, given our identifying strategy, those who are affected by the new rating system still use EI more than other comparable claimants.

1. Introduction

The most original legal change introduced in the *Employment Insurance Act* is arguably the introduction of a form of experience rating on unemployed workers. The new *Act* introduced a reduction in replacement rates for repeat users of the insurance system. For every 20 weeks of benefits paid out over the past 5 years, a claimant's replacement rate will be reduced by 1 percentage point of insured earnings, up to a maximum of 5 points.[1]

This unique system is interesting because, as far as we know, it has no precedent. The United States Unemployment Insurance (UI) system has a form of experience rating for firms, but not for individuals. To our knowledge, no other industrialized country applies any significant form of experience rating to its unemployment insurance system. Probably the only comparable rule is found in the new U.S. welfare system, which imposes a 100 percent reduction in welfare benefits for recipients after two years of lifetime benefits. This form of rating is obviously much more extreme than what was introduced in Canada through the EI reform. However, some of the lessons learned from Canada's Employment Insurance (EI) reform could probably serve in an assessment of the U.S. welfare reform, and vice versa.

In the U.S. system, UI tax rates are increased for firms that use the system more than others, in order to cover the costs they deplete from the unemployment insurance fund. This rating system was designed to increase the cost of layoffs for firms tempted to overuse UI as a way to retain redundant workers — who would rotate through multiple spells of temporary layoffs rather than being permanently let go. It was also intended to avoid the type of worker-employer collusion that is observed in Canada where no experience rating exists. Based on Canadian administrative data, Corak and Pyper (1995) show that firms use UI as a wage subsidy through worker rotations tailored to extract the most out of the UI system.

In a model of implicit contracts where there is no unemployment insurance, risk-neutral firms and risk-averse workers, there are no layoffs (Akerlof and Miyazaki, 1980). When an unemployment insurance system is introduced into the model without experience rating of firms, some layoffs are shown to take place. Experience rating implicitly introduces a tax on layoffs which is supposed to counterbalance the implicit subsidy on layoffs resulting from the UI system (Brechling, 1977).

From an economic point of view, the recent change in the Canadian EI law raises a question — will a system of experience rating of workers achieve the goals that are generally associated with the introduction of experience rating in any system — reducing moral hazard problems and the corollary of cost shifting?

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1 The new clawback provisions of the *EI Act* also have some experience-rating features. However, it is our view that these provisions should be studied more as a means-testing device than as a rating tool, since most of the rating aspects included in them are conditional upon a stringent means test. Furthermore, the clawback will affect far fewer people than the provisions considered here (7.5 percent of claimants, according to Human Resources Development Canada (HRDC) (1998)).

The introduction of the rating system has significantly reduced the cost of operating the EI system, which in itself is positive for the economy. There are many ways of reducing the operating cost of the system however. From a policy point of view, the decision to introduce experience rating will be justified if it helps to solve a problem of moral hazard — abuse of the system by some claimants, or a problem of cost shifting — some workers taking much more out of the system than they put in. This paper proposes to examine this aspect of the reform. In doing so, we shall take into account the fact that the slate was wiped clean for claimants when the reform was introduced. Benefits collected before June 30, 1996 will not count in the calculation of a claimant's replacement rate. This implies that this system will not be fully in place until 2001, but also that in the meantime, a claimant's actual history will differ from his or her "official" history.

The goal of the proposed research is to investigate this feature of the reform, and estimate how Canadian workers changed their behaviour as a result of it.

We propose to use historical Status Vector data of Canadian Out of Employment Panel (COEP) respondents to:

- look at their past employment and unemployment patterns using duration analysis;
- predict what these patterns would have been in the absence of Bill C-12; and
- measure to what extent these have changed as a result of Bill C-12.

As time goes by and the unemployed's "official" history moves closer to his or her actual history, behavioural changes should be observed. The advantage of this particular aspect of the reform is that it will take place only gradually, and will therefore be easier to isolate and identify amongst all the other changes involved in the passage of Bill C-12.

Survey data will be useful as control variables in the duration analysis, but will also allow us to produce separate analysis by groups: seasonal workers vs. other repeat users; men vs. women; part-time vs. full-time workers; and, of course, younger vs. older workers.

2. Theoretical and empirical background

It is important to remember here that the theoretical basis for the new system of experience rating of workers is not the same as in the U.S. system. As we noted, the U.S. system for rating firms can be justified in a theoretical model of implicit contract as a way of compensating for the implicit subsidy to layoffs that Unemployment Insurance (UI) generates for firms. The logic for the rating of workers is based on a search model.

In the search model (Mortensen, 1977, for example), an unemployed worker's return to work will be determined by the probability that he or she receives an acceptable job offer. The probability of receiving such an offer is determined by the intensity of their search, the general economic environment they are placed in, and their personal characteristics. The acceptability of such an offer will in turn be determined by the lowest acceptable wage for that worker — the "reservation wage". The model shows immediately that the more generous the unemployment insurance system, the higher the reservation wage.

In such a model, Employment Insurance (EI) usage by an individual *i* can be described as:

$$U_i = f(X_i, Y, G) \tag{1}$$

where: U is EI usage defined as the number of weeks of benefits a person will draw over a given period of time.
X is a vector of characteristics representing the unemployed
Y is a vector of characteristics representing the economic environment
G is a vector of characteristics representing the generosity of the EI system

An individual's characteristics and the characteristics of the economic environment clearly affect EI usage by taking into account the tightening of the labour market in which an individual must find employment. Similarly, given our definition of usage, three aspects of EI generosity can affect usage. The first one is obviously the rules of eligibility — the easier it is to qualify for benefits, the more likely people are to actually draw benefits. The second aspect is duration of benefits — the longer benefits can be drawn, the more likely people are to actually draw them. Finally, the third aspect is linked to replacement rates. The more generous the benefits, the more likely the unemployed are to claim, and delay their return to work.

The intent of the experience rating reform is to reduce the generosity of the EI system by reducing the benefits for repeat users of the system (those who have collected more than 20 weeks of benefits in the previous 5 years). This targeting of repeat users can be justified either because these workers have particular individual characteristics X that make them prone to use EI, or out of the concern that repeat users should be supported on a broader tax base than EI.

Estimating a search model has always been difficult because of its very nature, which implies that search duration, re-employment wages and search intensity are all simultaneously determined. Trying to isolate the impact of UI on search behaviour is even more difficult, especially in Canada. In the former Canadian UI system, the different measures of UI generosity were all strongly correlated with the other individual and economic characteristics relevant for EI usage.

Through the variable entry requirement provision, UI eligibility has been strongly correlated with regional unemployment rates. Similarly, the system used to compute the duration of benefits implied a strong correlation between benefit durations and regional unemployment rates. These correlations, however, were not strong enough to make it hopeless to attempt to quantify the impacts of these aspects of the generosity of the Canadian UI system. Previous studies sponsored by Human Resources Development Canada (HRDC) have provided good evaluations of the impacts of these aspects of the generosity of the UI system on the behaviour of the unemployed.

There is, however, one aspect of the generosity of the Canadian UI system that has always eluded researchers — replacement rates. The former system provided little variation, hence little scope for testing. In addition, most replacement rate changes were perfectly correlated to other determinants of UI usage. The replacement rate has been changed across the board a number of times, making it very difficult to disentangle the impact of that change from the impact of other changes in the economic environment. On some occasions, it has been changed for a specific group of unemployed whose distinct characteristics had to be included as an explanatory variable in any case. By providing real variations in the replacement rate for the first time in Canada, the EI reform provided the first opportunity to measure precisely the impact of replacement rates, and thus the impact of experience rating, on the Canadian unemployed.

3. Methodology

The purpose of the exercise is to try to estimate equation (1) so as to isolate the impact of experience rating, through its impact on replacement rates. While the reform provides some variation in replacement rates, measuring its impact on unemployed workers is far from straightforward.

Unlike exogenously mandated variations — the differences in Unemployment Insurance (UI) systems between American states, for example — these differences will be endogenous to the unemployed's behaviour. Experience rating will apply only to the extent that the unemployed uses the system; rational workers will take it into account in determining their reservation wage, and deciding whether or not to claim.

Take the following very simple situation. A worker has the habit of claiming twenty weeks of Employment Insurance (EI) benefits yearly, for which he receives $275 weekly. Suppose that these $275 correspond to a 55 percent replacement rate for an insurable wage of $500.

When deciding whether to claim a 20th week, the claimant will know that this decision will reduce the replacement rate by 1 percentage point over the next five years. This would result in a reduction in the weekly benefit of $5 over the next five years. Everything else being equal, for a worker with a 5 percent discount rate, this amounts to a present value of $429.82, compared to a benefit of $275. This worker will choose to go back to work after 19 weeks of unemployment. Conversely, a comparable worker with a higher discount rate might elect to take the reduction in replacement rate and stay unemployed for one more week. In this case, long unemployment durations would be associated with lower replacement rates, the two measures being inevitably simultaneous.

The solution to simultaneity problems in econometrics has always been to find instrumental variables, and fortunately the Canadian legislator has provided us with one. Since the unemployed will start the new EI regime with a clean slate, researchers will have more information about them than Human Resources Development Canada (HRDC) will actually take into account in setting the replacement rate. For five years, it will be possible to distinguish between a repeat user with high replacement rates, and an unfortunate unemployed who had one long unemployment spell and ended up with a lower replacement rate.

The second source of identification for the impact of experience rating on EI usage is linked to the non-linearity in the relation between past usage and replacement rate. While claiming an additional week will not have any impact on future benefits up to 19 weeks, the marginal impact of claiming a 20th week is considerable.

We will use this feature of the *Act* to measure the impact of experience rating of unemployed workers on EI usage. We propose two tests and measures.

The first and simplest empirical evidence would be to show if there exists a strong tendency to claim during the 19th, 39th, 59th (and so on) weeks. As noted, the non-linearity in the relation between replacement rates and EI usage strongly increases the marginal cost of claiming a 20th, 40th (and so on) week of benefits, especially for repeat users. If claimants are sensitive to the experience rating, such a tendency should be apparent.

The second test would be to perform a duration analysis explaining the number of weeks of benefits claimed before and after the introduction of the experience rating, controlling for the socio-demographic variables generally included in such regressions, and controlling for the number of weeks that could have been claimed by the unemployed in question. Given the specific features of the *Act*, it is worth noting that during the first year of the EI reform, replacement rate is only remotely linked to a worker's actual unemployment history. Therefore, the replacement rate variable can be included as is in the regression, and control variables indicating the number of weeks a worker actually claims during year t-2 to t-6 are also included. As time goes by, the number of weeks a worker claims during year t-2 to t-6 will become more and more closely correlated to the replacement rate, and this simple test will become impossible to perform.

Another approach is to estimate simultaneously EI usage and replacement rate. In that case, we will calculate:

$$U_i = f(X_i, Y, G_r) + g(RR) \tag{2}$$

and

$$RR_i = h(X_i, Y, G_r) = i(O_i) \tag{3}$$

where: G_r is the measure of EI generosity excluding the replacement rate
RR is the replacement rate
O is the official usage history of the worker.

Since the official and actual usage history diverge and will diverge for five years, the two equations can be identified by including the actual history in the usage equation (because it is a relevant individual characteristic and is not correlated with the replacement rate), and including the official usage history in the replacement rate equation (because it is correlated with the replacement rate and is only weakly correlated with the actual history).

4. Data

We used data from the first seven waves of the Canadian Out of Employment Panel (COEP) Survey. Since our problem is essentially linked to EI usage, special emphasis was put on administrative data (especially the Status Vector). This data set is now well known, and no special description is required here.

For the purpose of this exercise, we extracted from the Status Vector file all the claims filed by a COEP respondent between July 1995 and June 1997. Since July 1996 is the date in which weeks of benefits received started to be included in Human Resources Development Canada (HRDC)'s measure of past usage, these data will provide us with two groups of observations to compare — one year of claims filed before the implementation of experience rating, and one year of claims filed after.

Table 1 gives an idea of the magnitude of the problem. In this table, we show the extent to which the rating system would have affected COEP respondents between 1995 and 1998. The table presents the number of past usage weeks for all the claims filed during each of these years, past usage weeks being defined as in the *Employment Insurance (EI) Act* — weeks of benefits paid during the 260 weeks preceding the claim. The table also presents the impact that the rule would have had on the claimant's replacement rates. The top panel shows that on average over these five years, claimants have received about 56 weeks of benefits in the 5 years preceding the claim. Fewer than 30 percent of claimants would have received full benefits in any of these years. More than 20 percent of them would have received the minimum 50 percent replacement rate.[2] Remember, this is just an exercise. No experience rating was applied before 1997, and since people's usage history has been erased on July 1st, 1996, figures for 1996 onwards do not correspond to the official HRDC figures.

The bottom part of the table presents the same figure for our two subsamples (i.e., July 1995 to June 1996, July 1996 to June 1997). In addition, it allows us to distinguish between the actual usage history, as defined, and the official history that starts only in 1996. As expected, we do not see any significant difference in the actual history column. Too little time has elapsed for such a long-term variable to be affected. The similarities are even greater when looking at a simplified version of the official usage history. Here we simply look at the number of weeks of benefits claimed in the 52 weeks preceding for both subsamples. The distributions are exactly identical. This result confirms our expectation that if any behavioural change is to be detected this early as a result of the introduction of experience rating, it will be found in marginal effects rather than in average effects.

2 With the exception of 1998, but this result might be due to some long spells being censored, and will have to be validated when a more recent Status Vector file is available.

TABLE 1
Experience Rating in Perspective

All COEP respondents

Distribution of past usage weeks as defined in the EI Act

	Mean	Std. Dev
1995	56.793	47.374
1996	55.126	48.655
1997	57.835	46.341
1998	57.782	40.693

Distribution of Rate Reductions

Rate Reduced by	1995	1996	1997	1998
0%	28.6	30.5	25.7	19.7
1%	15.2	15.8	17.3	19.2
2%	13.9	13.8	14.4	18.2
3%	11.2	10.9	11.9	15.3
4%	9.6	8.7	10.0	11.0
5%	21.6	20.4	20.8	16.7

Two subsamples

Distribution of Rate Reductions

	Before		After	
Rate Reduced by	Actual History	Official History	Actual History	Official History
0%	30.7	81.4	30.0	81.4
1%	15.0	18.5	16.8	18.5
2%	13.7	0.1	13.9	0.1
3%	10.8	0	11.0	0
4%	8.9	0	8.8	0
5%	20.9	0	19.6	0

Table 2 presents the descriptive statistics of the data used here. The data cover 37,224 claims filed by 25,241 claimants over the two-year period. These data show that those in the sample are middle-aged and predominantly male; very few of them are disabled, minority or native. Almost 40 percent of the claims were filed in the Maritimes.

TABLE 2
Descriptive Statistics

	N=37,224		N=18,716 Before		N=18,508 After	
Demographic Variables	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**
Age	37.219	11.180	36.970	11.109	37.470	11.245
Minority	0.007	0.082	0.006	0.077	0.007	0.088
Native	0.015	0.123	0.015	0.120	0.016	0.126
Women	0.368	0.482	0.309	0.462	0.428	0.495
Disabled	0.003	0.059	0.003	0.055	0.004	0.063
Number of dependants	2.044	1.525	2.000	1.451	2.091	1.594
Geographic Variables						
Newfoundland	0.107	0.309	0.108	0.310	0.106	0.308
Prince Edward Island	0.083	0.275	0.083	0.276	0.082	0.274
Nova Scotia	0.103	0.305	0.103	0.304	0.103	0.305
New Brunswick	0.105	0.306	0.105	0.306	0.105	0.306
Quebec	0.134	0.341	0.134	0.341	0.135	0.342
Ontario	0.107	0.309	0.104	0.305	0.110	0.312
Manitoba	0.091	0.287	0.092	0.289	0.089	0.285
Saskatchewan	0.077	0.267	0.079	0.270	0.075	0.263
Alberta	0.078	0.268	0.081	0.271	0.075	0.264
British Columbia and NWT	0.115	0.319	0.112	0.315	0.119	0.323
Claim Characteristics						
Weeks of Benefits Paid	21.030	12.133	21.360	11.906	20.697	12.351
Benefits Rate	269.499	107.329	271.759	109.715	267.214	104.814
Weeks Entitlement	33.418	8.243	33.524	8.508	33.311	7.966
Benefits Exhausted	0.309	0.462	0.323	0.468	0.297	0.457
Claims Subject to Rating	0.497	0.500	0		1	

On average, they qualify for 33 weeks of benefits, and draw benefits during 20 of these 33 weeks; 30 percent of the claims are actually exhausted. Finally, these claims are almost evenly distributed before and after the introduction of the experience rating system. The table also shows the differences in sample characteristics for the before and after groups. The table shows that both groups are remarkably similar, with one major exception: many more women claim in the second sample than in the first. We will come back to this.

Table 3 shows that the 25,241 people included here are quite different relative to past EI/UI usage: 14 percent of them filed for benefits for the first time in the nineties. At the other extreme, 31 percent of them have filed six times or more during the same period. Repeat usage is clearly more prevalent among men: 27 percent of women have claimed six or more times, compared to 33 percent of men.

TABLE 3
Total Claims Filed During the Nineties by Respondents

Number of Claims	Proportion of Claimants	Proportion of Claimants	Proportion of Claimants
	All	Female	Male
1	0.143	0.175	0.125
2	0.168	0.196	0.151
3	0.142	0.149	0.138
4	0.123	0.116	0.127
5	0.113	0.092	0.126
6	0.108	0.090	0.119
7	0.139	0.129	0.145
8	0.058	0.049	0.063
9 or more	0.006	0.004	0.006

5. Results

5.1. Corner effects

Our first attempt was to show if there has been a significant increase in the number of people claiming 19 weeks or less of benefits after the introduction of the experience rating system to avoid having their future benefits reduced. Such an increase is clearly predicted by economic theory if the rating system is binding.

We compared the duration pattern for claims filed during the year preceding the introduction of experience rating (July 1995 to June 1996) with the pattern for those filed during the year following it (July 1996 to June 1997). Our data set includes all the Canadian Out of Employment Panel (COEP) respondents who filed a claim in either one of these two years. Our "dependent variable" was the number of weeks of benefits paid by Human Resources Development Canada (HRDC) to an unemployed worker.

There is one preliminary technical question regarding the proper treatment of the "weeks paid" variable. First is the question of censoring. Under the Employment Insurance (EI) rules, the benefit weeks paid to a claimant will count in his or her usage history, whether or not this number was reached because the claimant had exhausted their benefits. Those who exhaust their benefits should not be treated differently from those who do not. In a duration analysis, however, the "weeks of benefits paid" variable is censored when benefits are exhausted. Taking exhaustion into account is essential when comparing subgroups, for example. If two groups tend to have different lengths of benefits received, not accounting for censoring could lead us to conclude that behavioural differences exist between these groups, while the observed differences in attitude with respect to claims result directly from differences in benefit entitlements. In our analysis, we assumed that the "weeks paid" variable was censored when benefits were exhausted. However, none of our results was critically dependent on that assumption.

Figure 1 shows the Kaplan Meyer empirical hazard rates for the number of weeks paid, allowing for censoring. These hazards represent the probability that a spell will last exactly *n* weeks, conditional upon the fact that it has lasted for *n-1* weeks. These figures show the hazards separately for the claims filed before the introduction of experience rating (top panel), and after (bottom panel). The upper and lower bounds of the estimation at the 95 percent level are shown in dashed lines.

The figures show clearly that, as predicted by theory, a small but significant spike in the duration hazard at week 19. The figures presented in Table 4 confirm it. This table simply presents the estimated empirical hazards. It shows that after the introduction of experience rating, the probability of re-employment during week 19 goes up by one percentage point compared to the previous week. This implies that after the introduction of the rating system,

the probability of a return to work during the 19th week of benefits is significantly higher than in week 18 or 20; this was not the case before the introduction of the system. This phenomenon is more marked when the sample is limited to repeat users (those who have claimed six or more times during the nineties). The spike for them is close to 1.3 points.

FIGURE 1
Employment Insurance Benefits Duration Hazard

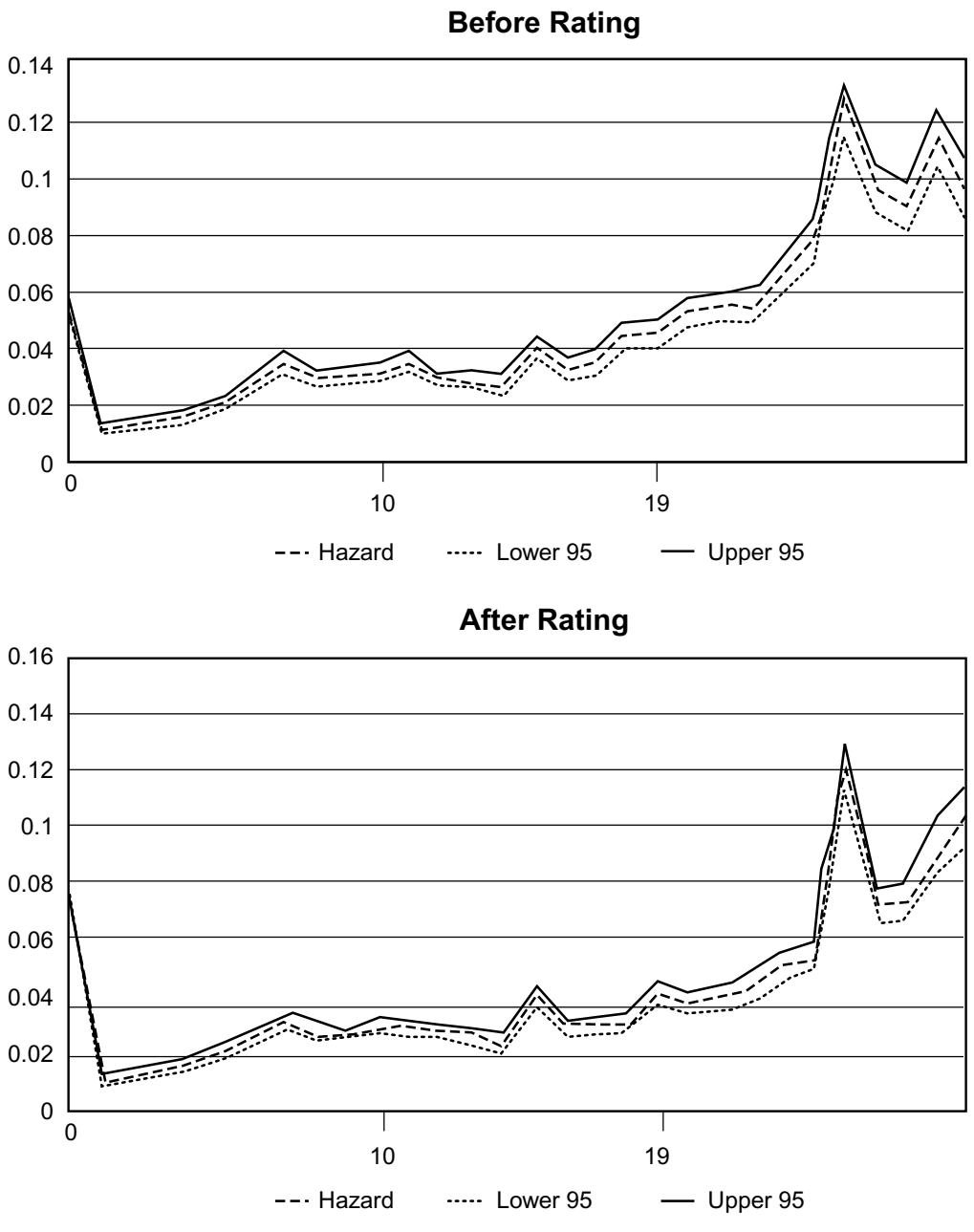


TABLE 4
Empirical Duration Hazards

Interval		Before			After		
		Hazard	Upper 95	Lower 95	Hazard	Upper 95	Lower 95
0	1	0.0524	0.0491	0.0557	0.0792	0.0751	0.0833
1	2	0.0117	0.0101	0.0133	0.0125	0.0109	0.0142
2	3	0.0131	0.0114	0.0148	0.0157	0.0138	0.0176
3	4	0.0149	0.0131	0.0168	0.0183	0.0163	0.0204
4	5	0.0186	0.0166	0.0207	0.0205	0.0183	0.0227
5	6	0.0211	0.0189	0.0233	0.0249	0.0225	0.0274
6	7	0.0299	0.0273	0.0326	0.0293	0.0266	0.0321
7	8	0.0351	0.0322	0.038	0.0373	0.0342	0.0404
8	9	0.0305	0.0277	0.0332	0.0308	0.0279	0.0336
9	10	0.0302	0.0274	0.033	0.0302	0.0273	0.0331
10	11	0.0311	0.0282	0.034	0.0342	0.031	0.0373
11	12	0.0348	0.0316	0.0379	0.033	0.0298	0.0361
12	13	0.0289	0.026	0.0318	0.0325	0.0293	0.0356
13	14	0.0287	0.0258	0.0316	0.0301	0.027	0.0331
14	15	0.0264	0.0236	0.0292	0.0246	0.0218	0.0274
15	16	0.0396	0.0361	0.0431	0.046	0.0421	0.0499
16	17	0.0299	0.0268	0.0331	0.0306	0.0273	0.0338
17	18	0.0302	0.027	0.0334	0.0283	0.0252	0.0315
18	19	0.0331	0.0297	0.0365	0.0272	0.024	0.0304
19	20	0.0339	0.0304	0.0375	0.0377	0.0339	0.0416
20	21	0.0349	0.0313	0.0386	0.031	0.0275	0.0346
21	22	0.0333	0.0297	0.037	0.0332	0.0294	0.037
22	23	0.0342	0.0304	0.038	0.0341	0.0302	0.038
23	24	0.0362	0.0321	0.0402	0.0403	0.036	0.0447
24	25	0.0417	0.0371	0.0462	0.0374	0.0331	0.0418
25	26	0.0886	0.0816	0.0955	0.0933	0.0861	0.1006
26	27	0.042	0.0369	0.0471	0.0446	0.0393	0.0499
27	28	0.0507	0.0448	0.0565	0.0492	0.0434	0.055
28	29	0.0476	0.0416	0.0536	0.0472	0.0413	0.0532
29	30	0.0499	0.0434	0.0563	0.0516	0.045	0.0582
30	31	0.042	0.0357	0.0483	0.0585	0.051	0.066
31	32	0.0525	0.0449	0.06	0.0486	0.0413	0.0559
32	33	0.0472	0.0394	0.055	0.0533	0.0451	0.0615

TABLE 4 (continued)
Empirical Duration Hazards

Interval		Before			After		
		Hazard	Upper 95	Lower 95	Hazard	Upper 95	Lower 95
33	34	0.0512	0.0422	0.0602	0.044	0.0359	0.0522
34	35	0.0479	0.0386	0.0572	0.048	0.0388	0.0572
35	36	0.0616	0.0502	0.0729	0.0509	0.0407	0.0611
36	37	0.043	0.0329	0.0532	0.0395	0.03	0.0491
37	38	0.0466	0.0354	0.0579	0.0485	0.0373	0.0597
38	39	0.049	0.0368	0.0612	0.0523	0.0399	0.0647
39	40	0.0378	0.0265	0.0491	0.0448	0.0325	0.0571
40	41	0.0357	0.024	0.0473	0.0405	0.0279	0.053
41	42	0.0442	0.0303	0.0581	0.0356	0.0231	0.0481
42	43	0.0302	0.0179	0.0425	0.0364	0.0229	0.0499
43	44	0.0226	0.0112	0.0341	0.0388	0.0239	0.0537
44	45	0.0306	0.0165	0.0448	0.0499	0.0317	0.068
45	46	0.0451	0.0267	0.0635	0	—	—
46	47	0.0387	0.0203	0.0571	0	—	—
47	48	0.0497	0.0273	0.072	0	—	—
48	49	0.0352	0.0153	0.0552	0	—	—

In addition, the log-rank tests strongly reject the assumption of equality between the survival curves before and after the policy change.

To account for other potential behavioural changes, we estimated a non-parametric duration model separately for the before and after groups. The results from these estimates are shown in Table 6. All coefficients show a remarkable stability, with the exception once again of that applied to women. While women were claiming on average longer than men before the application of the rating system, this difference disappears once the system is introduced. This behavioural change, however, could be (and likely is) related to the composition change we noted in the preceding section. It runs counter to the expected impact of the rating reform: since men are more likely to make repeated claims, it was reasonable to expect that they would respond more noticeably to the introduction of experience rating. However, it appears that women responded more than men. Table 7 summarizes the empirical hazards separately for men and women around week 19 (see also Figure 2). In addition to the reduction in the difference in the average number of weeks claimed between men and women, Table 7 shows that the response at week 19 by women seems to be stronger: re-employment hazard for women at week 19 increases by 86 percent compared to its level at week 18. The increase for men is only about 21 percent.

TABLE 5
Empirical Duration Hazards — Repeat Users Only

Interval		Before			After		
		Hazard	Upper 95	Lower 95	Hazard	Upper 95	Lower 95
0	1	0.0168	0.0136	0.0199	0.0282	0.0241	0.0323
1	2	0.0066	0.0047	0.0086	0.009	0.0066	0.0113
2	3	0.0073	0.0052	0.0094	0.0094	0.007	0.0118
3	4	0.0072	0.0051	0.0093	0.0108	0.0082	0.0134
4	5	0.0093	0.0069	0.0117	0.0146	0.0115	0.0176
5	6	0.0166	0.0134	0.0198	0.0195	0.016	0.0231
6	7	0.0261	0.0221	0.0302	0.0252	0.0211	0.0292
7	8	0.035	0.0303	0.0398	0.0399	0.0346	0.0451
8	9	0.0294	0.0249	0.0338	0.0297	0.0251	0.0342
9	10	0.0325	0.0277	0.0372	0.0288	0.0243	0.0334
10	11	0.0356	0.0306	0.0407	0.0373	0.032	0.0426
11	12	0.0436	0.0379	0.0493	0.0356	0.0303	0.0409
12	13	0.0315	0.0265	0.0364	0.0371	0.0316	0.0426
13	14	0.0268	0.0222	0.0314	0.0303	0.0253	0.0354
14	15	0.0263	0.0216	0.0309	0.0278	0.0229	0.0327
15	16	0.0341	0.0287	0.0394	0.0357	0.0301	0.0413
16	17	0.033	0.0276	0.0383	0.036	0.0303	0.0418
17	18	0.0294	0.0242	0.0345	0.0351	0.0293	0.0409
18	19	0.0432	0.0369	0.0496	0.0374	0.0313	0.0435
19	20	0.0485	0.0417	0.0554	0.051	0.0437	0.0583
20	21	0.0513	0.0441	0.0585	0.0424	0.0356	0.0492
21	22	0.0529	0.0454	0.0605	0.0434	0.0364	0.0504
22	23	0.0595	0.0513	0.0678	0.0514	0.0436	0.0592
23	24	0.0695	0.0603	0.0787	0.0572	0.0487	0.0656
24	25	0.0899	0.0791	0.1008	0.0685	0.0589	0.0781
25	26	0.0988	0.0869	0.1107	0.0962	0.0844	0.108
26	27	0.1185	0.1047	0.1323	0.1118	0.0984	0.1252
27	28	0.1089	0.0949	0.1229	0.1094	0.0954	0.1235
28	29	0.1499	0.1324	0.1674	0.1523	0.1347	0.1699
29	30	0.1243	0.1073	0.1414	0.1803	0.1596	0.2011
30	31	0.2084	0.1845	0.2323	0.158	0.1368	0.1792
31	32	0.1742	0.1501	0.1983	0.1542	0.1316	0.1769
32	33	0.4369	0.3937	0.4801	0.275	0.2416	0.3083

TABLE 5 (continued)
Empirical Duration Hazards — Repeat Users Only

Interval		Before			After		
		Hazard	Upper 95	Lower 95	Hazard	Upper 95	Lower 95
33	34	0.2891	0.246	0.3323	0.36	0.3157	0.4044
34	35	0.2727	0.2244	0.3211	0.2869	0.2399	0.3339
35	36	0.2353	0.1841	0.2865	0.2116	0.1655	0.2578
36	37	0.1978	0.1453	0.2503	0.2092	0.1582	0.2601
37	38	0.2313	0.1682	0.2943	0.1833	0.1305	0.236
38	39	0.1488	0.0928	0.2047	0.2082	0.1463	0.2701
39	40	0.1333	0.0764	0.1902	0.1387	0.0834	0.1941
40	41	0.0559	0.0172	0.0947	0.1325	0.0745	0.1904
41	42	0.0981	0.0448	0.1514	0.1609	0.0923	0.2295
42	43	0.0488	0.0098	0.0878	0.087	0.0331	0.1408
43	44	0.0779	0.0271	0.1288	0.1154	0.0502	0.1806
44	45	0.0367	0.0007	0.0727	0.1075	0.041	0.1741
45	46	0.0478	0.0059	0.0898	0.271	0.1561	0.3858
46	47	0.04	0.0008	0.0792	0.0938	0.0188	0.1687
47	48	0.0417	0.0008	0.0825	0.0333	0	0.0795
48	49	0.0215	0	0.0513	0.0522	0	0.1112

TABLE 6 Cox Proportional Hazard Model of Weeks of Benefits Claimed				
	Before		After	
	Coef.	Stand. Dev.	Coef.	Stand. Dev.
Quarter				
Winter	0.185	0.024	0.148	0.024
Spring	0.300	0.024	0.336	0.023
Summer	-0.233	0.028	-0.220	0.026
Age	-0.003	0.001	-0.005	0.001
Female	-0.155	0.026	-0.040	0.028
Disabled	-0.245	0.172	-0.235	0.144
Native	-0.108	0.073	-0.283	0.073
Number of Dependants	-0.022	0.007	-0.052	0.008
Minority	-0.218	0.118	-0.262	0.103
Province				
Newfoundland	-0.499	0.039	-0.638	0.038
Prince Edward Island	-0.437	0.043	-0.620	0.042
Nova Scotia	-0.253	0.039	-0.265	0.037
New Brunswick	-0.477	0.041	-0.467	0.039
Quebec	-0.146	0.036	-0.111	0.034
Ontario	0.168	0.037	0.042	0.036
Manitoba	0.119	0.038	0.189	0.038
Saskatchewan	0.027	0.040	0.125	0.039
Alberta	-0.025	0.040	0.149	0.040

TABLE 7
Empirical Duration Hazards — Men and Women Separately

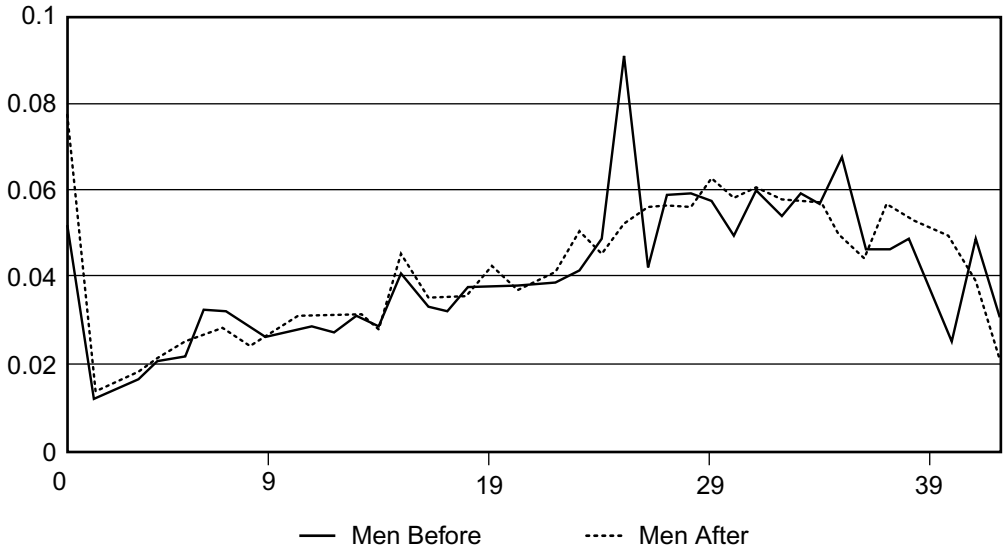
MEN

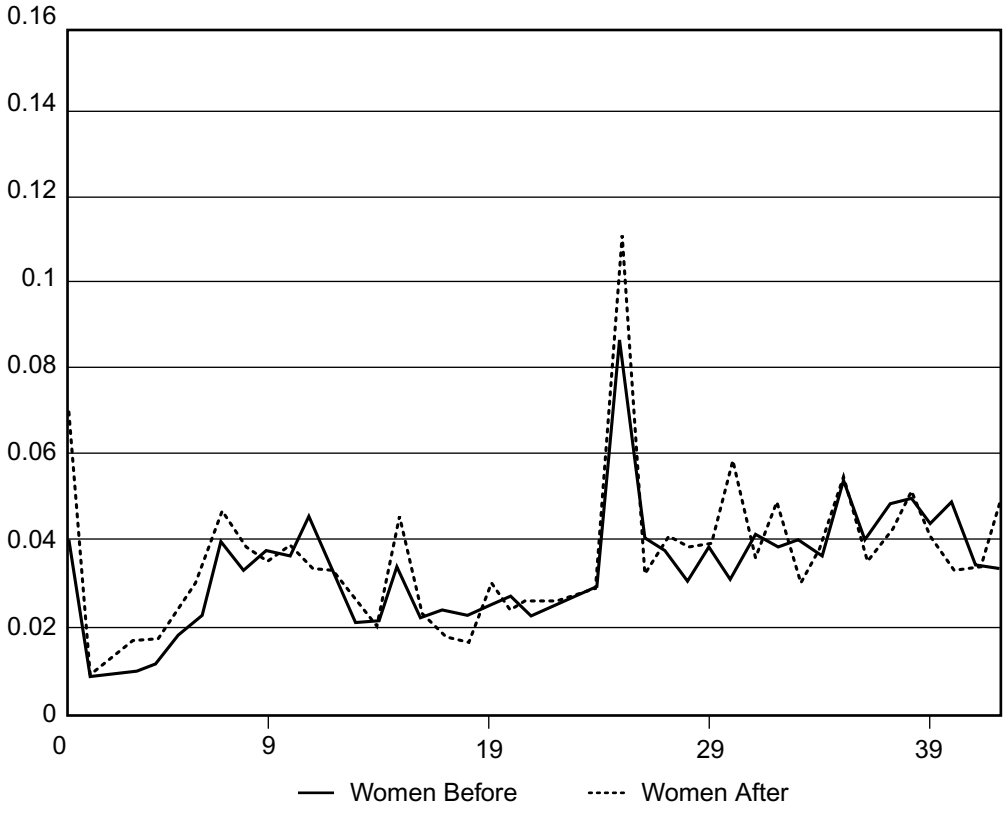
		Before			After		
Interval		**Hazard**	**Upper 95**	**Lower 95**	**Hazard**	**Upper 95**	**Lower 95**
14	15	0.0287	0.0252	0.0323	0.0286	0.0245	0.0326
15	16	0.0419	0.0375	0.0463	0.0468	0.0415	0.052
16	17	0.0336	0.0296	0.0377	0.036	0.0313	0.0407
17	18	0.0327	0.0286	0.0367	0.036	0.0312	0.0408
18	19	0.0383	0.0338	0.0428	0.0358	0.0309	0.0406
19	20	0.0383	0.0337	0.0429	0.0435	0.038	0.049
20	21	0.039	0.0342	0.0437	0.0375	0.0323	0.0428
21	22	0.0391	0.0342	0.0441	0.0385	0.033	0.044
22	23	0.0395	0.0344	0.0447	0.0419	0.036	0.0478
23	24	0.0415	0.036	0.0469	0.0512	0.0444	0.058
24	25	0.0488	0.0426	0.055	0.0452	0.0386	0.0518

WOMEN

		Before			After		
Interval		**Hazard**	**Upper 95**	**Lower 95**	**Hazard**	**Upper 95**	**Lower 95**
14	15	0.0213	0.0168	0.0259	0.0193	0.0155	0.0231
15	16	0.0346	0.0288	0.0405	0.045	0.0391	0.0509
16	17	0.0221	0.0173	0.0268	0.0234	0.0191	0.0278
17	18	0.0251	0.02	0.0302	0.0184	0.0145	0.0223
18	19	0.0224	0.0175	0.0274	0.0164	0.0126	0.0201
19	20	0.0251	0.0198	0.0304	0.0305	0.0254	0.0357
20	21	0.0271	0.0215	0.0327	0.0231	0.0185	0.0277
21	22	0.0224	0.0173	0.0276	0.0269	0.0218	0.0319
22	23	0.0245	0.019	0.0299	0.025	0.0201	0.03
23	24	0.0268	0.0209	0.0326	0.0281	0.0228	0.0334
24	25	0.0295	0.0232	0.0358	0.0289	0.0234	0.0344

FIGURE 2
Employment Insurance Benefits Duration Hazard





5.2 Employment Insurance usage and replacement rate

An alternative approach to the problem is to estimate directly the impact of variations in replacement rates on EI usage. As noted, the EI reform provides us with a necessary instrumental variable to isolate this effect. Using all the claims made after July 1995,[3] we estimated (2) and (3) to measure the extent to which the new system of experience rating worked as a deterrent.

We first computed the true replacement rate, by dividing the amount of benefits payable to the unemployed, as reported in the Status Vector data, by the weekly lost wage reported in the COEP Survey.[4] In Table 8, we report the results of our estimations of the determinants of the replacement rate. We included, as explanatory variables, all the socio-demographic variables available — variables controlling for year and quarter (to account for seasonal and legal changes); and the lost wage (up to power three). The lost wage is introduced here as a way to take into account the existence of a maximum insurable earnings. We also included weeks of benefits potentially available. Finally, we included both the "actual" measure of historical EI usage (the number of weeks of benefits received in the last 60 months), and the 'official' measure (EI usage since July 1996).

This estimation reveals that everything else being equal, women and people with dependants have lower replacement rates. Once again, everything else being equal, there are large significant differences between provinces and quarters in average replacement rates. The average replacement rate also rose in 1998.

We also isolated a highly significant relation between replacement rate and the past wage (not surprising given the existence of maximum insurable earnings). Finally, we were able to isolate very precisely the impact of the first group of repeat users affected by the system. Those having between 20 and 40 weeks of usage since July 1996 would have their replacement rate reduced by 1 percentage point. This 1.8 percent reduction in benefits was estimated to be 2.6 percent. Those between 40 and 60 weeks were supposed to suffer a 3.6 percent reduction in benefits. That reduction was estimated to be 4.3 percent. Our estimate of the reduction in replacement rates for those with more than 60 weeks usage clearly overshot at more than 13 percent. However, the very small sample could explain this imprecision.

It is also interesting to note that those with long benefit entitlements tend to receive higher replacement rates (denoting probably their stronger labour market attachment). Finally, everything else being equal, repeat users have higher replacement rates.

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3 This limit in time for this sample is justified by the fact that we want to have accurate measures of the true replacement rates, and therefore have to limit ourselves to claims filed around COEP time.

4 Although all these claims might not correspond to the COEP separations, this is probably the best estimation of the "true" replacement rate around that time, as perceived by the unemployed.

TABLE 8
Determinants of the True Replacement Rate

Regression of the replacement rate
Dependent Variable: (Weekly Benefits/Weekly COEP Wage)

	(1)		(2)	
	Coef.	**Stand. Dev.**	**Coef.**	**Stand. Dev.**
Age	0.001	(0.000)	0.001	(0.000)
Female	-0.035	(0.002)	-0.034	(0.002)
Disabled	-0.022	(0.010)	-0.024	(0.010)
Native	-0.006	(0.005)	-0.009	(0.005)
Number of Dependants	0.001	(0.001)	-0.001	(0.001)
Minority	-0.007	(0.007)	-0.005	(0.007)
Province				
Newfoundland	0.008	(0.003)	-0.021	(0.003)
Prince Edward Island	0.000	(0.003)	-0.020	(0.003)
Nova Scotia	-0.002	(0.003)	-0.019	(0.003)
New Brunswick	0.011	(0.003)	-0.004	(0.003)
Quebec	-0.001	(0.003)	-0.013	(0.003)
Ontario	0.009	(0.003)	0.013	(0.003)
Manitoba	-0.006	(0.003)	0.000	(0.003)
Saskatchewan	0.001	(0.003)	0.002	(0.003)
Alberta	0.006	(0.003)	0.016	(0.003)
Quarter				
Winter	-0.011	(0.002)	-0.012	(0.002)
Spring	-0.015	(0.002)	-0.015	(0.002)
Summer	-0.014	(0.002)	-0.014	(0.002)
Year				
1985	-0.025	(0.003)	-0.018	(0.003)
1986	-0.024	(0.003)	-0.020	(0.003)
1987	-0.018	(0.003)	-0.016	(0.003)
Weeks Benefits Available			0.095	(0.003)
Weeks Used in Past 60 Months			0.008	(0.000)
Lost Wage	-6.801	(0.231)	-6.449	(0.227)
Lost Wage Squared	1.201	(0.039)	1.137	(0.038)
Lost Wage 3	-0.071	(0.002)	-0.068	(0.002)
Actual History				
1% Reduction	-0.026	(0.002)	-0.024	(0.002)
2% Reduction	-0.043	(0.005)	-0.038	(0.005)
3% Reduction	-0.132	(0.025)	-0.129	(0.025)
Adjusted R-Squared	0.290		0.315	

The presence of this "official" EI usage history in the regression allows us to identify model (2)-(3), since these variables are clearly correlated with the replacement rate, though not to the usage decision, because they only remotely relate to actual past behaviour (which is known and included). We estimated (2)-(3), first estimating (3) as a simple linear regression using two-stage least squares. Table 9 presents the results of these estimations. It shows that women tend to use less, while older people and claimants with dependants tend to use more. There are also large seasonal differences and differences between provinces. The large differences with respect to 1998 can be justified by the fact that many of the later claims are still active. Past usage is always strongly and positively correlated with current usage. In the Ordinary Least Squares (OLS) estimation, replacement rate is positively associated with usage. Surprisingly, weeks of entitlement are negatively correlated with usage. These last two signs are reversed when using two-stage methods. Long entitlement is now more naturally associated with longer usage, but replacement rate is now negatively related to usage.

The same results persist when (3) is estimated using the Cox method rather than a linear regression. Predicted value for replacement rate from Table 9 is incorporated into a Cox model. Robust standard errors are computed. The results are presented in Table 10. The Cox estimation confirms that higher replacement rates are associated with higher exits from EI — and therefore shorter usage. While this result seems paradoxical, remember that in this case, the replacement rate is identified using basically the few people who have already been affected by the system. What this result says is that these people keep using more EI than other comparable claimants.

TABLE 9
Employment Insurance Usage and Replacement Rate

Ordinary and Two-Stage Least Square Regression of EI Usage
Dependent Variable: Number of Weeks of Benefits Received During the Claim

	OLS		2SLS	
	Coef.	**Stand. Dev.**	**Coef.**	**Stand. Dev.**
Age	0.002	(0.000)	0.006	(0.001)
Female	-0.106	(0.014)	-0.322	(0.022)
Disabled	0.187	(0.068)	0.038	(0.069)
Native	0.164	(0.033)	0.101	(0.034)
Number of Dependants	0.096	(0.004)	0.088	(0.004)
Minority	0.128	(0.048)	0.097	(0.048)
Province				
Newfoundland	0.364	(0.018)	0.196	(0.023)
Prince Edward Island	0.305	(0.019)	0.147	(0.023)
Nova Scotia	0.185	(0.018)	0.048	(0.021)
New Brunswick	0.239	(0.018)	0.191	(0.018)
Quebec	0.072	(0.017)	-0.026	(0.018)
Ontario	-0.078	(0.018)	0.010	(0.019)
Manitoba	-0.112	(0.018)	-0.109	(0.018)
Saskatchewan	-0.002	(0.019)	0.009	(0.019)
Alberta	-0.045	(0.019)	0.064	(0.021)
Quarter				
Winter	0.054	(0.012)	0.003	(0.013)
Spring	-0.135	(0.013)	-0.218	(0.015)
Summer	0.032	(0.012)	-0.055	(0.014)
Year				
1985	1.008	(0.020)	0.998	(0.020)
1986	0.943	(0.016)	0.909	(0.017)
1987	0.783	(0.017)	0.731	(0.017)
Weeks Benefits Available	-0.091	(0.018)	0.555	(0.056)
Weeks Used in Past 60 Months	0.078	(0.003)	0.126	(0.005)
Lost Wage	8.089	(1.509)	-34.685	(3.830)
Lost Wage Squared	-1.356	(0.254)	6.183	(0.670)
Lost Wage 3	0.075	(0.014)	-0.373	(0.039)
Replacement Rate	0.189	(0.035)	-6.432	(0.546)
Adjusted R-Squared	0.183		0.186	

TABLE 10 Employment Insurance Usage and Replacement Rate		
Cox Proportional Hazard of EI Usage **Dependent Variable: Number of Weeks of Benefits Received during the Claim**		
Age	-0.008	(0.001)
Female	0.204	(0.023)
Disabled	0.036	(0.103)
Native	-0.200	(0.051)
Number of Dependants	-0.057	(0.006)
Minority	-0.156	(0.076)
Province		
Newfoundland	-0.428	(0.027)
Prince Edward Island	-0.321	(0.030)
Nova Scotia	-0.118	(0.027)
New Brunswick	-0.362	(0.027)
Quebec	-0.022	(0.025)
Ontario	0.004	(0.026)
Manitoba	0.203	(0.027)
Saskatchewan	0.045	(0.028)
Alberta	-0.009	(0.029)
Quarter		
Winter	-0.208	(0.018)
Spring	0.154	(0.019)
Summer	-0.238	(0.020)
Year		
1985	-1.771	(0.030)
1986	-1.640	(0.025)
1987	-1.267	(0.024)
Weeks Used in Past 60 Months	-0.071	(0.004)
Lost Wage	30.066	(2.939)
Lost Wage Squared	-5.383	(0.503)
Lost Wage 3	0.328	(0.029)
Replacement Rate	6.525	(0.283)
Pseudo R-Squared	0.020	

6. Predictions

Experience rating, through the intensity rule, has the potential to affect the benefits of the majority of Employment Insurance (EI) recipients. Without behavioural change in response to the introduction of this provision, and everything else being equal, 70 percent of claims should be rated below the maximum possible replacement rate. As Table 11 shows, this corresponds to a reduction of more than 2.5 percent in payments made to beneficiaries.

We have seen some evidence of a response to the introduction of a rating system in EI. The most obvious evidence is the increase in the number of people leaving EI just before their future benefits could be affected if they stayed for one more week. Although we believe this effect to be statistically significant, its economic effect is minimal. Assuming that all the increase in exits at the 19th week can be attributed to experience rating, we carried out the following exercise. We started from the baseline hazard of the Cox regression on the "after" sample, as presented in Table 6, and compared the average usage implied by this baseline hazard with that implied by the same baseline, with the exception that the spike in the hazard at week 19 was replaced by an interpolation of the hazards for weeks 18 and 20. The difference in the implied average usage caused by the spike corresponds to less than a quarter of a week.

Of course, the contrary would have been surprising. As we note, this is a marginal effect, but one that is quite easily identified.

The estimation of the structural model does not provide us with many more clues. Although women appear to be behaving differently with respect to usage, they do not appear to have reacted differently to experience rating (these results are not shown here). The model also shows that, given our identifying strategy, those who are affected by the new rating system keep using EI more than the comparable unemployed.

TABLE 11
Experience Rating in Perspective — Savings
Potential Reductions in Payments Associated with the Intensity Rule

This table shows the savings that would have been made in EI payments if the intensity rule had been in full force in 95, 96 and 97, using Status Vector information of Canadian Out of Employment Panel (COEP) respondents.

Claims filed in	Payments made on these claims ($)	Potential savings from intensity rule ($)	Savings as a proportion of payments (%)
1995	85,483,601	2,270,674	2.65%
1996	97,677,638	2,446,643	2.51%
1997	71,039,739	1,887,313	2.66%

7. Conclusions

The system of experience rating instituted by the new *Employment Insurance (EI) Act* through the intensity rule has the potential to affect a very large majority of EI claimants. If the system had been implemented during the nineties, 70 percent of claimants would have been affected. One out of 5 claimants would have had their replacement rate reduced by 5 points, or 9.1 percent. Such a large potential impact is bound to induce behavioural changes.

There is no doubt that this provision will have a major impact on EI disbursements. The evidence that behavioural response to the introduction of the intensity rule is limited and economically small (although statistically large) confirms that potential. To the extent that Canadian Out of Employment Panel (COEP) is a representative sample of separations (and of potential new claims), the evidence shows that the intensity rule alone could generate a reduction in EI payments of approximately 2.5 percent.

Measuring the true impact of the change will be a slow process, however, as the "actual" employment history moves closer to the "official" history, and claimants start feeling the pain of reduced benefits. We believe we have seen the first signs of such a change, but the behavioural changes observed so far are tiny: a slight increase in the number of benefit recipients leaving after 19 weeks to avoid their future replacement rates being affected.

This evolution will have to be monitored. In addition to a marginal "corner" effect, we have seen a reduction in the number of weeks claimed since the introduction of the experience rating system. At this stage, a formal structural model cannot attribute this reduction directly to the new system. If more conclusive results do not appear in the future, one will have to conclude that unemployed workers do not have as much control over their usage of EI as the proponents of the reform thought they had. In this case, the experience rating system would merely result in a reduction of the welfare of the unemployed, with no improvement of welfare for the society as a whole.

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