Do Train-or-Pay Schemes Really Increase Training Levels?*

BENOIT DOSTIE

Reacting to perceived market failures leading to under-optimal levels of firm-sponsored training, governments all over the world have stepped in with various policy instruments to alleviate this problem, using incentives such as regulation or co-financed schemes directed at firms or at individuals. Despite the widespread use of these schemes, rigorous empirical evaluation of such policies is uncommon. In this paper, we provide a careful evaluation of a reform in a train-or-pay scheme used in Canada that exempted medium-sized workplace from the training requirement. Our identification strategy involves comparing changes in training levels in medium-sized workplaces, before and after the reform, to changes for both smaller and larger workplaces. We also compare relative changes in training intensities to those observed in a neighboring province in which no such changes took place. We find the policy had no impact on training levels but caused firms to change their human capital investments portfolio, substituting informal and formal training.

Introduction

Many researchers and government officials believe that workplaces under-invest in employee training. The theoretical foundation for this belief (reviewed in Leuven 2005) is the presence of labor market imperfections and credit constraints, which may impede workers' or firms' ability to either finance or capture the rents from training.[1]

Governments around the world have responded to those perceived market failures by devising policies aimed at encouraging firms and workers to increase their investment in training. It is surprising, in view of this, that rigorous impact assessments of these policies are virtually absent. Bassanini and colleagues (2007) provide a comprehensive review of the various policy

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[1] The seminal paper here is Becker (1964), and other prominent recent contributions include Acemoglu and Pischke (1999), Stevens (1994, 2001), and Katz and Ziderman (1990).

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instruments used by governments, ranging from subsidies directed to the firms or individual to broad-ranging regulations, and lament the absence of "rigorous empirical evaluations of their effectiveness" (p. 284). They add that "many investigations provide only descriptive statistics with no counter factual for the assessment of the policy impact" (p. 303).

Among the few exceptions that are closest to our research, Abramovsky and colleagues (2011) evaluated the effectiveness of the UK Employer Training Pilots in raising training levels for low-skilled workers and found no evidence that the program worked as intended. Leuven and Oosterbeek (2004) examined the impact of a tax deduction for training older workers in the Netherlands and found that it led workers to postpone training and did not raise aggregate training incidence.

One of the reasons for this lack of evidence is that regulations governing firm-sponsored worker training are typically determined at the national level and tend to change infrequently over time (Almeida and Aterido 2011). Heterogeneity across countries as well as lack of variation in treatment therefore makes it difficult to assess the impact of such policies. In this paper, we overcome this difficulty by using a workplace panel data set, and exploiting a subnational policy change pertaining to a training levee applied to some firms but not others.

On June 22, 1995, the Canadian province of Quebec introduced a training levy. Formally titled the "Act to Foster the Development of Manpower Training," the law is commonly known Bill 90 or the "1% law," reflecting its key requirement that firms devote 1 percent of their payroll toward training, or submit an equivalent amount to the Quebec Minister of Revenue.[2] On January 1, 2004, a reform of Bill 90 exempted medium-sized (i.e., with payroll below $1 million) workplaces from the law's 1 percent requirement.

The law includes detailed information on the type of training that qualifies. Only transferable skill-related structured training that is directly related to the job or that is recognized by other workplaces qualifies. Structured training must impart or improve skills necessary for doing one's job (see Gouvernement du Québec 1998).

Training levees, such as the one used in Quebec, are one good example of policies used by governments to influence firm-sponsored training. An important policy question is whether they serve their intended purpose—to raise training levels. We use this change in the law as a natural experiment to answer two related questions. First, did the Quebec training levee increase

[2] The more commonly known French title of the law is "Loi favorisant le développement de la formation de la main-d'oeuvre."

training levels? Second, how did it affect the portfolio of workplace-training investments?

To answer these questions, we use the Workplace and Employee Survey (WES) 1999–2006 from Statistics Canada.[3] This longitudinal linked employer–employee dataset provides us with detailed information on the training policies of the firm, in particular the number of workers undertaking classroom and on-the-job training in a given year. It also provides us with detailed payroll data, which allows us to identify which firms were subject to Bill 90 as well as its partial repeal.

When comparing the raw incidence of training before and after the reform for medium-sized firms, we find a decrease of 13.2 percent in the incidence of classroom training and an increase of 10.4 percent in the incidence of on-the-job training. These movements in opposite directions suggest that the law had a negligible impact on aggregate training levels. It seems that firms simply substituted on-the-job training for classroom training for the purposes of meeting the law's requirement.

This conclusion holds when estimating the impact of Bill 90 on training levels by using this reform as a natural experiment, computing difference-in-difference estimators, comparing training levels in medium-sized workplaces, before and after the reform, to changes for both smaller and larger workplaces. Our robustness checks include estimating these changes taking into account observable workplace characteristics, and using triple-difference estimators comparing relative changes in training intensities to those observed in Ontario, a neighboring province in which no such changes took place.

The Quebec Training Levee Law

As mentioned previously, the Act to Foster the Development of Manpower Training, commonly known as Bill 90, mandates firms to spend at least 1 percent of their payroll on training. Firms spending less than 1 percent must remit the difference to the Quebec government, hence the train-or-pay scheme moniker.[4]

In the summary analysis provided by Bassanini et al. (2007), the advantages of train-or-pay schemes are low cost of administration and a purported effectiveness in increasing training investments. Among co-financed schemes direc-

[3] The first round of WES was conducted in 1999 and we use all available years of data from this survey.

[4] The law replaced a tax credit for training expenses that was abandoned due to its high complexity and high administrative burden (Emploi Québec 2000).

ted at firms, the low administrative cost is compared to levy-grand schemes that require administrative bodies that decide on what training programs are implemented. Given disadvantages are (possibly) low training quality and high expected deadweight loss.

On January 1, 1996, all firms with payroll more than $1 million became subject to the law, but in the following year, this was extended to cover firms with a payroll of more than $500,000, and from 1998 onward, all firms with payroll more than $250,000 were subject to the law.[5]

On June 12, 2003 as part of the 2003–2004 budget, the Quebec government promised a repeal of the 1 percent law for workplaces with payroll of less than $1 million. The government contended, as its rationale for this proposal, that the costs of administrative paperwork incurred by medium-sized workplaces to demonstrate compliance to the law exceeded the benefits proffered by the law itself.[6]

These burdens were somewhat corroborated by compliance to the law (Emploi Québec 2005). Compliance was much higher for firms with payroll more than $1 million (between 86.8 percent and 88.2 percent over the 2000–2003 time period) than for firms with payroll between $250,000 and $500,000 (67.9 percent to 70 percent).[7,8] It is interesting to note that, among the most frequent reasons provided for not complying, are that the workplace perceives training as providing few benefits relative to its cost and fears of increased mobility of trained workers. Also frequently by mentioned by workplaces were difficulties in planning, organizing, and providing training activities.

The modification to Bill 90, repealing the application of the law for smaller firms, was officially proposed by the Ministère de l'emploi de la solidarité sociale (Ministry of Employment and Social Solidarity) on October 1, 2003, approved by the Parliament on December 10, and went into effect on January 1, 2004. This modification reduced the number of firms subjected to the 1 percent levee from 37,346 in 2003 to 10,832 in 2004. The law, which still applies to the majority of employees (though not firms) working in the private sector,

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[5] While the sequential nature of the implementation of the law would allow us to measure to what extent firms were substituting between different types of training, there are unfortunately no data available with the required information for this time period.

[6] The law was and still is very unpopular with workplaces. See for example Conseil du Patronat du Québec 2006) who give specific examples of the administrative burden faced by workplaces with respect to the law.

[7] Compliance rates were marginally lower over the preceding 5-year period (Emploi Québec 2000).

[8] In 2004, 1169 firms didn't meet the 1 percent requirement and paid a total of $14.6 million to the government as a penalty (Direction du Fonds national de formation de la main-d'oeuvre 2005). The government uses such funds to subsidize many activities, including research projects on training policy as well as training proposals made by workplaces.

TABLE 1

SAMPLE SIZES BY PAYROLL CATEGORIES

		Quebec		Ontario	
Gross Payroll		%	#	%	#
> $1,000,000	(large)	8.3	2,721	10.6	3,302
> $ 250,000 & < $1,000,000	(medium)	21.0	961	23.1	1,137
< $250,000	(small)	70.7	1,406	66.3	1,435
Total		100.0	5,088	100.0	5,874

SOURCE: Workplace and Employee Survey (1999, 2001, 2003, 2005)
#, number of sampled workplaces; %, weighted population represented.

remains unpopular among businesses, which have persistently lobbied for its repeal (Haroun 2005).

Data

Our analysis uses data from the WES. Started in 1999 with an initial sample of 5440 Canadian workplaces, the WES contains detailed information on a workplace's workforce; vacancies; human resources practices; and most importantly for our purposes, training activities and payroll data.[9] Workplaces are sampled from the Business Registry and followed over time with sampling adjustments every 2 years to keep the sample representative.[10]

Although the workplaces sample is meant to be representative for the universe of Canadian workplaces, this is not necessarily the case with provincial subsamples. Fortunately, those are representative for the biggest provinces; that is, British Columbia, Alberta, Ontario, and Quebec.

Because the WES provides annual data, and because of the timing of the change in the law, the most direct comparison we can use to evaluate the impact of the reform would be to look at training incidence and intensity in 2003 and 2004. However, data from 2004 refer to the year ending on March 31. Therefore, the first complete year of data post reform is 2005. Moreover, another reason to use 2005 as the first post-reform year is because workplaces are resampled on odd years: the representativeness of the 2004 sample hinges on Statistics Canada sampling weights correctly reflecting attrition. Table 1 presents sample sizes.

[9] It should also be noted that except for the provided information about the workplace's payroll, there is no direct information in WES about which workplaces are subject to the law.

[10] The WES is defined by Abowd and Kramarz (1999) as a linked employer–employee dataset in which both the employer and employee samples are representative of their respective population. However, we do not use the employee sample for our analysis.

It is also worth emphasizing that the WES was not designed for the evaluation of Bill 90; the law applies to firms while the WES samples workplaces. This leads to the possibility that some workplaces in our sample are misclassified as small firms whereas their total payroll (when adding the payroll of other workplaces belonging to the same firm) would classify them as large firms subject to the law.

This misclassification results in a smaller training differential between large and small workplaces, and between large and medium-sized workplaces. Because this most likely muddles differences between our treatment and control groups, this will lead to a downward bias in our estimate of the reform. In any case, because our main conclusion involves comparing the impact of the reform on different types of training, using the same classification of workplaces according to their size, we are confident our results are robust to possible misclassification.

We capture "standard training" as mandated under Bill 90 through the incidence of classroom training. This seems like a good proxy, because classroom training in the WES is explicitly defined as all training activities: that have predetermined format, including a predefined objective; that have specific content; that have standards by which progress may be monitored and/or evaluated; and are most often provided by an instructor who is not an employee of the workplace. The WES separately measures the incidence of on-the-job training, described as informal, usually taking place during working hours, and provided by a colleague or a supervisor. If the 1 percent training mandate is binding for firms, we expect medium-sized workplaces to respond to the repeal by substituting away from classroom training toward on-the-job training.

We measure training levels in two ways. First, by constructing two dichotomous variables measuring the incidence of training. These variables are equal to one if the workplace offers any classroom or on-the-job training, and zero otherwise. Second, we construct two variables measuring the intensity of training. These variables are equal to the ratio of the total number of employees receiving classroom (on-the-job) training—as provided by the employer—over the year divided by the number of employees at the workplace on March 31 of the current year.

Empirical Strategy

Because our data comprise a workplace panel observed from 1999 to 2005, we exploit two sources of variation generated by this policy change. First, after 2003, Bill 90 was repealed for businesses with a payroll under $1 million. Two groups of firms within Quebec were not affected by this change. The law

TABLE 2

SUMMARY STATISTICS FOR TRAINING INCIDENCE

Québec	% Offering Classroom Training			Ontario	% Offering Classroom Training		
Size	Small	Medium	Large	Size	Small	Medium	Large
1999	20.7	56.7	86.6	1999	23.2	41.1	71.1
2001	16.7	59.3	80.8	2001	17.8	39.9	72.0
2003	17.5	56.5	80.3	2003	17.7	53.0	66.5
2005	18.7	49.0	78.7	2005	25.7	49.0	69.7
Québec	% Offering On-the-Job Training			Ontario	% Offering On-the-Job Training		
Size	Small	Medium	Large	Size	Small	Medium	Large
1999	21.3	71.4	86.3	1999	43.6	59.7	76.7
2001	21.2	63.9	78.3	2001	37.0	52.4	79.2
2003	19.5	58.3	83.4	2003	38.2	64.6	74.1
2005	19.7	65.1	85.7	2005	41.7	64.1	83.3

SOURCE: Workplace and Employee Survey (1999, 2001, 2003, 2005)

continued to apply to workplaces with payroll more than $1 million, and workplaces with payrolls under $250,000 continued to be exempt.

These specifications create a clearly defined treatment group within Quebec: "medium-sized" firms, i.e., those whose payrolls were between $250,000 and $1 million. The control group comprises all other workplaces that were not affected by the change in the law. However, because the law applied to businesses in Quebec but not in the neighboring province of Ontario, or indeed anywhere else in the rest of Canada, workplaces from other provinces can also be used as a control group.

We exploit variation in treatment based on firm size through a difference-in-difference strategy, which compares changes in training and productivity in medium-sized firms (the treatment group) relative to the small and large firms (the control group). Note that using only small or only large firms in the control group leads to similar (though less precise results). We exploit the additional variation at the provincial level by estimating a triple difference wherein changes in outcomes between treatment and control firms in Quebec are compared to analogous changes in Ontario and (separately) the rest of Canada, where there was no such change in mandated training policies.

Preliminary Analysis

Training incidence. Raw data on training incidence and training intensity at the workplace level are presented in Tables 2 and 3 for Quebec and Ontario

TABLE 3

SUMMARY STATISTICS FOR TRAINING INTENSITIES

Québec	Average Proportion of Employees Receiving Classroom Training			Ontario	Average Proportion of Employees Receiving Classroom Training		
Size	Small	Medium	Large	Size	Small	Medium	Large
1999	13.6	32.4	46.5	1999	16.1	23.9	37.1
2001	9.4	32.7	56.0	2001	16.8	25.0	37.4
2003	12.0	34.7	46.0	2003	12.1	32.8	39.7
2005	12.2	23.1	42.5	2005	17.6	30.2	33.2
Québec	Average Proportion of Employees Receiving On-the-Job Training			Ontario	Average Proportion of Employees Receiving On-the-Job Training		
Size	Small	Medium	Large	Size	Small	Medium	Large
1999	12.1	35.5	43.7	1999	33.1	32.4	40.5
2001	12.3	27.1	41.9	2001	33.5	34.0	47.3
2003	11.3	36.7	38.1	2003	30.9	42.5	36.9
2005	13.1	43.7	42.1	2005	36.2	39.2	48.2

SOURCE: Workplace and Employee Survey (1999, 2001, 2003, 2005)

by year and workplace size. The tables show the expected finding that bigger firms are both more likely to offer training, and when they do so, train more workers.

Focusing first on training incidence in Table 2, we see that, indeed, it does seem that following the Bill 90 reform, medium-sized workplaces cut back on their classroom training efforts. In 2003, 56.5 percent of medium-sized workplaces offered classroom training but only 49 percent did the same in 2005, a drop of 7.5 percentage points, or 13.3 percent. Among small workplaces, which were never subject to the law, classroom-training incidence is mostly stable at 17.5 percent and 18 percent in 2003 and 2005, respectively, but we also observe a diminishing classroom-training incidence for bigger firms although the drop is only 2 percent. In other words, classroom-training incidence dropped more sharply for medium-sized firms following the repeal of Bill 90 for this group.

Comparing these movements to those observed in Ontario, we see that the training incidence increased for both smaller (+4.5 percent) and bigger (+6.3 percent) workplaces and decreased for medium-sized workplaces (–7.5 percent). Because of the rises in the control groups, we see the relative decrease in the incidence of training for medium-sized workplaces is similar in Ontario and Quebec. Estimating a triple difference would thereby correct for the training trend particular to medium-sized firms.

Turning to on-the-job training, we observe a relative increase of the training in-cidence for medium-sized workplaces (+12.3 percent) compared to small-sized (+1 percent) and big-sized workplaces (+2.7 percent). This increase

nearly matches the decrease in classroom-training incidence (–13.3 percent). Overall, these movements are coherent with the hypothesis that medium-sized workplaces in Quebec substituted classroom to on-the-job training following the change in Bill 90.

Training intensity. This preliminary conclusion is not changed when we turn to training intensities in Table 3. The average proportion of employees receiving classroom training in medium-sized workplaces decreased by 11.6 percentage points or 33.4 percent between 2003 and 2005 while the intensity of on-the-job training increased by 7 percentage points or 19.1 percent.

Compared to Ontario, we observe a relative decline in the intensity of classroom training of medium-sized workplaces compared to smaller firms but a decrease com- pared to bigger firms. Moreover, for on-the-job training, we observe a relative decline in the intensity of on-the-job training for medium-sized workplaces. Overall, the raw data on training intensities are even more suggestive of a substitution by medium-sized firms in Quebec away from classroom training and toward on-the-job training.

In the following section, we tackle the question of whether these movements are statistically significant in a regression framework. Note that because the variable indicating the proportion of workers receiving training is a more precise measure of the training levels within the firm, we use that specific variable in the regression analysis that follows.

Regression Analysis of Training Intensities

Double-differences estimates. In order to test whether the movements outlined above are statistically different from zero, and to take into account some other observable differences between our treatment and control groups, we first use a double-differences model in which the change in training intensities for medium-sized workplaces before and after the repeal of the law is contrasted to the change in a comparison group that includes both smaller and larger workplaces.[11]

Formally, let P_{jt}^{k} be the proportion of worker in workplace j at time t who received either classroom training ($k = c$) or on-the-job training ($k = o$).

[11] Because we have three years of observations before the reform, we are able to formally test the assumption that training intensities in medium-sized workplaces follow the same trend as observed in the control group. When we do so, we cannot reject the null hypothesis that medium-sized workplaces follow the same trend as smaller or larger workplaces as separate groups or as a merged control group. This result holds for both on-the-job and classroom training.

We estimate the following regression model for P_{jt}^{k} on the sample of workplaces from Quebec:

$$P_{jt}^{k} = \beta_0 + \beta_1 D_{jt}^{YEAR=2001} + \beta_2 D_{jt}^{YEAR=2003} + \beta_3 D_{jt}^{YEAR=2005} + \gamma_1 D_{jt}^{SIZE=MEDIUM} + \gamma_2 D_{jt}^{SIZE=LARGE} + + \tau(D_{jt}^{YEAR=2005} * D_{jt}^{SIZE=MEDIUM}) + \epsilon_{jt}$$

in which $D^{YEAR=2001}$, $D^{YEAR=2003}$, and $D^{YEAR=2005}$ are dummy variables equal to one if t is 2001, 2003, and 2005, respectively (1999 is the omitted year) and $D^{SIZE=MEDIUM}$ and $D^{SIZE=LARGE}$ are dummy variables for medium and large workplaces, respectively (small workplaces are the omitted category). τ represents the effect of interest and is interpreted as the impact of the reform on training intensities.[12]

We use data from the sampling years, i.e., 1999, 2001, 2003, and 2005. This means there are three pre-repeal periods (1999, 2001, and 2003) and one post-repeal period (2005). This raises the possibility that standard errors could be biased downward (see Bertrand, Duflo, and Mullainathan 2004). Standard errors for all of our coefficient estimates are bootstrapped in order to fully account for the stratified sampling procedure used by Statistics Canada. This is also recommended by Donald and Lang (2007) to control for residual clustering at the unit of observation level. Statistical significance is based on the bootstrapped confidence interval.

Results are presented in Table 4. The dependent variable is the classroom training intensity in the first four columns and on-the-job training intensity in the last four columns. Coefficients for year dummy variables are not statistically different from zero while coefficient for workplace size indicator variables gives the usual results that larger workplaces provide both more classroom and on-the-job training than smaller workplaces (see for example Barron, Black, and Loewenstein 1987), maybe because of lesser credit constraints.

Turning to the estimate of the impact of the reform, we find a significant decline in classroom training intensities for medium-sized workplaces following the repeal of the obligation to spend at least 1 percent of payroll on training. One interpretation is that Bill 90 was successful in raising training levels. Moreover, coefficient estimates for on-the-job training (though not statistically different from zero) indicate that intensities of on-the-job training moved in the opposite direction, meaning the total training effort by workplaces did not fall as much as initially thought.

[12] Double-difference estimates obtained from a specification that includes industry and organizational changes dummies as additional covariates yield similar results.

TABLE 4

Double-Differences Regression Results

	Average Proportion of Employees Receiving Classroom Training				Average Proportion of Employees Receiving On-the-Job Training			
Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year indicators								
Year = 1999		—	—	——		—	—	—
Year = 2001		−0.018	−0.023	−0.024		−0.011	−0.016	−0.016
		(0.030)	(0.028)	(0.028)		(0.024)	(0.023)	(0.023)
Year = 2003		0.008	−0.007	−0.008		−0.001	−0.016	−0.015
		(0.029)	(0.027)	(0.027)		(0.027)	(0.025)	(0.025)
Year = 2005		−0.013	−0.036	−0.014		0.031	0.010	0.002
		(0.032)	(0.031)	(0.036)		(0.029)	(0.026)	(0.031)
Workplace size indicators								
Small			—	—			—	—
Medium			0.190***	0.215***			0.207***	0.198***
			(0.024)	(0.028)			(0.023)	(0.027)
Large			0.357***	0.355***			0.290***	0.291***
			(0.029)	(0.029)			(0.021)	(0.022)
Treatment indicator								
MED * Year = 2005				−0.099**				0.037
				(0.049)				(0.060)
Constant	0.187***	0.193***	0.134***	0.129***	0.190***	0.185***	0.128***	0.129***
	(0.011)	(0.022)	(0.024)	(0.024)	(0.010)	(0.016)	(0.015)	(0.015)
#OBS	5088	5088	5088	5088	5088	5088	5088	5088
R-squared	0.00	0.00	0.07	0.07	0.00	0.00	0.08	0.08

Source: Workplace and Employee Survey (1999, 2001, 2003, 2005)
Bootstrapped standard errors in parentheses; ** significant at the 5-percent level; *** significant at the 1-percent level

Taken at face value, these results indicate that train-or-pay schemes seem somewhat effective at raising training levels but that a correct assessment of their effectiveness must carefully take into account the possibility that workplaces are substituting other forms of training for the specific type of training required by the law.

One reason to doubt this conclusion is the possibility of time-varying shocks in the error term of our estimated equation that affect workplaces of different sizes differently. In fact, differential trends in training intensities can be inferred from the summary statistics provided in Table 3 but are more easily seen in Figures 1 and 2. In particular, intensities for both classroom and on-the-job training seem to vary more over time for small workplaces than for medium and large workplaces.[13]

Triple-difference estimates. To account for the possible impact of time-varying shocks affecting training intensities differently depending on workplace size, we estimate a triple-difference model, using workplaces in the province of Ontario as an additional control group. The province of Ontario is a neighboring province most similar to Quebec in terms of industrial structure, and is thus the most credible candidate for such an exercice.

Formally, now let P^k_{jpt} be the proportion of worker in workplace j in province p at time t who received either classroom training ($k = c$) or on-the-job training ($k = o$). We estimate the following regression model for P^k_{jpt} on a sample of workplaces from Quebec and Ontario:

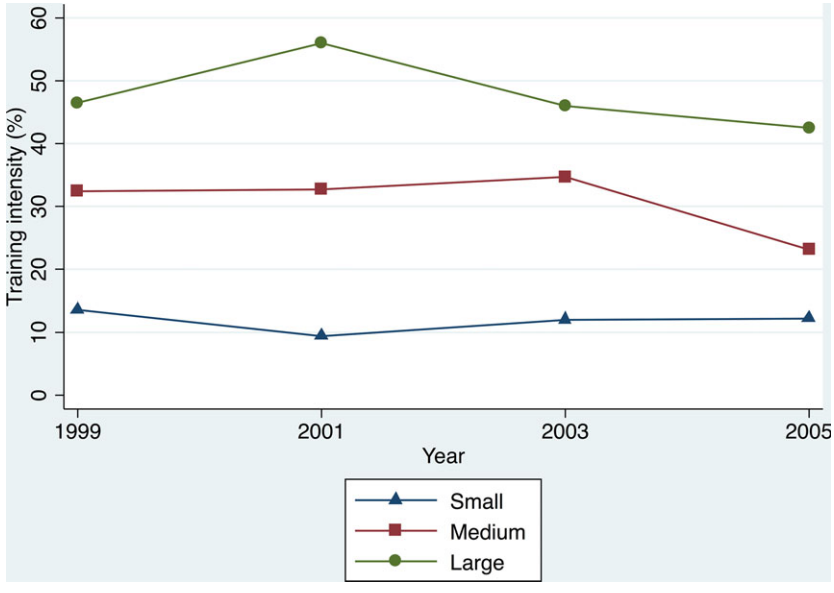
$$\begin{aligned} P^k_{jpt} = {} & \delta ONT_{jpt} + \beta YEAR_{jpt} + \gamma SIZE_{jpt} + \\ & + \theta_1(QC_{jpt} * REF_{jpt}) + \theta_2(REF_{jpt} * MED_{jpt}) + \theta_3(QC_{jpt} * MED_{jpt}) + \\ & + \tau(REF_{jpt} * MED_{jpt} * QC_{jpt}) + \epsilon_{jpt} \end{aligned}$$

in which ONT_{jpt} is a dummy variable equal to one if p is Ontario; $YEAR_{jpt}$ is a vector of year dummies from t = 2001, 2003, and 2005 (1999 is the omitted category); $SIZE_{jpt}$ is a vector of workplace size dummies in which we distinguish three categories (small [omitted], medium, and large); QC_{jpt} is a dummy variable equal to one if p is Quebec; REF_{jpt} is a dummy variable equal to one for the post-reform years (t = 2005); and finally, MED_{jpt} is a dummy variable equal to one for medium-sized workplaces. τ represents the effect of interest and is interpreted as the impact of the reform on training intensities.

[13] Interestingly, Figure 1 clearly shows that drop in the intensity of classroom training after the reform while Figure 2 raises the possibility that workplaces already started making adjustments in 2003 in anticipation of a possible change in the legislation (which was announced in June 2003.)

FIGURE 1

Average Intensity of Classroom Training by Workplace Size



Source: Workplace and Employee Survey (1999, 2001, 2003, 2005)

Coefficient estimates are presented in Table 5. The table shows similar results for variables included in the double-differences model. However, because of the bigger sample size, we are able to estimate the coefficients much more precisely. If there is a constant difference in training levels between Quebec and Ontario, it is shown in significantly higher levels of on-the-job training in Ontario.

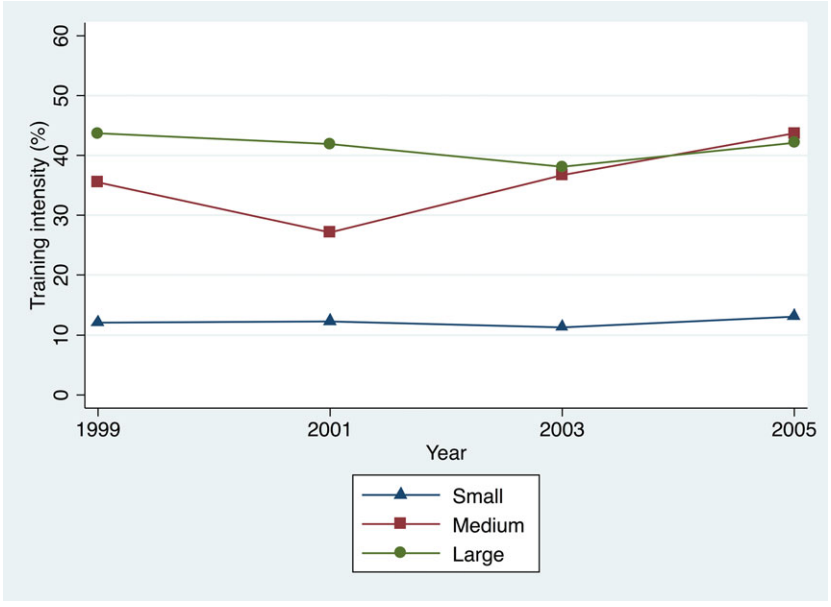
Our triple difference estimates are presented near the bottom of the table. The estimate in column 4 indicates that classroom training intensities drops 7.1 probability points, a drop similar to the estimated –9.9 estimated previously. However, on-the-job training intensities increase by 10.9 probability points. In both cases, changes are statistically different from zero, indicating that repeal instigated a decrease in classroom training, accompanied by a compensating increase in on-the-job training.

Conclusion

On January 1, 2004, the Quebec government abolished a law that had required that firms with total payroll between $250,000 and $1,000,000 use 1

FIGURE 2

AVERAGE INTENSITY OF ON-THE-JOB TRAINING BY WORKPLACE SIZE



SOURCE: WORKPLACE AND EMPLOYEE SURVEY (1999, 2001, 2003, 2005)

percent of their total revenue for training purposes. In this paper, we use this change in the law as a natural experiment to investigate whether the training levy was effective in raising training levels in Quebec. We thus add to the very short literature evaluating the impact of governmental programs designed to increase levels of firm-sponsored training.

We find that after the application of a train-or-pay scheme was suspended for medium-sized workplaces, they started doing less classroom training (the type man- dated by the law) and more on-the-job training. These results indicate that a correct assessment of the effectiveness of train-or-pay schemes must carefully take into account the possibility that workplaces are substituting other forms of training for the specific type of training required by the law.[14]

[14] This conclusion assumes away asymmetric effects; i.e., the possibility that the effect of the removal of a policy might be different from its introduction. Having been induced to provide training by law, and having seen some productivity benefits that were not previously perceived, it is possible that workplaces might then substitute to cheaper informal, noncertified training when the law is abolished. But this doesn't necessarily mean that they substituted from informal training to formal training when Bill 90 was introduced. Unfortunately, we have no data covering the introduction period to test this hypothesis.

TABLE 5

TRIPLE-DIFFERENCES REGRESSION RESULTS

	Average Proportion of Employees Receiving Classroom Training				Average Proportion of Employees Receiving On-the-Job Training			
Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Province indicators								
Ontario	0.019	0.019	0.010	0.006	0.163***	0.163***	0.157***	0.163***
	(0.017)	(0.017)	(0.017)	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)
Workplace size indicators								
Small			—	—			—	—
Medium			0.148***	0.155***			0.099***	0.089***
			(0.021)	(0.022)			(0.021)	(0.023)
Large			0.252***	0.252***			0.163***	0.164***
			(0.020)	(0.020)			(0.020)	(0.020)
Double interactions								
MED * Year = 2005				0.007				−0.009
				(0.053)				(0.058)
MED * QC				0.077*				0.139***
				(0.043)				(0.041)
QC * Year = 2005				−0.022				−0.019
				(0.043)				(0.054)
Treatment indicator								
MED * QC * Year = 2005				−0.071*				0.109**
				(0.041)				(0.054)
Constant	0.187***	0.182***	0.139***	0.140***	0.190***	0.178***	0.150***	0.148***
	(0.011)	(0.019)	(0.019)	(0.019)	(0.010)	(0.018)	(0.018)	(0.018)
#OBS	10962	10962	10962	10962	10962	10962	10962	10962
R-squared	0.00	0.00	0.05	0.05	0.02	0.02	0.03	0.03

SOURCE: Workplace and Employee Survey (1999, 2001, 2003, 2005)
Includes year indicators; bootstrapped standard errors in parentheses; ** significant at the 5-percent level; *** significant at the 1-percent level.

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