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Did work-related training protect the employed from unemployment during the COVID-19 pandemic?[1]

Czy szkolenia zawodowe chroniły pracujących przed bezrobociem podczas pandemii COVID-19?

Słowa kluczowe: szkolenia, zatrudnienie, model probitowy.

Streszczenie: Szybkie tempo postępu technicznego sprawia, że szkolenia zawodowe stają się coraz ważniejszym źródłem kompetencji pracownika. Wydaje się, że ich znaczenie mogło być jeszcze większe w czasie pandemii COVID-19, gdyż mogły one dostarczać pracownikom wiedzę i umiejętności potrzebne do wykonywania pracy w formie hybrydowej lub zdalnej. Z teoretycznego punktu widzenia można więc oczekiwać, że szkolenia zawodowe przyczyniły się w tamtym okresie do spadku ryzyka utraty pracy. Na podstawie danych jednostkowych z Badania Aktywności Ekonomicznej Ludności (BAEL) dla lat 2018–2020 oszacowaliśmy model probitowy odpływów z zatrudnienia, aby sprawdzić, czy w wyniku szkoleń malało prawdopodobieństwo odpływu osób pracujących do bezrobocia. Wyniki nie potwierdzają jednak występowania takiej zależności ani przed pandemią (2018–2019), ani w jej trakcie (2020).

Key words: training, employment, probit model.

Abstract: The rapid pace of technological development makes work-related training an increasingly important source of competences for employees. It seems that new competences may have been crucial during the COVID-19 pandemic, as they provided employees with the knowledge and skills needed to work in a hybrid or remote form. Therefore, from a theoretical point of view, one would expect that work-related training contributed to a decrease in the risk of job loss at that time. Using individual data from the Polish Labour Force Survey (LFS) for the years 2018–2020, we estimated a probit model of outflows from employment to see whether participation in work-related training reduced the probability of outflows from employment

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into unemployment. However, the results do not confirm the existence of such a relationship either before (2018–2019) or during (2020) the pandemic.

Introduction

The rapid pace of technological development and the related changes in the structure of labour demand means that work-related training is a very important source of employee competences, allowing them to acquire and improve knowledge and skills necessary at work. Therefore, it is not surprising that the percentage of working people who participate in training is successively increasing. In 2005, 20.6% of employees of enterprises employing at least 10 persons participated in training organized by the employer, while in 2015 as many as 37.1% of employees participated in this form of further education (Statistics Poland, 2007, 2017). In 2020, due to restrictions caused by the COVID-19 pandemic, this percentage dropped to 28.8% (Statistics Poland, 2022). However, the long-term upward trend was maintained, as evidenced by data from Eurostat based on the Labour Force Survey (LFS). The data shows that the percentage of employed people aged 25–64 who participated in training or formal education in the last four weeks increased in Poland from 4.0% in 2015 to 8.8% in 2022, more than doubling, although it was temporarily at a lower level (4.2%) in 2020.[2] Looking at the scale of lifelong learning in our country in the European context, it should be noted that although it is still less popular in Poland than in other EU countries, in recent years we have been successively reducing the gap between us and the EU27 average in this respect.[3]

The increasing popularity of work-related training may indicate that more and more employers and employees are recognising the benefits of this form of education. From a theoretical perspective, training provides an individual with knowledge and skills that, if found useful, increase work efficiency, which leads to increased employability and earnings in a perfectly competitive labour market (Becker, 1964). In the context of working individuals, it can therefore be expected that their participation in work-related training will lead to a decrease in the risk of job loss. This expectation seems particularly justified with respect to the training conducted during the COVID-19 pandemic. Due to restrictions imposed on employers by the Polish government – first in March and then in November 2020 – the scale of work-related training decreased significantly, but at the same time the training that was provided could have been helpful in adapting working conditions to the restrictions introduced, including the transition to hybrid or remote working. This could have protected some companies from suspending operations and employment reductions.

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[2] https://ec.europa.eu/eurostat/databrowser/view/TRNG_LFS_03__custom_6670636/default/table?lang=en

[3] In 2015, the fraction of working individuals aged 25–64 who participated in formal training or education in the last 4 weeks in Poland was more than twice lower than the average for the EU-27 countries (4.0% vs. 10.7%), while in 2022 it was lower by only 1/3 (8.8% vs. 12.6%). Source: Eurostat (see footnote 4).

To date, no research has been done for Poland on the impact of work-related training of the employed on the risk of job loss. The only research delivered concerned the question whether training of unemployed people increases their employability. It confirmed the positive effect of work-related training in the Polish labour market (Bieliński et al., 2008; Liwiński, 2015a, 2015b). The employment effects of training delivered to working individuals have also been analysed for other countries using the experimental method. However, the studies revealed that work-related training has no impact on job retention (Schwerdt et al., 2012) or job change (Hidalgo et al., 2014).

The aim of this paper is to show whether the participation of employed people in work-related training during the COVID-19 pandemic in 2020 in Poland reduced the risk of losing their jobs in the following three or twelve months. The analysis was conducted using the difference-in-differences (DID) approach. In particular, we estimated a probit model of outflows from employment using the maximum likelihood (ML) method based on data from the Polish Labour Force Survey (LFS) for the years 2018–2020.

The subsequent sections of the article present the data and the method of analysis followed by a discussion of the results and conclusions.

Analysis of the impact of work-related training on the risk of job loss

Data and method of analysis

To conduct the empirical analysis, individual data from the Polish Labour Force Survey (LFS) for 2018–2020 were used. This survey is conducted by the Statistics Poland in the form of a questionnaire interview on a random sample of the population aged 15 and over, who reside in Poland. The interview provides information on the respondent's participation in various forms of education, his/her economic status and a number of socio-demographic characteristics. In the LFS, the respondent is subject to four observations according to the 2-(2)-2 rule, i.e. he/she is interviewed in two consecutive quarters, and then after a two-quarter break he/she is interviewed again in two consecutive quarters. Thus, it is possible to merge individual data into quarterly, semi-annual and annual panels.

Information on the respondent's participation in work-related training refers to the period of four weeks preceding the interview. Training is defined as a participation in any out-of-school form of education aimed at acquiring or developing work-related knowledge or skills. With regard to the most recent training, the respondent is additionally asked to indicate its purpose, initiator and length. Unfortunately, the above information does not make it possible to ascertain whether the respondent completed the training and when it took place. The earliest it could have ended was four weeks before the interview, but the latest possible completion date is impossible to determine, as in extreme cases the declared length of the training

is more than two years (there is no upper limit). However, short trainings – of up to one week – are by far the majority (70%) in our sample, while those lasting more than two years or with no specified length are only 7.5% in total. On the one hand, it is clear that effects can only be expected for completed training, which is an argument for removing those respondents who participated in long training courses from the sample. On the other hand, the longer the training is the larger effect on productivity we may expect. Taking this into account, our analysis covers all trainings, regardless of their length, which may potentially result in an underestimation of employment effects.

The key challenge in studying the effects of education is to eliminate selection bias. Since individuals with above-average abilities are more likely to participate in work-related training, their privileged position in the labour market – including higher employability – results not only from the training itself, but also from their higher innate abilities. It is difficult to eliminate the resulting selection bias and identify the causal effect of training, as individual abilities that influence labour productivity are difficult to measure, i.e. *de facto* unobservable.

In this analysis, a difference-in-differences (DID) strategy was used to identify the causal effect of participation in training. We examined whether the difference between the increments of the outcome variable in the treatment and control group is statistically significant, while individuals in both groups are the same in terms of other observable characteristics that potentially may affect the outcome variable. In order to analyse short- and medium-term effects, we merged data from consecutive observations of each respondent to create quarterly and yearly panels, i.e. we merged the respondent's observations at the moments t_0 and t_1, which were 3 or 12 months apart, respectively.

The research sample consisted of individuals aged 18–65 who were working (as employees or self-employed) at time t_0, and were either working or unemployed at time t_1.[4] This sample design allowed us to examine whether participation in a training within 4 weeks before t_0 affected the risk of job loss in the period $t_0 - t_1$. Since the main goal of the analysis was to compare the effects of training during the COVID-19 pandemic in 2020 with the earlier period (2018–2019), while the first restrictions related to the pandemic were in force from March 12, 2020, we limited our sample to respondents, whose first observation (t_0) was in the 2nd, 3rd or 4th quarter in 2018–2020. The quarterly panel included 114,346 individuals, of whom 4,310 (3.8%) participated in a work-related training. The yearly panel consisted of 82,413 individuals, including 3,562 participants (4.3%) of a training.

To identify the impact of work-related training on the probability of job loss in the period $t_0 - t_1$, we estimated the following probit model:

[4] The respondent's status in the labor market was determined in accordance with the definition used by the Statistics Poland in the Labour Force Survey (see: Statistics Poland, 2022).

$$\Pr(Y_i = 1 \mid S_i, X_i) = \frac{\exp\left(S_i \beta_1 + X_i \beta_2\right)}{1 + \exp\left(S_i \beta_1 + X_i \beta_2\right)} = F\left(S_i \beta_1 + X_i \beta_2\right) \quad (1)$$

where: Y_i is a dummy variable representing the change in the labour market status of individual i in the period $t_0 - t_1$, with the value of 1 in the case of job loss and becoming unemployed, and 0 in the case of remaining in employment; S_i is the key independent variable that represents the participation of respondent i in work-related training within 4 weeks before t_0; X_i is a vector of control variables including several characteristics of respondent i at t_0. The key control variable is participation in a non-work-related training within 4 weeks before t_0. It is intended to represent the respondent's willingness to learn. In addition, the X_i vector contains the following variables: gender, age, age squared, marital status, level of education, town size and voivodeship.[5]

Model (1) was estimated using the maximum likelihood (ML) method. The value of coefficient β_1 represents the impact of work-related training on the probability of job loss. To enable quantitative interpretation of the results, raw coefficients were transformed into the so-called *marginal effects*. These may be interpreted as the change in the probability of a job loss (in percentage points) associated with a change in the value of a given independent variable by one unit, provided that the values of other independent variables are constant.[6]

Results

Table 1 presents descriptive statistics of key variables included in model (1) for each quarter in the period 2018–2020. For comparative purposes, the fractions presented in the table were calculated on the basis of both quarterly and yearly panel data. The fraction of training participants among working individuals amounted to approximately 5% in 2018 and it decreased to 4.4% one year later. In the first quarter of 2020, this weak downward trend continued, and then in the second quarter of 2020, when the restrictions related to the first wave of the COVID-19 pandemic were in force, the fraction of individuals who participated in a training dropped sharply to approximately 2%, i.e. by more than a half compared to the second quarter of 2019. This is evidenced by both the quarterly and yearly panel data. Then, in the last two quarters of 2020, the fraction of individuals who participated in training increased, and it seems that this was not stopped even by the second wave of the pandemic, which started in October 2020.

[5] A voivodeship is the highest-level administrative unit of Poland, corresponding to a province in many other countries. There are 16 voivodeships in Poland.

[6] Estimations were performed in Stata/SE 17.0.

Table 1. Fractions of working individuals who participated in training or lost their job in 2018–2020

Period		Training participants		Individuals who lost their job	
		Quarterly panel	Yearly panel	Quarterly panel	Yearly panel
		as % of working individuals			
2018	I q.	6.5	5.9	0.54	0.82
	II q.	5.7	5.8	0.46	0.88
	III q.	3.9	3.8	0.38	0.79
	IV q.	4.8	4.9	0.51	0.63
	Total	5.3	5.1	0.46	0.83
2019	I q.	5.1	4.8	0.27	0.67
	II q.	4.6	4.7	0.41	1.16
	III q.	3.3	3.3	0.41	1.33
	IV q.	4.4	4.8	0.45	1.01
	Total	4.4	4.4	0.40	0.92
2020	I q.	3.6	4.6	0.84	1.42
	II q.	2.1	2.2	0.38	1.11
	III q.	2.7	4.4	0.43	0.62
	IV q.	3.4	4.5	0.59	0.60
	Total	3.0	4.0	0.55	1.02

Source: own computations based on LFS, 2018–2020.

The COVID-19 pandemic also increased the risk of job loss, or – more precisely – the fraction of individuals flowing from employment to unemployment. In the period 2018–2019, the risk of job loss within the next 3 months amounted to 0.4–0.5%, on average. The effect of the first wave of the pandemic is clearly visible in the first quarter of 2020, when the risk increased to 0.84% (quarterly panel data), which was more than twice the average of 2019. In the next two quarters of 2020, the risk returned to the level of 2019, and then in the fourth quarter of 2020 it slightly increased (to 0.59%), which may be the effect of the second wave of the pandemic. The fractions based on the yearly panel data present a similar picture. The risk of job loss in the next 12 months increased almost twice between the first and second quarter of 2019 (from 0.67% to 1.16%), which resulted from the reduction of employment in spring 2020. Then the risk remained at the higher level for the next four quarters (1.01–1.42%), after which it returned to the pre-pandemic level.

To sum up, although the risk of a job loss is generally very low, it clearly increased during the pandemic period. At the same time, the restrictions which limited direct contact among employees resulted in a dramatic decrease in the intensity of work-related training during the first wave of the pandemic. Therefore, the question arises whether the training of employees was helpful in adapting working

conditions to the requirements imposed on Polish employers during the pandemic, i.e. changes in work organisation, including the transition from on-site to remote or hybrid work. If the work-based training was helpful, it can be expected that it contributed to reducing the scale of employment reduction.

Table 2 presents the values of the estimator of the impact of training on the probability of job loss that come from estimations of model (1) based on the quarterly and yearly panel data. At first, we estimated the model without control variables to check whether the training itself is correlated with the probability of job loss in 2018–2020 (columns 1–3). It turned out that a statistically significant correlation is visible only in 2020 in the yearly panel (column 3). Its value indicates that individuals participating in work-related training had a 0.6 percentage point lower probability of flowing from employment to unemployment. However, after including control variables in the model, the value of this coefficient decreased and lost statistical significance (column 6). The estimated values of the coefficient based on the quarterly panel data are also insignificant for the years 2018–2020. Thus, we conclude that work-related training, on average, had no impact on the probability of remaining in employment either before (2018–2019) or during the pandemic (2020), both in the 3- and 12-month perspective.

Table 2. The impact of work-related training on the probability of job loss (marginal effects)

Specification	(1)	(2)	(3)	(4)	(5)	(6)
	2018	2019	2020	2018	2019	2020
	Quarterly panel					
Work-related training	0.001	0.003	-0.001	0.001	0.003	0
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Control variables	no			yes		
N	31 596	24 961	25 856	31 343	24 754	25 605
Pseudo R2	0.0008	0.0001	0.0025	0.0577	0.0629	0.047
	Yearly panel					
Work-related training	-0.003	0	-0.006*	-0.003	-0.002	-0.004
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Control variables	no			yes		
N	35 426	31 649	47 271	35 159	31 391	46 852
Pseudo R2	0.0001	0.0011	0.0001	0.0646	0.0693	0.0604

Notes: ***/**/* refer to 0.1%, 1% and 5% significance levels, respectively; standard errors are in parentheses; a set of control variables: non-work-related training, gender, age, age squared, education level, marital status, town size, voivodeship.

Source: own estimations based on LFS, 2018–2020.

The lack of average effect of work-related training does not necessarily mean that no type of training protected employees from job loss during the pandemic. Table 3 presents the estimation results of the full model, i.e. including all control variables, where different types of work-related training were distinguished on the basis of three characteristics of training: its initiator (employee / employer), purpose (acquiring or changing / improving job competences) and the length (less / more than 1 week). The results indicate that, during the COVID-19 pandemic, none of these types of training had an impact on the probability of a job loss, both in the 3- and 12-month perspective. Although the values of coefficients estimated for 2020 are in most cases negative – which was in line with our expectations – they are not statistically significant.

The results of the estimation based on the quarterly panel for 2018 and 2019 are somewhat surprising, as they suggest that the risk of job loss was increased by three types of training courses: the employer-initiated ones, those aimed at acquiring or changing competences, and those lasting less than 1 week. Perhaps it was a consequence of a negative selection of training participants, i.e. employees at risk of being fired may have been trained by employers more often at that time. However, this is only our hypothesis that needs further investigation to be confirmed.

Table 3. The impact of work-related training on the probability of job loss by selected characteristics of training (marginal effects)

Characteristics of training	2018	2019	2020	2018	2019	2020
	Quarterly panel			*Yearly panel*		
I. Initiator:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Employee	0.002	0.002	-0.000	-0.001	0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.004)	(0.005)	(0.005)
Employer	-	0.006*	-0.002	-0.004	-0.002	-0.004
		(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
II. Aim:	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Acquiring or changing job competences	0.012***	0.006*	0.000	0.001	0.006	-0.001
	(0.003)	(0.003)	(0.003)	(0.004)	(0.006)	(0.005)
Improving job competences	-0.002	0.001	-0.001	-0.004	-0.001	-0.005
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
III. Length:	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**
Less than 1 week	0.002	0.004*	-0.001	-0.002	0.001	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.003)
1 week or more	0.002	-	-0.001	-	0.002	0.001
	(0.003)		(0.003)		(0.007)	(0.007)

Notes: ***/**/* refer to 0.1%, 1% and 5% significance levels, respectively; standard errors are in parentheses; a set of control variables: non-work-related training, gender, age, age squared, education level, marital status, town size, voivodeship.

Source: own estimations based on LFS, 2018–2020.

Conclusions

The aim of this paper was to show whether the participation of working individuals in work-related training during the COVID-19 pandemic in 2020 in Poland reduced the risk of job loss within the next three and twelve months. Our identification strategy rested on the difference-in-differences (DID) approach. In particular, we estimated a probit model of outflows from employment using the maximum likelihood (ML) method and the data from the Polish Labour Force Survey (LFS) for the years 2018–2020.

The results of the analysis indicate that work-related training, on average, did not protect working individuals from unemployment in the 3- and 12-month perspective, both before (2018–2019) and during (2020) the pandemic. In addition to the absence of an average effect, a lack of effect was also found for several types of training identified in the analysis, i.e. employer-financed as well as employee-financed training to acquire competences and improve them, lasting less than 1 week and at least 1 week. These results are consistent with those obtained in other studies covering the pre-pandemic period (Hidalgo et al., 2014; Schwerdt et al., 2012).

The lack of employment effectiveness of training may be interpreted in several ways. Firstly, training may actually have no impact on work efficiency. Some types of training – such as health and safety training – may not serve to increase work efficiency by definition, others – such as language courses – may have an impact on productivity, but rather in the longer term, while still others – such as lectures and conferences – may be loosely related to work or provide only theoretical knowledge. Secondly, even if training affects work efficiency, those employees who are not willing to undergo training do not have to be dismissed – instead, they can be transferred to other positions, where continuous training is not required. Thirdly, during the pandemic, government support for employers aimed at protecting jobs (the so-called 'anti-crisis shield') was a factor in reducing the sensitivity of employment to labour productivity. Finally, it is possible that the ICT knowledge and skills needed to adjust to hybrid or remote work were transferred to employees informally (outside of formal training), or employees used digital competences they already possessed, as suggested by Liwiński and Seifert (2022).

Obviously, our analysis has some limitations that may have affected the results. The first is the fact that information about participation in training comes from the respondents themselves. Undoubtedly, it involves some degree of a measurement error, as the respondents may have shared false data. The second possible limitation relates to the difference-in-differences (DID) strategy that was used to identify the causal effect of training participation. This approach allows for the elimination of selection bias, as long as the impact of unobservable characteristics of respondents on the outcome variable is constant over time. If this is not the case, the bias may still be present, although it has been significantly reduced through the use of the

DID strategy. To additionally reduce the size of the bias, an independent variable representing the participation in non-work-related training was included in the model to control for innate personal abilities of individuals and their willingness to learn.

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