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Why do young workers quit their first job? Identification of the risk factors using the Cox model and survival trees[1]

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Abstract. According to Statistics Poland's data, the situation of young people in the Polish labour market has improved significantly in recent years. Therefore, on the one hand, it is easier for young people entering the labour market to find a job, and on the other, it is increasingly difficult for employers to keep such people in their organisation. The aim of this study is to identify and assess individual characteristics of young workers and work-related factors that affect the length of the time they spend in their first job. The study is based on data for 2019 and 2020 from Statistics Poland's Labour Force Survey. It is of key importance in the research on the professional activity of young people to take into account in modelling the high volatility of their characteristics over time. Therefore, we used the Cox model with time-variant variables to identify factors of risk of quitting a young employee's first job. One of the findings of the study was that people with higher education were more likely to quit their jobs than people with lower-level education. As regards work-related factors, in addition to the type of employment contract, the weekly working time and holding or not a managerial position were the important ones affecting the decision to continue or quit. Furthermore, groups of employees homogeneous in terms of the duration of their first job were identified using survival trees. We found that employees with fixed-term contracts were less likely to quit their jobs than those with permanent contracts, but working part-time.

Keywords: labour market, first job, young employees, Cox model, survival trees
JEL: J62, J64, C14, C41

Dlaczego młodzi pracownicy porzucają pierwszą pracę? Identyfikacja czynników ryzyka z wykorzystaniem modelu Coxa i drzew przetrwania

Streszczenie. Według danych Głównego Urzędu Statystycznego w ostatnich latach w Polsce sytuacja młodych osób na rynku pracy znacznie się poprawiła. W konsekwencji osobom wchodzącym na rynek pracy łatwiej jest znaleźć zatrudnienie, a pracodawcom coraz trudniej zatrzymać takie osoby w organizacji. Celem badania omawianego w artykule jest identyfikacja

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i ocena indywidualnych charakterystyk młodych pracowników oraz czynników związanych z wykonywaną pracą, które mają wpływ na czas trwania pierwszego zatrudnienia. W badaniu wykorzystano dane za lata 2019 i 2020 pochodzące z Badania Aktywności Ekonomicznej Ludności przeprowadzonego w Polsce przez Główny Urząd Statystyczny. Kluczowym elementem badań aktywności zawodowej młodych osób na rynku pracy powinno być uwzględnienie w modelowaniu dużej zmienności w czasie ich indywidualnych charakterystyk, dlatego do ustalenia czynników ryzyka porzucenia pierwszej pracy wykorzystano model Coxa ze zmiennymi zależnymi od czasu. Stwierdzono m.in., że większe ryzyko zaprzestania wykonywania pracy istniało w przypadku osób z wyższym wykształceniem niż wśród osób z niższym wykształceniem. Oprócz rodzaju umowy o pracę duży wpływ na to ryzyko miały też tygodniowy czas pracy i pełnienie funkcji kierowniczych. Ponadto wśród respondentów wyodrębniono, z wykorzystaniem drzew przetrwania, grupy homogeniczne ze względu na czas trwania pierwszego zatrudnienia. Okazało się, że istnieje mniejsze prawdopodobieństwo rozwiązania stosunku pracy przez pracowników zatrudnionych na czas określony niż przez pracowników zatrudnionych na czas nieokreślony, ale pracujących w niepełnym wymiarze godzin.

Słowa kluczowe: rynek pracy, pierwsza praca, młodzi pracownicy, model Coxa, drzewa przeżycia

1. Introduction

The situation of young people in the labour market in Poland has improved significantly in recent years. According to Eurostat data, the unemployment rate among people aged 15 to 29 in 2020 was 7.1% – one of the lowest in Europe (Eurostat, 2022). The year 2020 marked the outbreak of the COVID-19 pandemic in Poland and several other countries, which significantly impacted the global economy, including the job market. In 2020, the unemployment rate among Poles aged 15 to 29 increased by 0.5% compared to 2019; however, it was 0.6% lower than in 2018 and significantly lower than in previous years. This made it increasingly difficult for employers to retain young workers in their companies or institutions. Too-high a rate of voluntary employee turnover is undesirable, as it entails high costs for the organisation (Steenackers & Guerry, 2016) and, consequently, leads to an even higher turnover (Boon & Biron, 2016). Among other things, hiring a new employee requires appropriate training, even if they have all the required professional competencies. It is therefore desirable not only to define a suitable applicant profile in terms of the position to be filled, but also to assess the risk of the applicant quitting his or her job. According to Domurath et al. (2023), the desire to change jobs grows stronger over time, and this effect is particularly strong for employees working in low-growth ventures. Moreover, people under the age of 30 often change their jobs as they are still figuring out what they want to do in life (Arnett, 2006).

Currently, people born in the 1980s and 1990s, i.e., Generation Y and older representatives of Generation Z, are considered to be young workers in the labour market. According to Gadomska-Lila (2015), these people have significantly different work attitudes than the older generations. Hence, the factors that drive

them to change employers may be different from those motivating people from older generations. According to Horáčková and Kopáček (2018), the different attitude of young people towards work aggravates the workforce management problem and makes these workers less retainable. Considering the findings of Arnett (1998, 2006), in this study we will focus on the first job of people aged 18 to 29. The data for the study came from the Polish Labour Force Surveys (LFS) held in 2019–2020. The study includes, among other respondents, those who were employed for the first time or had just terminated their employment at their first employer at the time of the survey. Both the individual characteristics of young workers and factors directly related to their jobs were included in the analysis.

The aim of this study is to identify and assess individual characteristics of young workers and work-related factors that affect the length of the time they spend in their first job.

Therefore, our first research question is: which characteristics of young employees influence the risk that they would quit their first job? Here we have to remember, though, that determining the impact of individual employee characteristics on this risk might not be enough. The decision to remain in particular employment may also be influenced by the conditions of this employment and the characteristics of the enterprise. Therefore, the second question we posed is: which work-related factors influence the risk that young workers would quit their first job? In addition to identifying these factors, it is important to examine their importance and check under what conditions young people want to continue working in the same enterprise. Hence the third research question: what is the profile of a young employee who is not very likely to leave his or her employment? Finally, the fourth research question: which work-related factors can keep young workers in an enterprise for longer, and which push them away?

2. The first job and switching jobs

According to Ignaczak's research (2014) based on the Canadian General Social Survey, successive cohorts of workers tend to spend less and less time in their first job. This trend was observed for both women and men, but more significantly for men. In our study, we focus on generations Y and Z. Generation Y is very familiar with modern means of communication and the virtual world. These are the people who live at a fast pace and focus on themselves and their own development (Robak, 2017). In the literature, these individuals have been described as having little loyalty towards their employer, looking for a job that they will enjoy and, at the same time, one that will guarantee them financial independence (Wawrzonek, 2014). Consequently, people from this generation are prone to change employers frequently in

search of a satisfactory job, and their employers face the problem of qualified staff retention and high turnover of employees (Hassan et al., 2023). Generation Z has a high level of self-confidence and currently is the most technologically-competent generation of all. Individuals from Generation Z are often highly educated and have competencies that are now in strong demand in the labour market – they are not afraid of risk and make decisions quickly. In addition, they are geared towards fast-track professional careers and at the same time want their working and private lives to be a coherent whole (Żarczyńska-Dobiesz & Chomątowska, 2014).

A study by McGinnis Johnson and Ng (2016) found that there is a strong correlation between the education level of people from Generation Y and their employer-switching behaviours. While examining the duration of the first job according to the educational background on the basis of data from the Canadian General Social Survey, Ignaczak et al. (2022) indicated significant differences between genders. They observed that for women, in contrast to men, a higher level of education reduced the hazard of changing jobs. For men, entering the labour market at a young age and working part-time resulted in a higher likelihood of quitting their first job. Immigrant and married men, on the other hand, were less likely to quit their jobs. As regards women, the probability of leaving their first job increased in the case of part-time female employees and mothers. Similar results were obtained by Steenackers and Guerry (2016) when analysing the labour market behaviour of young people in Belgium. They found that young women were more likely than young men to change employers in the early stages of their careers. This reflects their search for a rewarding and stable job that would allow them to take care of their children after starting a family (Grzenda, 2019; Steenackers & Guerry, 2016).

Young people at the beginning of their professional careers are more likely to change employers than their older colleagues (Steenackers & Guerry, 2016). There is a particularly high probability of employee departure in the case of entry-level jobs. It is rare for an employee to start and end their career with the same employer (Pandey, 2019). Changing employers is exceptionally common in the private sector and among Generation Y workers (Steenackers & Guerry, 2016). From the company's point of view, excessive employee turnover is highly undesirable and employers use various strategies to deal with this problem. Understanding, at the individual level, factors influencing the behaviour of young people in the labour market can significantly improve employers' efectiveness of retaining these people in the company and thus makes it more viable to fully use the potential of young employees (Das & Baruah, 2013).

Young people do not always change jobs voluntarily, but anyway, the experience they gain in their first job enables them to perform much better in the labour market

afterwards. According to a study by Cockx and Picchio (2012), even short-lived jobs for graduates, lasting for a quarter of a year or shorter, increase the likelihood of finding long-term employment later on. Similar results were obtained for young people taking up jobs while still in education (Baert et al., 2022).

3. Research method

Our study used data from Statistics Poland's LFS to model the time spent in the first job. It is a quarterly panel survey with rotational sampling conducted by Statistics Poland and covering persons aged 15 and older (Główny Urząd Statystyczny [GUS], 2018). The LFS is based on a representative sample of Polish households. In the first quarter of 2019, the sample consisted of 69,526 people (GUS, 2019). In accordance with the study's main precepts, a randomly selected respondent is surveyed for two consecutive quarters, then does not participate in the study for the next two quarters, and is surveyed again in the following two. The LFS contains retrospective questions that make it possible to analyse the length of the employment. Our analysis covers respondents aged 18–29 who, at the time of the survey, were employed for the first time or had just quitted their first job. Only people who started working at the age of 18 or above were considered in our research. The assumed upper age limit of respondents was determined on the basis of Arnett's research (1998, 2006), which sets the full social maturity of a person around the age of 30. The number of observations performed for the purpose of the analysis was 384. Of the surveyed people, at the time of the last survey, only 13 (3.39%) were still in their first job.

In the case of young people, it is very common for their characteristics such as marital status, education, or place of residence to change over a short period. Factoring in the changes in the values of explanatory variables requires the use of appropriate data analysis methods. Hence, in this study, the time-dependent Cox model (Blanche et al., 2022; Fisher & Lin, 1999; Kalbfleisch & Prentice, 2002) and survival trees (Bou-Hamad et al., 2011; De Rose & Pallara, 1997; Shimokawa et al., 2015) were used to analyse the time spent by young workers in their first job. The risk determinants relating to people aged 18 to 29 quitting their first job were identified by means of the generalisation of the Cox model containing both time-invariant and time-variant variables (Hosmer et al., 2008). In the second part of the analysis, groups of employees homogeneous in terms of the duration of their first job were identified using survival trees. The proposed approach and the use of up-to-date data provide a new insight into the behaviour of young people on the labour market in Poland. The obtained results can be used, for instance, to define the profile of a young employee who is highly probable to quit his or her job.

The dependent variable, which in the survival analysis is time to failure, was defined as the number of months from the beginning of the first job to its termination for those who quit work during the observation period, or until the last survey for those who were still working for the same company or institution at the time of the last survey. The minimum time spent in a job was one month, and the maximum 123 months. In addition, a censoring variable was created and assigned the value of unity if the event occurred during the observation period. Thus, the value was one if the respondent terminated employment with the first employer, and zero if he or she did not.

Due to the very small representation of one of the two following categories, the information about the type of institution where the respondent worked (private or public) and whether the person was self-employed or not (less than 1%) were not included in the analysis. Detailed information on the overtime, salary, having or not an additional job and participating or not in training was also skipped, as less than 5% of respondents provided this information. The age variable was created by categorising the continuous variable describing the age of the respondent. The first category reflects the age range into which young people are classified, while the second group corresponds to those in the 'emerging adulthood' stage (Arnett, 2006). The set of potential independent variables selected for modelling is presented in Table 1.

Table 1. Individual characteristics and work-related factors

Variable	Categories	Number	Percent
	Individual characteristics		
Gender	man	226	58.85
	woman	158	41.15
Macroregion of Poland (NUTS 1)	South (Małopolskie, Śląskie)	53	13.80
	Northwest (Wielkopolskie, Zachodniopomorskie, Lubuskie)	63	16.41
	Southwest (Dolnośląskie, Opolskie)	31	8.07
	North (Kujawsko-Pomorskie, Warmińsko-Mazurskie, Pomorskie)	63	16.41
	Central (Łódzkie, Świętokrzyskie)	45	11.72
	East (Lubelskie, Podkarpackie, Podlaskie)	80	20.83
	Mazovia Voivodship (Warszawski Stołeczny, Mazowiecki Regionalny)	49	12.76
Marital status	single	328	85.42
	married	56	14.58
Age	18–25 years	214	55.73
	26–29 years	170	44.27
Finished process of education	no	64	16.67
	yes	320	83.33

Table 1. Individual characteristics and work-related factors (cont.)

Variable	Categories	Number	Percent
Individual characteristics (cont.)			
Education	tertiary	150	39.06
	post-secondary and vocational secondary	94	24.48
	general secondary	54	14.06
	basic vocational	35	9.11
	lower secondary, primary, incomplete primary	51	13.28
Place of residence	city with 100,000 or more residents	130	33.85
	city with less than 100,000 residents	84	21.88
	rural areas	170	44.27
Work-related factors			
Weekly working time	part-time (less than 40 hours per week)	33	8.59
	full-time (40 hours per week)	316	82.29
	overtime (more than 40 hours per week)	35	9.12
Type of employment contract	permanent	230	59.90
	fixed-term	154	40.10
Shift work	no	260	67.71
	yes	124	32.29
Managerial position	no	345	89.84
	yes	39	10.16
Earnings	up to PLN 2,500	77	20.05
	over PLN 2,500	55	14.32
	no data available	252	65.63
Employer's NACE (classification of activities)	wholesale and retail trade; repair of motor vehicles including motorcycles; transportation and storage	97	25.26
	manufacturing; electricity, gas, steam, hot water and air conditioning manufacturing and supply; water supply; sewerage, waste management and remediation activities; construction	128	33.33
	human health and social work activities	22	5.73
	education; public administration and defence; compulsory social security	27	7.03
	others	110	28.65
Workplace in the same municipality as the place of residence	no	141	36.72
	yes	243	63.28
Employer size	up to 10 people	97	25.26
	10 people and more	287	74.74
Full-time job	no	26	6.77
	yes	358	93.23
Work consistent with education level	yes	165	42.97
	partially	64	16.67
	no	155	40.36
Individual professional development plan	no	38	9.90
	yes	288	75.00
	others	58	15.10

Source: authors' work based on Statistics Poland's Labour Force Survey.

In this study, to identify factors affecting the probability of quitting the first job, we used the generalisation-of-the-proportional-hazards model containing both time-invariant and time-variant variables (Hosmer et al., 2008). Let $[x_1, \ldots, x_k]^{\mathrm{T}}$ denote the vector of independent variables, and $[\beta_1, \ldots, \beta_k]$ denote the vector of regression coefficients, due to which the hazard rate for the model of proportional hazards takes the form:

$$h(t|x_1, \ldots, x_k) = h_0(t) \exp\left(\sum_{i=1}^{k} \beta_i x_i\right), \tag{1}$$

where $h_0(t)$ denotes the baseline hazard. The baseline hazard can be regarded as the hazard function for an individual whose all covariates have the values of zero. It is a non-negative function of a continuous random variable *T*, for $t \geq 0$ (Cox, 1975; Cox & Oakes, 1984). Due to the nonparametric specification of the hazard function, the partial likelihood method is used to estimate the covariate effect in this model.

The Cox model is based on the assumption of the proportionality of hazards. In this study, the assumption was verified using the time-dependent covariate method. This method involves including time-dependent variables in a model with the set of potential explanatory variables by creating interaction between the independent variables and a non-zero function of the time variable $g_i(t)$. The most popular functions are $g_i(t) = t$ and $g_i(t) = \ln(t)$. We choose the second function similarly as Ng'andu (1997). The model then takes the following form:

$$h(t|x_1, \ldots, x_k) = h_0(t) \exp\left\{\sum_{i=1}^{k} \beta_i x_i + \sum_{i=1}^{k} \gamma_i x_i g_i(t)\right\}, \tag{2}$$

where γ_i denotes the parameter of interaction for the *i*-th ($i = 1, \ldots, k$) explanatory variable. Hazards are assumed to be proportional at times *t*, if $\gamma_i = 0$, for $i = 1, \ldots, k$. This assumption is verified using the likelihood ratio test.

When the assumption of proportional hazards is not met, it is possible to construct a generalised Cox model with nonproportional hazards, called a time-dependent Cox model (Blanche et al., 2022; Fisher & Lin, 1999; Kalbfleisch & Prentice, 2002). We used the generalisation-of-the-proportional-hazards model containing both time-invariant and time-variant variables (Hosmer et al., 2008). The hazard rate for this model is defined as:

$$h\left(t|x_1, \ldots, x_{k_1}, x_{1t}, \ldots, x_{k_2 t}\right) = h_0(t) \exp\left\{\sum_{h=1}^{k_1} \beta_h x_h + \sum_{l=1}^{k_2} \gamma_l x_{lt}\right\}, \tag{3}$$

where x_h $(h = 1, \ldots, k_1)$ denotes time-invariant variables, and x_{lt} $(l = 1, \ldots, k_2)$ stands for time-variant variables.

In the second stage of the research, the survival tree was used to find groups of employees homogeneous in terms of the time spent in their first job. Survival trees are an alternative to classical survival analysis methods (De Rose & Pallara, 1997). These techniques, also known as recursive partitioning methods, involve the construction of prediction rules in the form of a binary tree. The advantage of this method over classical methods is its structure, which requires fewer assumptions and allows relatively simple analysis of the non-standard and non-linear structure of a dataset. Using this model provides easily-interpretable decision rules which reflect the behavioural patterns of individuals during the surveyed period. For each group formed on the basis of a behavioural pattern, it is possible to calculate a survival function and a hazard ratio (De Rose & Pallara, 1997).

Basic recursive partitioning involves splitting data according to the value of one explanatory variable in a single step. In the case of the continuous or ordinal variable X, the potential splitting rule takes the form $X \leq c$, where c is a constant. For the categorical variable X, the splitting rule takes the form $X \in \{c_1, \dots, c_k\}$, where $c_1, \dots, c_k$ are the possible values of variable X. The division starts with the root node, which contains all the observations. In this step, all possible binary splitting rules are searched for and verified using a predetermined partitioning criterion. For survival trees, the log-rank test (Klein & Moeschberger, 2006) is commonly used as a partitioning criterion. This criterion assures the best separation of the median survival times over two children of nodes. The best split is the one for which the largest significant test statistic value was obtained (Bou-Hamad et al., 2011).

4. Factors contributing to quitting the first job

In the first stage of the research, we checked which of the demographic and socio-economic characteristics of the respondents and the work-related factors change over time. It turned out that only two characteristics are constant over time: 'gender' and 'macroregion of Poland'. Thus, we used the hazards model containing both time-invariant and time-variant variables (3). For the remaining explanatory variables, the examined period was divided into sub-episodes in which the values of the considered variables were constant for each respondent. Before starting to construct the Cox model, the assumption of hazard proportionality was verified. This assumption was not met for the 'age' variable. Therefore, a time-dependent indicator variable was created for this factor. This variable was constructed using a non-parametric hazard function, with the 30th month of employment chosen as the split point. This point was chosen taking into account the shape of the hazard function. In this way, two variables were created: the first one corresponding to the time interval from the first month to the 30th month of employment, and the second

corresponding to the time interval from the 31st month of employment to the end of the study. Finally, only those factors that had a statistically significant impact on the risk of quitting the first job were included in the model. The results obtained from the generalised Cox model are presented in Tables 2 and 3.

Table 2. Hazard of terminating employment: the results of the Cox model (Type 3 Tests)

Covariate	DF	Wald Chi-Square	*p*-value
Marital status	1	4.3791	0.0364
Age: up to the 30th month of work	1	36.7849	<0.0001
after 30 months of work	1	56.0383	<0.0001
Education level	4	42.0982	<0.0001
Weekly working time	2	13.0962	0.0014
Type of employment contract	1	89.5275	<0.0001
Managerial position	1	9.2081	0.0024
Employer's NACE	4	21.3222	0.0003
Individual professional development plan	2	4.3302	0.1147

Source: authors' work based on Statistics Poland's Labour Force Survey.

Table 3. Hazard of terminating employment: the results of the Cox model

Covariate	Parameter estimate	Standard error	*p*-value	Hazard ratio
Age (ref. 18–25 years)				
26–29 years: up to the 30th month of work	–1.163	0.192	<0.0001	0.312
after 30 months of work	–1.383	0.185	<0.0001	0.251
Marital status (ref. single)				
Married	–0.360	0.172	0.036	0.698
Education level (ref. lower secondary, primary, incomplete primary)				
Higher	0.613	0.202	0.002	1.846
Post-secondary and vocational secondary	–0.133	0.179	0.458	0.876
General secondary	–0.102	0.224	0.651	0.903
Basic vocational	-0.607	0.219	0.006	0.545
Weekly working time (ref. full-time)				
Part-time	–0.324	0.203	0.111	0.723
Overtime	–0.701	0.205	0.001	0.496
Type of employment contract (ref. permanent)				
Fixed-term	1.266	0.134	<0.0001	3.545
Managerial position (ref. no)				
Yes	–0.560	0.184	0.002	0.572
Individual professional development plan (ref. no)				
Yes	–0.108	0.197	0.584	0.898
Others	–0.378	0.184	0.040	0.685

Table 3. Hazard of terminating employment: the results of the Cox model (cont.)

Covariate	Parameter estimate	Standard error	p-value	Hazard ratio
Employer's NACE (ref. wholesale and retail trade; repair of motor vehicles including motorcycles; transportation and storage)				
Manufacturing; electricity, gas, steam, hot water and air conditioning, manufacturing and supply; water supply; sewerage, waste management and remediation activities; construction	–0.610	0.142	<.0001	0.544
Human health and social work activities	–0.600	0.280	0.832	0.942
Education; public administration and defence; compulsory social security	0.035	0.287	0.901	1.036
Others	–0.184	0.156	0.239	0.832

Source: authors' work based on Statistics Poland's Labour Force Survey.

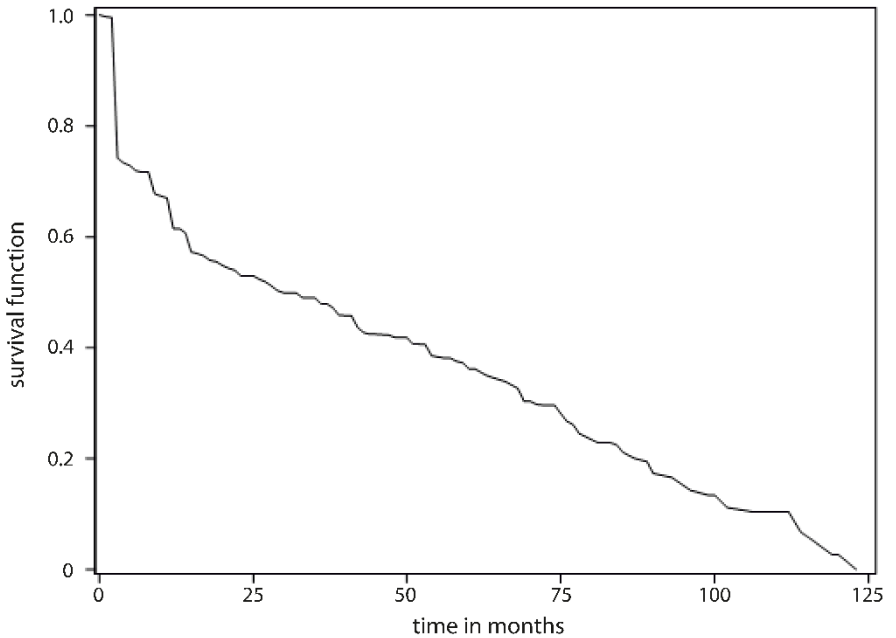
The estimation of the Cox model with time-dependent variables revealed that the risk of leaving the first job decreased with age. People aged 26 to 29 were 68.8% less likely to terminate their first employment contracts in the first 30 months, and 74.9% less likely to do so when the employment relationship lasted longer than 30 months than people aged 18 to 25. Married people were 30.2% less likely to quit their jobs than the unmarried. Furthermore, statistically significant parameter estimates were obtained for some levels of the respondent's education variable. People with higher education were 84.6% more likely, and those with basic vocational education were 45.5% less likely to terminate their job than the least educated people.

The type of employment contract is an especially important work-related factor. Respondents with a fixed-term employment contract were approximately 3.5 times more likely to quit their job than people with a permanent contract. Another important work-related factor was weekly working time. People who reported working overtime were 50.4% less likely to leave their employer than those working full-time (40 hours per week). In addition, people in managerial positions were 42.8% less likely to quit than those in other positions. Having an individual professional development plan proved statistically insignificant. Young people working in industries such as manufacturing, electricity, gas, steam and air conditioning supply, water supply, sewerage and waste management, and remediation activities and construction were 45.5% less likely to terminate their employment contracts than respondents working in industries such as wholesale and retail trade, repair of motor vehicles including motorcycles, and transportation and storage. Differences in relation to the reference category for the other categories of the employer's NACE variable were found to be statistically insignificant. These interpretations remain valid under the ceteris paribus assumption.

In the second part of the study, we determined the survival curve for all respondents using the Kaplan-Meier method (Figure 1). Next, using two survival trees, groups of respondents homogeneous in terms of the duration of their first job were identified. For each of them, a survival curve was estimated. These curves made it possible to assess the probability of continuing employment at each point over time. Moreover, the applied approach allowed the detection of the relations between the examined determinants of the duration of the first employment. In the study, individual characteristics of respondents and work-related factors were considered separately. The results are shown in Figures 2 and 3.

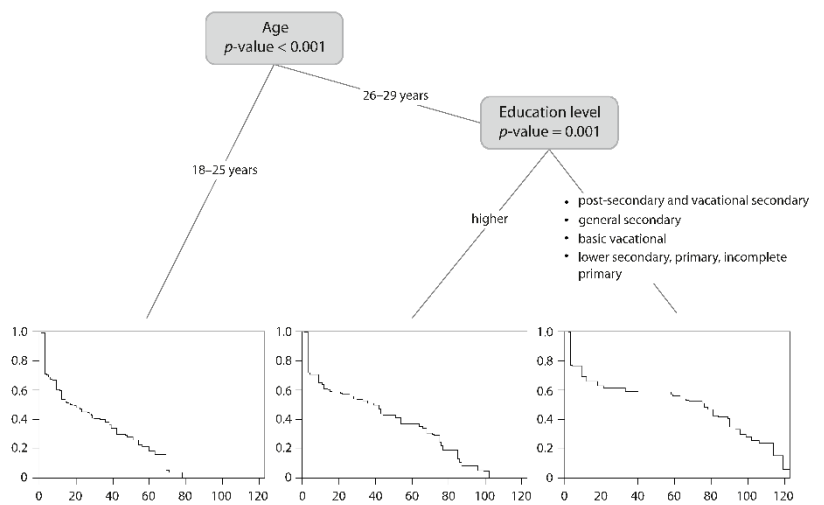
Considering the individual characteristics of the respondents only (Figure 2), it turned out that the key factors influencing the duration of the first job were 'age' and 'education level'. A conclusion could be formed on the basis of the estimated survival curves that the probability of staying in the first employment throughout the studied period decreased more quickly in the case of respondents aged 18 to 25 than in the case of those aged 26 to 29. Moreover, this probability decreased more quickly in relation to people aged 26 to 29 with higher education than in the case of respondents aged 26 to 29 with education level lower than tertiary. Regarding people aged 18 to 25, the probability of staying in the same job decreased very quickly during the first year of employment, and was about 0.6 afterwards. After two years, the probability of remaining in the same organisation was approximately 0.4. For people aged 26 to 29 with the education level lower than tertiary, the probability of not terminating their first employment also decreased rapidly during the first year of employment. However, in their case, the probability of staying in their first job between the second and fifth year of employment remained at a similar level, i.e. at around 0.6. For people aged 26 to 29 with tertiary education, the probability of remaining in the same organisation decreased at a similar rate throughout the whole studied period.

Figure 1. Survival curve plotted by using the Kaplan-Meier method



Source: authors' work based on Statistics Poland's Labour Force Survey.

Figure 2. Survival tree for individual characteristics of young employees in Poland

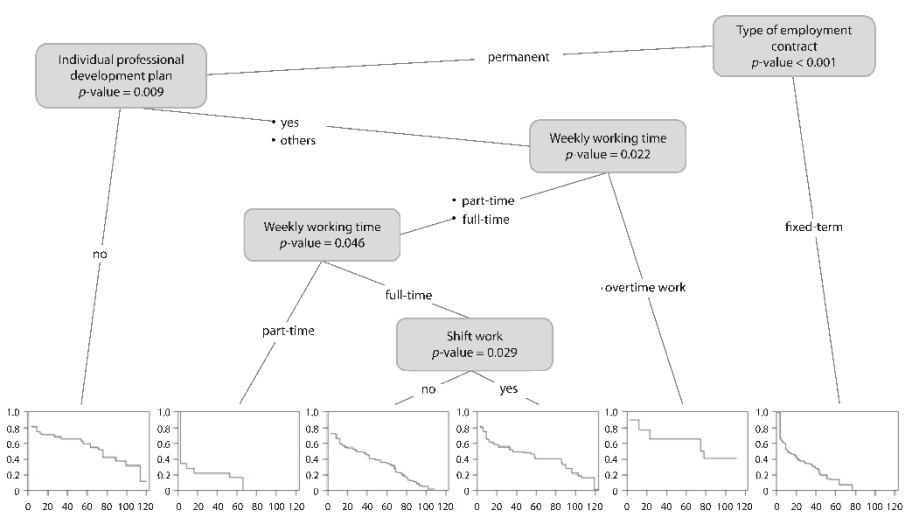


Note. *x* axis – time in months, *y* axis – survival function.
Source: authors' work based on Statistics Poland's Labour Force Survey.

Using the survival tree analysis and the work-related factors, six subgroups of respondents statistically significantly different in terms of survival functions were identified (Figure 3). It was found that the key factor influencing the termination of the first job was 'type of employment contract'. The survival function for respondents with a fixed-term contract decreased very quickly in the first year of employment; the probability of employment termination after one year reached 0.5. For people with a permanent contract, the second significant work-related factor was an individual professional development plan. Interestingly, for those who did not have such a plan, the probability of quitting decreased very slowly compared to other groups of respondents.

Outside the group of respondents who worked overtime weekly, the probability of quitting did not drop below 0.4, which may stem from two reasons. Firstly, the sample size of this group was not substantial. Additionally, workers who did overtime tended to change employment relatively often. For other respondents, weekly working time proved to be the key factor. For respondents who worked full-time, it was important whether they worked in shifts. Working in such a system resulted in a lower probability of quitting within the studied period than in the case of working according to a fixed schedule. The study used SAS software and R language.

Figure 3. Survival tree for work-related factors



Note. As in Figure 2.
Source: authors' work based on Statistics Poland's Labour Force Survey.

5. Discussion

Demographic changes result in a decrease in labour supply (Lewandowski & Magda, 2018). This paper focuses on young workers and their first job. Preliminary data analysis confirmed our assumptions about the high volatility of most of the individual characteristics of young people as well as work-related factors over time. In addition, some variables appeared to be time-dependent.

In the Introduction, we formulated four research questions:

1. Which characteristics of young employees influence the risk that they would leave their first job?
2. Which work-related factors influence the risk that they would leave their first job?
3. What is the profile of a young employee who is not very likely to leave his or her employer?
4. Which work-related factors can keep young workers in the organisation for longer, and which push them away?

For the first and second research questions, we used a time-dependent Cox model to identify risk factors for the termination of the first job. For the third and fourth, we identified groups of employees homogeneous in terms of the time they spent in their first job. These groups were identified using survival trees. Additionally, the survival curves were drawn for each group, which enabled the assessment of changes over time in the probability of staying with the same employer.

On the basis of the results obtained by means of the time-dependent Cox model, it can be concluded that for the surveyed respondents, the probability of terminating their first job decreased with age. This outcome is consistent with previous research on young people in Belgium, which showed a positive correlation between the age of workers and the duration of the employment relationship (Steenackers & Guerry, 2016). In addition, we found that married people were less likely to quit their jobs than other people. Our results also comply with previous studies for men in Canada (Ignaczak et al., 2022) and women in Poland (Grzenda, 2019). Therefore, it can be assumed that young people, after getting married, seek job stability to ensure financial security and adequate conditions for expanding their family. Moreover, in the case of young pregnant women, such results may be the consequence of the labour market regulations in Poland.

Ignaczak et al. (2022) indicated that the effect of education on the probability of quitting the first job differed between genders. Our study does not confirm such differences. We found that people with higher education had a greater tendency to leave their first job than the least educated people. The result obtained for Poland might be affected by the fact that people with higher education at the initial stage of their professional career change jobs more often in search of a job that is consistent

with their education, interests, and qualifications or closer to their financial expectations. According to AbouAssi et al. (2021), millennials are perceived as employees who are driven by a higher pay and who feel dissatisfied with their jobs relatively quickly, as a consequence of which they are prone to leave their jobs.

The second group of determinants of the probability of quitting that we considered were work-related factors. As we expected, in this group of factors, the type of employment contract had the greatest impact on the risk of terminating a job. Young people with fixed-term contracts were over three times more likely to quit their jobs than those with permanent contracts. There are several potential reasons for this. On the one hand, it might be due to the type of contract; some of them expire without the possibility of renewal (e.g. internship contracts, apprenticeships) or are not renewed due to other reasons. Among the latter, there is the young employee's decision made due to his or her dissatisfaction with the working conditions offered by the employer, the effect of the employee's insufficient skills required for his or her position, or the lack of suitable commitment on their part. The discontinuation of the contract may also result from reasons within the employer's responsibility (e.g. the company's economic situation, caused, for instance, by the recent COVID-19 pandemic).

As reported by Portugal and Varejão (2022), fixed-term contracts are often used by employers as a form of verification of the skills and the commitment of applicants for given positions, which in the case of the positive assessment of the employee are then changed into permanent contracts. An interesting result was obtained for the 'weekly working time' variable. The study showed that those who worked overtime were less likely to terminate their job than those working full-time without overtime. This may be due to young people's determination to retain their position, their drive for quick promotion, or having a job they are passionate about. A similar conclusion was reached by Musinszki et al. (2020) for Generation Y and Z in Hungary and Romania. In their study, it was found that young people work overtime because of fear of losing their job or because overtime is paid, which in effect is treated as additional earnings. Based on the results of our research, people in managerial positions were less likely to terminate their first job.

To answer the third and fourth questions, individual characteristics of respondents and work-related factors were analysed separately using survival trees. The results are consistent with the outcome of the time-dependent Cox model. In the case of individual respondent characteristics, the survival curves indicate a faster decline in the probability that people aged 18 to 25 would remain in their first job than in the case of other respondents throughout the study period. Moreover, people aged 26 to 29 with tertiary education were more likely to quit their first jobs over the analysed period than less-educated people in the same age group.

As regards work-related factors, it was found that throughout the study period, those with a permanent contract, an individual professional development plan and not working full-time, were less likely to stay with their first employer than those with a fixed-term contract. This result is consistent with the findings of Steenackers and Guerry (2016), who showed a link between part-time work and a higher likelihood of quitting. In contrast, people with a permanent contract and without an individual professional development plan were the most likely to remain with their first employer. This surprising result concerning an individual professional development plan may be related to the size of the organisation in which someone is employed, i.e. such plans are most often created by human resources departments of larger organisations, while missing in small companies. Furthermore, based on the shape of the majority of the estimated survival curves, it can be inferred that the minimum period of employment (365 days in Poland) needed to obtain unemployment benefits has a strong impact on the probability of terminating the first employment contract. This thesis is supported by a study by Immervoll and Knotz (2018).

Importantly, for some respondents, their first professional experience coincided with the COVID-19 pandemic. Its adverse effects predominantly affected individuals under 24 years of age (GUS, 2021), which was also reflected in the results of our research. Moreover, the pandemic impacted the economic activity of women and men in a different way. Comparing 2020 to 2019, greater discrepancies in the economic activity were observed in individual quarters among women than among men. This could be attributed to constraints on access to childcare facilities and remote learning (GUS, 2021). Our study did not show differences in the duration of employment based on gender. This may be due to the age of the respondents, as well as their other individual characteristics.

6. Conclusions

Our paper identifies the individual characteristics of young workers and work-related factors that affect the time spent in their first job. Most of the studies conducted so far have shown clear differences in the duration of employment according to gender. Our research indicates changes taking place in this area. We found that gender is not a factor that currently affects the time spent by young people in Poland in their first job. We found that the probability of quitting the first job decreases with the age of the respondent, but also depends on the level of education. Moreover, offering young workers an indefinite-term first contract makes them stay in the job for longer. However, even with such a contract, in the case of part-time work, the probability of quitting is higher than in the case of fixed-term contracts.

Results of our research may be helpful in defining the profile of an applicant who is more likely to continue in a job, and may also help companies provide working conditions that would encourage employees to stay with the same employer.

Our study had some limitations, i.e. it was not possible to use weights while constructing survival trees. There is such a possibility, however, in the case of a semiparametric model, which was one of the research tools used in this work. The results presented in this article may constitute the basis for future research on the employer-switching behaviour of young people. Assessing the probability of quitting the first job, but also the frequency of job changes, could help researchers and employers gain a deeper understanding of the labour market behaviour of young people in Poland.

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