Patterns of Labour Market Entry of Higher Education Graduates in Poland in the COVID-19 Times

Marek Bożykowski (University of Warsaw, National Data Processing Institute)
Mikołaj Jasiński (University of Warsaw, National Data Processing Institute)
Agnieszka Chłoń-Domińczak (SGH Warsaw School of Economics, National Data Processing Institute)

Abstract

We analyse the career paths of higher education graduates in Poland before and during the COVID-19 pandemic. We assess, to what extent the labour market consequences related to stringency measures introduced in Poland during the COVID-19 pandemic affected the labour market entry of HE graduates. We use the data from the Polish Higher Education Graduate Tracer Survey (ELA), a population-based system based on registry data. We assume that the higher education graduates are equipped with capital that make them resilient to the economic shock of the COVID-19 pandemic. There are some groups of graduates that perform better on poorer. Our results show that for the entire population of graduates, the distributions of economic status are similar in the pandemic period for the 2018 cohort and its counterpart for the 2016 cohort. We assign the graduates populations into ten clusters. Then, we estimated a multinomial regression model separately for the two cohorts. Our results indicate that the labour market entry mechanism for higher education graduates in Poland was not modified by the COVID-19 pandemic. In the qualitative perspective we observe the same labour market entry patterns and apparent impact of Covid-19 is related on their sequences of labour market entry.

Introduction

In this paper, we analyse the career paths of higher education graduates in Poland before and during the COVID-19 pandemic. We aim to assess, to what extent the labour market consequences related to stringency measures introduced in Poland during the COVID-19 pandemic affected the labour market entry of higher education graduates. We use the data from the Polish Higher Education Graduate Tracer Survey (ELA), that is a population-based system, that uses the registry data.

The outburst of the COVID-19 pandemic and introduction of stringency measures, including labour market policies can be understood as an economic 'shock event' (Akkermans et al., 2020) which destabilises career pathways and forces individuals to reappraise their place in the labour market and how they may carve out sustainable career outcomes. As highlighted by (Tomlinson et al., 2023) it is more useful to look at graduate outomes as unfolding event that entails prior processes of acquisition, on-going processes of performance and activity, and future processes of development and sustainability. They also underline that the pandemic labour market represents a significant challenge for graduates, as they are transiting into it during a challenging economic period. The UK graduates, in the qualitative part of their study highlighted that pandemic has had a detrimental impact on graduate employment prospects, as there are declining opportunities through a fall in vacancies and job openings. (Martin & Okolo, 2022) show that in the UK, the final quarter of 2020 saw a movement of graduates out of non-employment into low productivity occupations. The employment transition of higher education graduates is preceded by their earlier behaviour. (Aucejo et al., 2020) findings on academic outcomes indicate that COVID-19 has led to a large number of students delaying graduation (13%), withdrawing from classes (11%), and intending to change majors (12%). Moreover, approximately 50% of the sample separately reported a decrease in study hours and in their academic performance.

The issue of employability of graduates during the shocks, such as pandemic is complex. (Nghia et al, 2020) underline that employability is a complex interaction between broader structural influences and individuals' own agency in making sense and mediating these changes. It is ultimately bound up in context and wider conditions of the labour market, society, educational structures, and influences in individuals' own live.

Literature findings show that on the one hand graduates can have capital and skills that can make them resilient to the shocks. Graduates have specific skills related to their subject type (for example, engineering, accountancy, psychology), as well as more general transferrable skills (writing, communication, critical thinking). Because of these skills, graduates may have greater resilience during times of economic crisis, although the evidence is mixed. Moreover, graduates are more occupationally and geographically mobile, a factor that may support their employment in times of crisis.

On the other hand, the economic shocks can have negative impact on career paths, that can lead to employment scarring. (Nghia et al, 2020) argue that employment scarring can further damage the way individuals think about their job futures and this can become a self-fulfilling prophecy, including presenting oneself less favourably to employers. This may be self-reinforcing if employers interpret a period of unemployment or under-employment as signals of weaker employability potential. (Tomlinson et al., 2023) underline that initial scarring during the initial labour market entry phase not only in the forms of depletion in human capital and skills utilisation but also more social and psychological effects. These centred feelings of lowered confidence, reduced morale, career efficacy, fears of being less attractive to employers.

Given the existing literature evidence, we investigate, if the COVID-19 pandemic modified the pre-pandemic patterns of labour market entry of higher education graduates in Poland.

Research questions and hypotheses

Our main research hypothesis is that the skills and human capital of higher education graduates make them resilient with regards to the patterns of the labour market entry, also during the shock related to the COVID-19 pandemic.

In order to investigate this hypothesis we ask the following research questions:

1. What are the constant features of the labour market entry pathways of higher edcuation graduates?
2. Which characteristics determine the different labour market entry sequences after graduation?
3. What was the significance of the Cvido-19 pandemic for labour market entry sequences?
4. Which labour market entry sequences are associated with the smallest/greatest gender pay gap and did it change for graduates entering labour market during the pandemic?

Data sources

The analysis was conducted on the basis of an individual dataset from the 7th edition of the Polish Graduate Tracking System (pol. ELA). The ELA system is register-based, and it combines data from two sources. The first one is POL-on – an IT system that collects science and higher education data in Poland. It provides information on the full higher educational histories of individuals. The second source are the resources of ZUS – the Social Insurance Institution – which contains among others information on labour market activities.

Based on these data sources, two individual analytical datasets have been constructed. The first one contains information on the entire population of the second- and long-cycle 2016 graduates in Poland (n=162 230), and the second one – on the entire population of the second- and long-cycle 2018 graduates (n=147 555). Both datasets cover the period of three calendar years after the year of graduation. It means that the first dataset (2016) describes the period before the COVID-19 pandemic (2017-2019), while the second dataset includes also the pandemic period (2019-2021). The datasets cover entire populations of graduates.

On the basis of higher education activities and monthly social insurance contributions, we calculated the labour market status and earnings of each graduate in the set in each month covered by the research. Two additional sources have been used to provide more information on the features of places of residence of the graduates. The first one was Statistics Poland which provided economic characteristics of *powiats* (counties) in Poland. The second source was the e-Health Centre, which provided two epidemiological characteristics of *powiats*: the number of COVID-19-related deaths in *powiats*, and the number of COVID-19 vaccinations in *powiats*.

The method

As we mentioned in the introduction, the paper's main goal is to reconstruct and compare Polish graduates' labour market entry paths before and during the COVID-19 pandemic. Particularly, we will show if the COVID-19 pandemic influenced the early career patterns of graduates. To achieve that we use the quasi-experimental analytical model: for both populations, we use the same set of independent variables to predict the type of labour market entry pattern of a graduate. This approach allows us to compare the contributions of the regional epidemiological features to the predictions of the labour market entry paths within the cohort not affected by the COVID-19 pandemic (2016) and the cohort of graduates who faced the pandemic consequences (2018).

Thanks to the fact, that we have analysed the entire population of graduates, all results are – by definition – statistically significant on any significance level.

We are going to present the construction of the analytical model step by step. For each graduate of each cohort, we assigned the vector of 36 labour market statuses – one for each month in the three-year period. There were 10 possible statuses (in brackets we present the abbreviations of statuses used in charts below): childcare (C), childcare while working (C_W), civil law contract (CLC), employment contract (E), having an employment contract and a civil law contract at the same time (E_CLC), in higher education (HE), in higher education while working (HE_W), inactive/unknown (I), self-employment (SE), unemployment (U). We identify being in higher education status with the POL-on data, and the rest based on the social insurance contributions (ZUS data).

For each cohort separately we calculate a matrix of distances between the aforementioned vectors of every individual graduate. We use the optimal matching with equal weights method to calculate those distances. For each cohort, a set of 10 clusters of those vectors has been revealed based on the distance matrices by the hierarchical cluster analysis method. Each cluster can be interpreted as a pattern of labour market entry. We will present, compare, and interpret both sets of clusters in the next section.

We needed to indicate which features of graduates, their study programmes, and their place of residence drive graduates towards particular clusters. The multinomial logistic regression model has been calculated for each cohort. The dependent variable was the assignment to a cluster. The set of independent variables includes:

Variables regarding individual features of graduates

- sex (female/male; reference category: male)
- being a foreigner (dummy variable)
- pre-graduation job (employment contract or self-employment) experience (job experience before enrolment/ job experience only during studies/ no job experience before graduation; reference category: job experience before enrolment)

Variables regarding study programmes they graduated from

- form of studies (part-time/full-time; reference category: part-time)
- area of study (humanities/ medical and health sciences/ natural sciences/ agricultural sciences/ social sciences/ exact sciences/ technical sciences/ arts; reference category: humanities)

Variables regarding the place of residence of graduates

- size of place of residence (big city – over 500,000 citizens/ medium city – smaller than 500,000 but the city is a separate county/ small town or village; reference category: small town or village)
- local unemployment rate (in the powiat of residence)
- COVID-19-related deaths in the powiat per 1,000 people
- COVID-19 vaccinations in the powiat per 1,000 people

The last two variables in the set (variables related to the COVID-19 pandemic) were used also in the model for 2016 graduates. Although the 2016 graduates did not face the COVID-19 pandemic in the three-year period after graduation, and it could not affect their labour market entry, we still use the future features of their places of residence as a comparison point in our analyses. This way these variables have been used as the base for quasi-experimental analysis and allowed us to answer the question of whether the COVID-19 pandemic influenced labour market entry mechanisms among graduates in Poland.

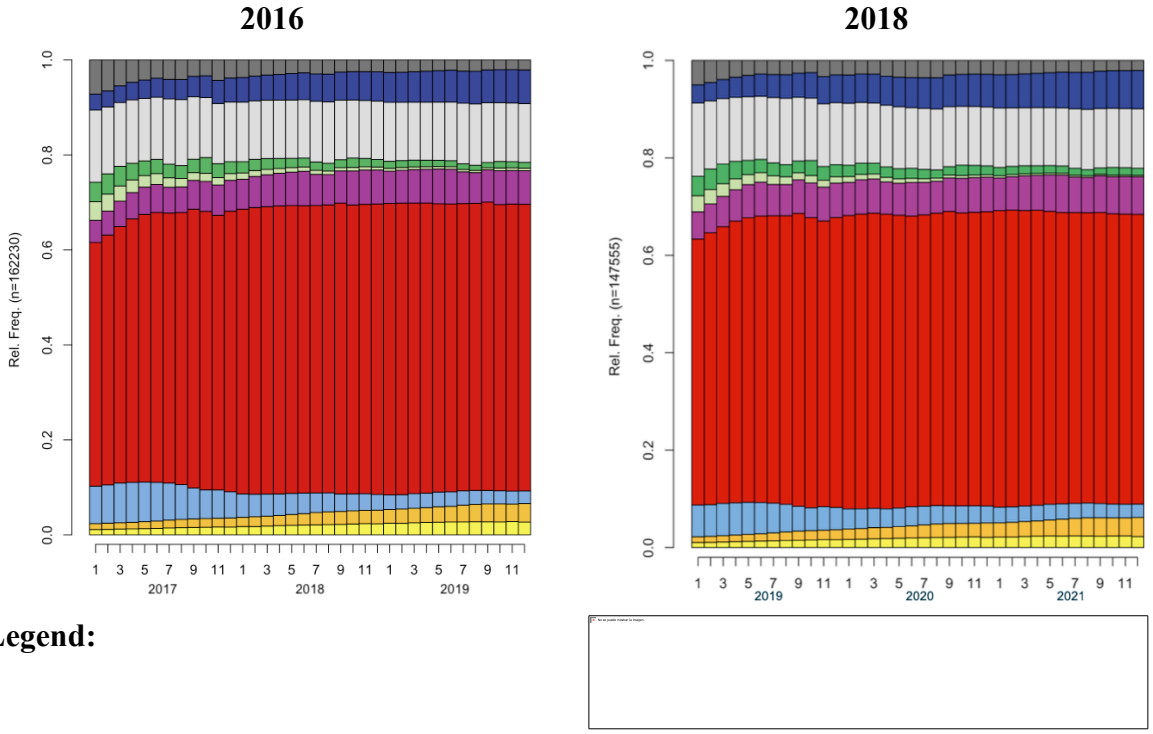
The results

In this section, we will present the results. We start with the overview of the dynamics of labour market statuses of 2016 and 2018 graduates separately in three-year periods following the years of graduation. We will compare the distributions of the labour market positions in these cohorts in each month of those periods. Next, we will describe and compare two sets of the labour market statuses' clusters revealed from both cohorts. The second part of the section will be the presentation of the results of multinomial regression models of the 2016 and 2018 cohorts. At the end of this section, we will discuss the results.

The overview of labour market entry dynamics

The charts below present the distributions of the labour market statuses of the 2016 and 2018 graduates in 36 consecutive months. As you can see, the distributions are similar, and almost identical in the periods crucial for our analysis: the pandemic period for the 2018 cohort (03.2020 – 12.2021) and its counterpart for the 2016 cohort (03.2018 – 12.2019).

Figure 1. Dynamics of the labour market status distributions in the entire 2016 and 2018 cohorts



We have compared all percentages of particular statuses for both cohorts. Bigger differences (absolute value of the difference) were observed at the beginning of the analysed periods: 3,31pp of the percentage of graduates with an employment contract in the first month was the biggest difference between the cohorts in the entire period. In the pandemic period and its counterpart, the biggest one was only 0,96pp (percentage of people with an employment contract in the 33rd month). The average difference in the entire period was 0,43pp, while in the pandemic period and its counterpart – 0,29pp. As a conclusion, we have shown that the COVID-19 pandemic didn't cause any serious harm to the overall labour market entry pattern of graduates in Poland.

We have also compared some basic measures for those two cohorts. The average earnings of the 2016 graduates were lower (3814,40 PLN, i.e. 895,04 EUR) than those of the 2018

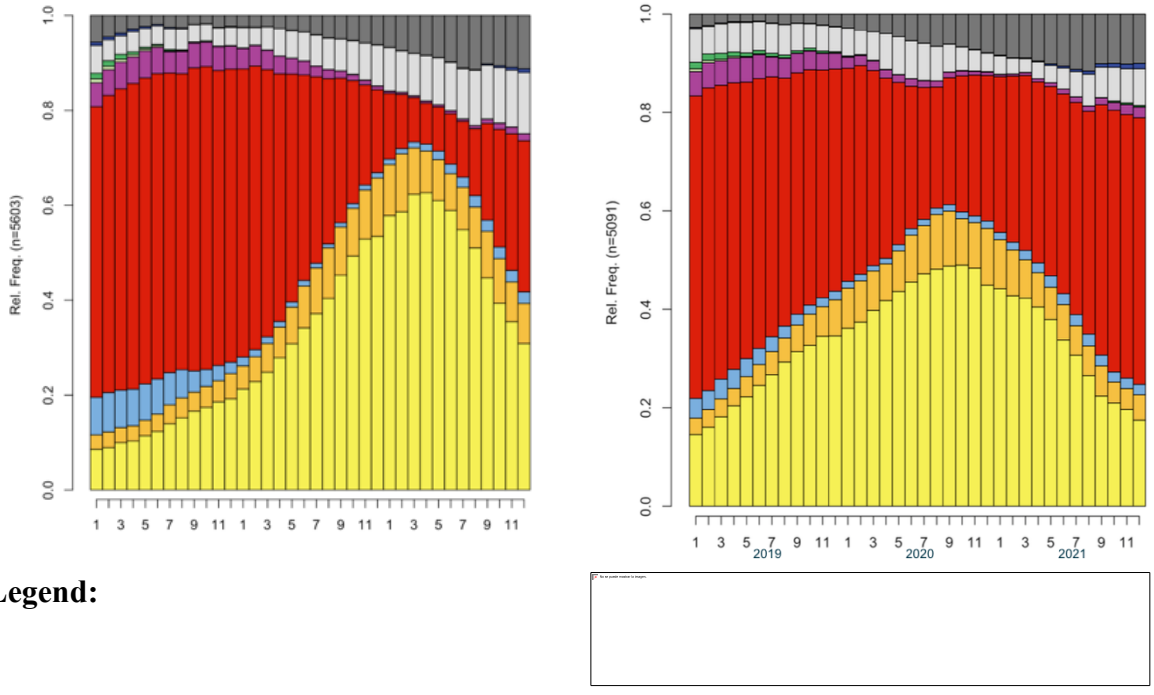
graduates (4474,64 PLN, i.e. 969,63 EUR). We should take into consideration that the average earnings in Poland have also increased from 4848,09 PLN (1137,59 EUR) in the period analysed for the 2016 cohort to 5568,66 PLN (1206,70 EUR) in the period analysed for the 2018 cohort. It means, that the increase in graduates' earnings level was just marginally higher than in the general economy in Poland.

The feminisation rate was almost identical (68% of women in the 2016 cohort vs 67% in the 2018 cohort). The level of the gender pay gap among graduates has slightly decreased (from 26,8% in the 2016 cohort to 25,2% in the 2018 cohort).

Our next step is to look deeper into classifications of typical labour market paths of graduates of different cohorts. As we mentioned in the previous section, we have revealed 10 clusters for each cohort independently. Each of those clusters consists of a set of similar labour market status vectors, therefore it reflects a separate entry pattern of graduates. We observed that each of those clusters in one of the cohorts has its obvious counterpart among the clusters revealed from the other cohort. We present those pairs of clusters in the figures below and interpret them. For each pair of charts representing a specific cluster, the labour market entry patterns are almost identical, as they show the same key experience defining those groups in both cohorts.

Figure 2. Dynamics of the labour market status distributions in cluster 1: Parenthood.

2016 **2018**



The charts above present the dynamics of statuses in the first cluster. The most characteristic feature of this cluster is the domination of childcare leave. Moreover, this status replaces the employment contracts and is later replaced back by them. A similar share of graduates of both cohorts belongs to this cluster (respectively, 3,6% and 3,4%).

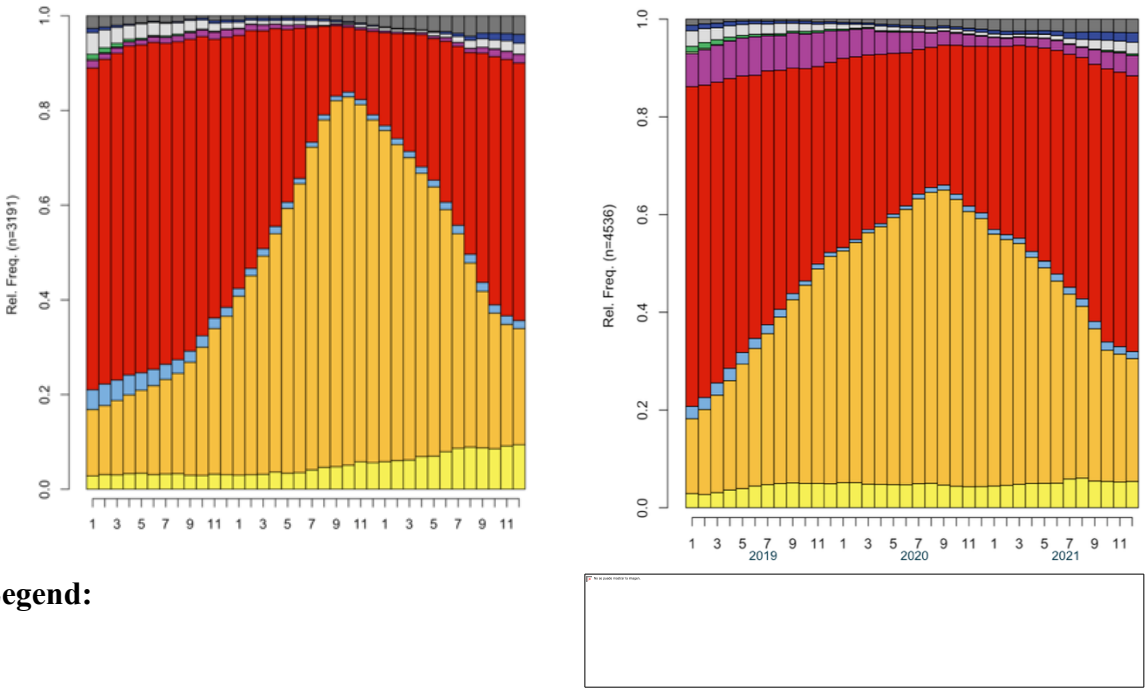
The average earnings in this cluster were 2343,47 PLN (549,89 EUR) for the 2016 cohort and 2786,56 PLN (603,83 EUR) for the 2018 cohort.

In that cluster, the feminisation rate was almost 100% for both cohorts (99,9% of women in the 2016 cohort and 99,8% in the 2018 cohort). It is the consequence of the fact, that women in

Poland take childcare leave more often and for longer periods than men. For this reason, we are not presenting the gender pay gap for that cluster.

Figure 3. Dynamics of the labour market status distributions in cluster 2: Working parenthood.

2016 **2018**



Legend:

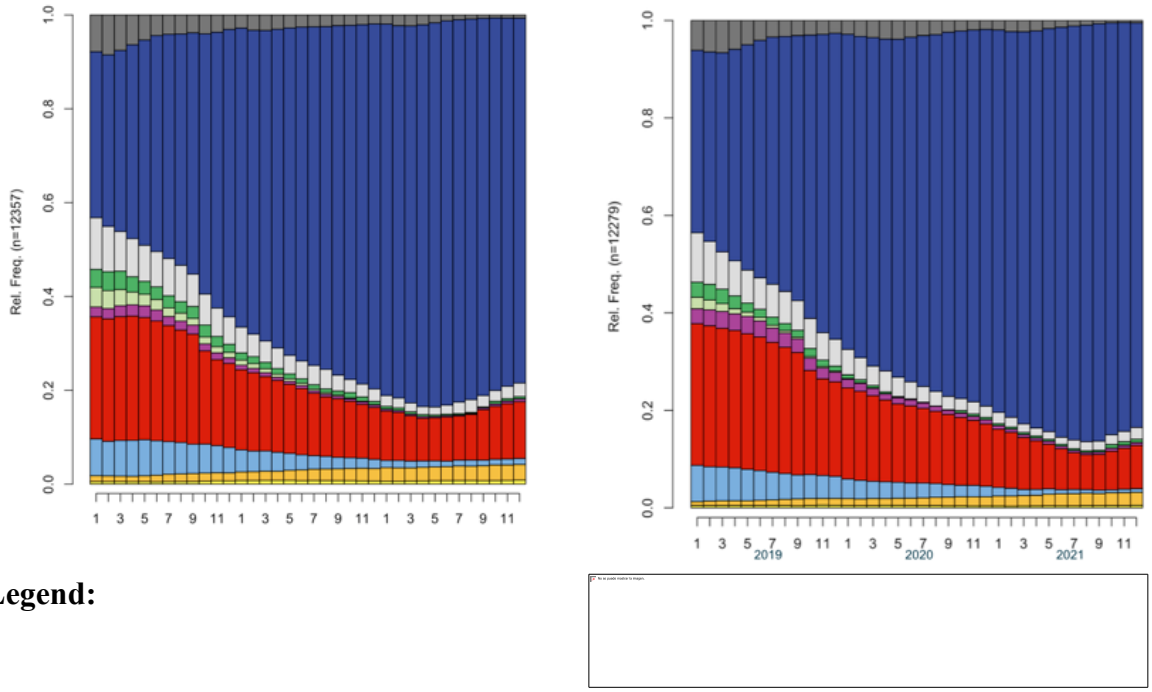
The second cluster is very similar to the first one. The main experience in this cluster is also a childcare leave but this time connected with working, and also interchangeable with employment contract. Shares of graduates of both cohorts belonging to this cluster are also small and similar (respectively, 2,0% and 3,1%).

The average earnings in that cluster were 2520,26 PLN (591,37 EUR) for the 2016 cohort and 2947,20 PLN (638,64 EUR) for the 2018 cohort.

The feminisation rate was similarly high as for the first cluster (99,7% of women in the 2016 cohort and 99,8% in the 2018 cohort). Therefore, we are not presenting the gender pay gap for that cluster either.

Figure 4. Dynamics of the labour market status distributions in cluster 3: Expanding self-employment.

2016 **2018**



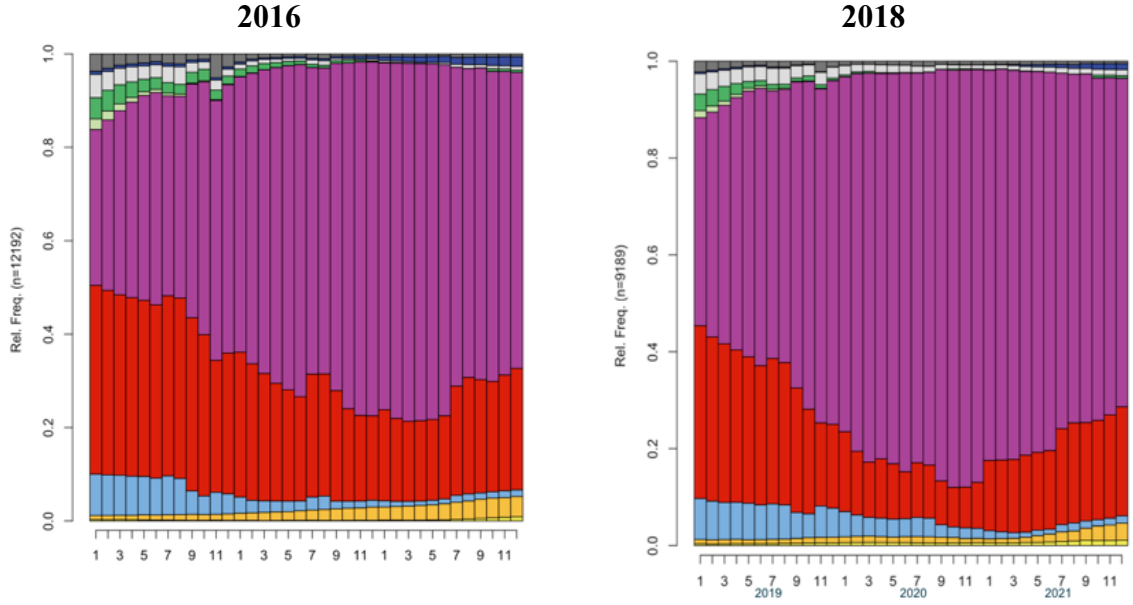
Legend:

The third cluster illustrates the growing share of self-employed graduates. On the general level, self-employment is not a common activity among Polish graduates but is the main status in this cluster. Shares of graduates of both cohorts belonging to this cluster are similar (respectively, 7,9% and 8,3%).

The average earnings in that cluster were 3155,63 PLN (740,46 EUR) for the 2016 cohort and 4057,51 PLN (879,24 EUR) for the 2018 cohort.

This cluster has the lowest feminisation rate for both cohorts (respectively, 50,0% and 48,9%). The gender pay gap for this cluster was the highest one (respectively, 38,4% and 38,3%.

Figure 5. Dynamics of the labour market status distributions in cluster 4: Multiple contracts.



Legend:

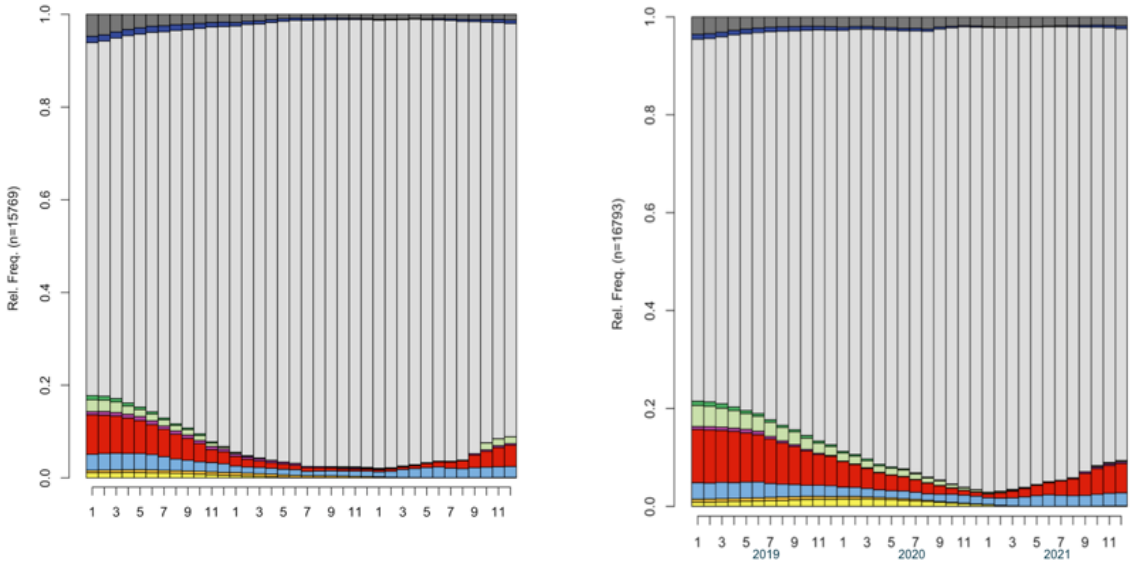
The charts above represent the groups of the busiest graduates. Almost all of them are working with an employment contract, and most of them are supplementing it with civil law contracts. Therefore, it is no surprise that the members of this cluster have the highest earnings among graduates: 4318,32 PLN (1013,29 EUR) for the 2016 cohort and 5272,85 PLN (1142,60 EUR) for the 2018 cohort.

Shares of graduates of both cohorts belonging to this cluster are, respectively, 7,8% and 6,2%.

The feminisation rate in this cluster was almost identical for both cohorts (respectively, 70,8% and 70,7%). The gender pay gap for this cluster was moderate (respectively, 14,4% and 9,6%).

Figure 6. Dynamics of the labour market status distributions in cluster 5: Long-term inactivity.

2016 **2018**



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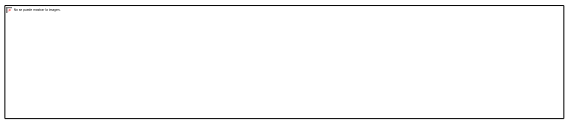


The fifth cluster consists of people who weren't leaving any trace of activity in registers used in the research for most of the time. This may mean that they were inactive on the labour market in these periods or that they were in activities unregistered in the Social Insurance Institution (working abroad, some types of short-term contracts, being professional farmers, and working without a legal contract).

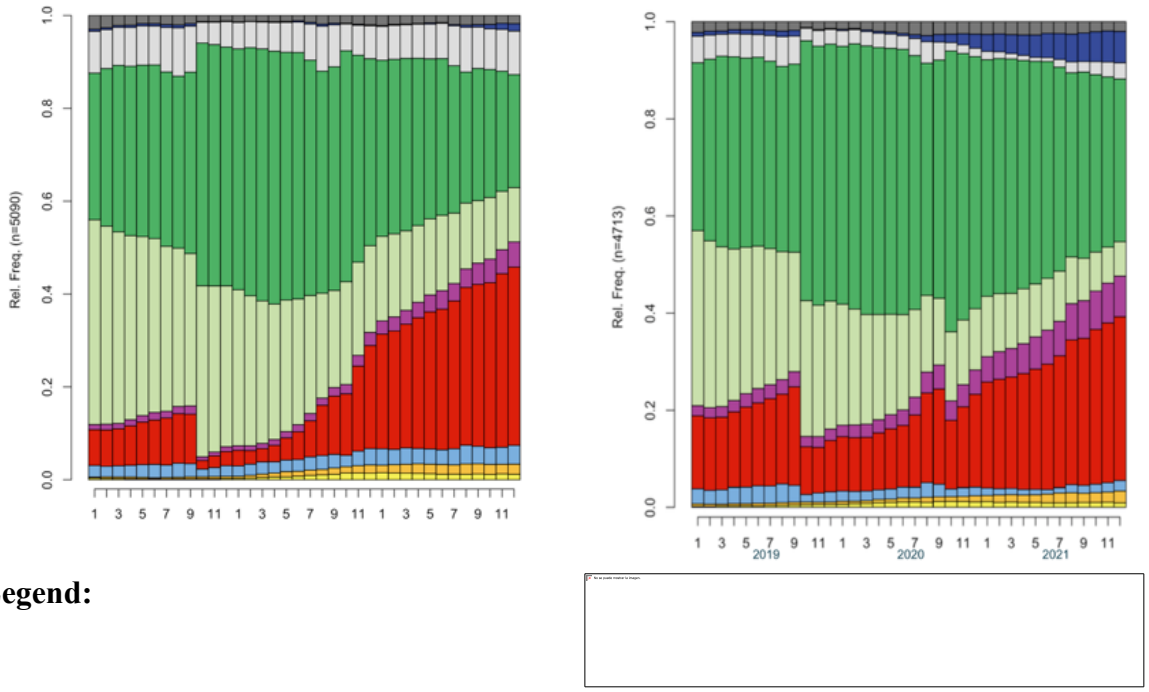
This labour market entry pattern was characteristic of a higher percentage of graduates entering the labour market during the COVID-19 pandemic (11,4% of the 2018 cohort) than before it (6,6% of the 2016 cohort).

The earnings in this cluster were possible to calculate because of the job activity of a small percentage of those people who at some point in these periods had a job. The average earnings in the fifth cluster were 1815,33 PLN (425,96 EUR) for the 2016 cohort and 2421,55 PLN (524,74 EUR) for the 2018 cohort.

The feminisation rate for this cluster was almost identical for both cohorts (respectively, 70,1% and 70,0%). The gender pay gap for this cluster was unstable due to the small percentage of people working in analysed groups. It was -6,3% (the minus means that women earned more) for the 2016 cohort and 20,7% for the 2018 cohort.

Figure 7. Dynamics of the labour market status distributions in cluster 6: Further education.

2016 **2018**



Legend:

The main activity for graduates in the cluster illustrated above is their further education after getting the Master's degree, either while working (dark green) or while not (light green). The sudden changes in both charts can be observed in October when the academic year begins. The sharp increase in academic activity of graduates is accompanied by a decrease in their other labour market statuses.

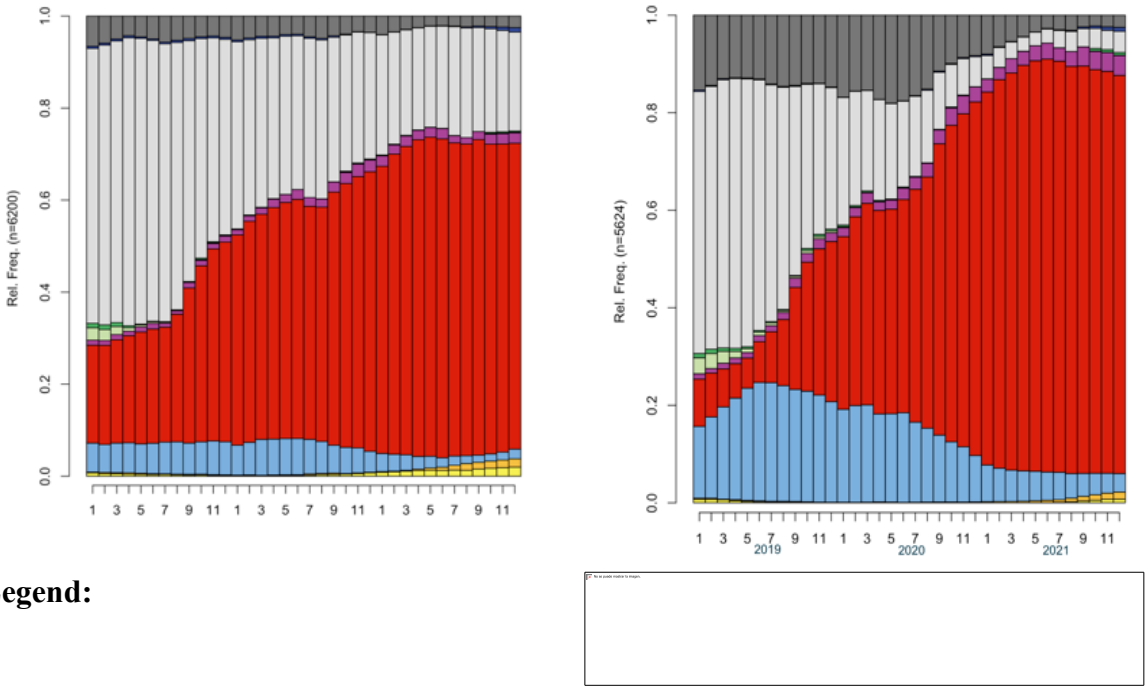
Shares of graduates of both cohorts belonging to this cluster are similar, respectively, 3,0% and 3,2%.

The average earnings in this cluster were 3656,09 PLN (857,89 EUR) for the 2016 cohort and 4391,78 PLN (951,67 EUR) for the 2018 cohort.

The feminisation rate for this cluster was similar for both cohorts (respectively, 68,2% and 66,1%). The gender pay gap in this cluster was also similar for both cohorts: respectively, 19,1% and 21,3%.

Figure 8. Dynamics of the labour market status distributions in cluster 7: Delayed employment contract.

2016 **2018**



Legend:

The seventh cluster presents a path from a poor labour market position to a stable employment contract. For the 2016 cohort, an employment contract replaces mostly inactivity on the labour market, while for the 2018 cohort, it replaces a mix of inactivity, unemployment, and civil law contracts.

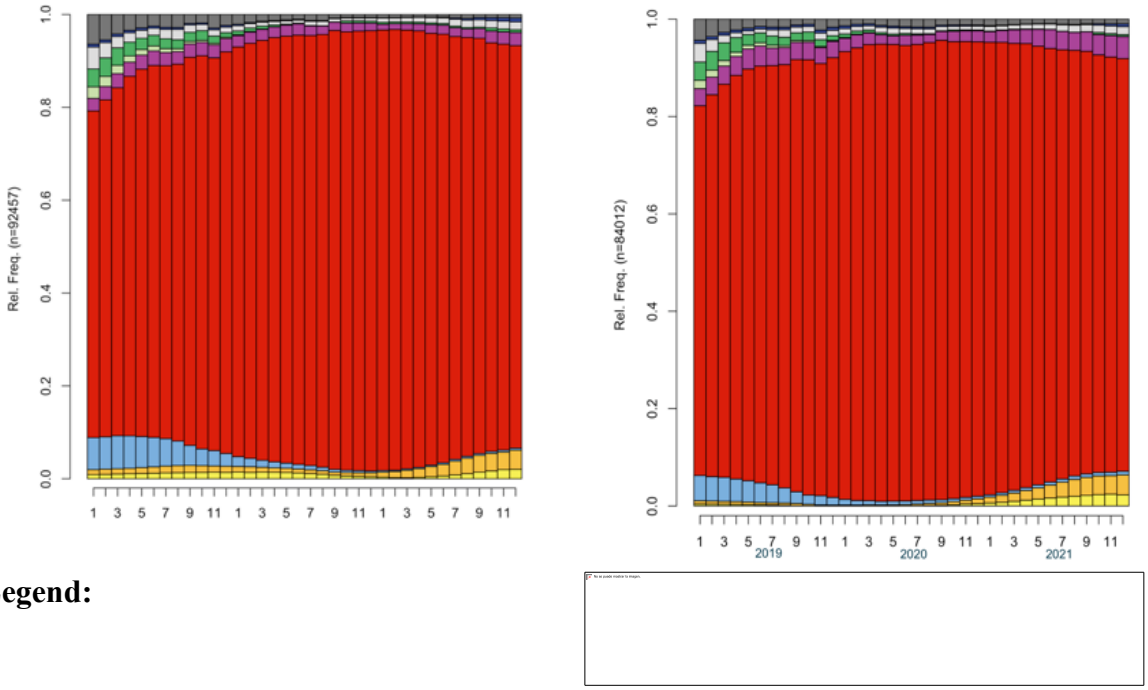
Shares of graduates of both cohorts belonging to this cluster are also similar, respectively, 4,0% and 3,8%.

The average earnings in this cluster were 2915,64 PLN (684,15 EUR) for the 2016 cohort and 2939,83 PLN (637,04 EUR) for the 2018 cohort.

The feminisation rate for this cluster was also similar for both cohorts (respectively, 67,3% and 68,9%). The gender pay gap in this cluster was higher for the 2016 cohort (20,9%) than for the 2018 cohort (14,9%).

Figure 9. Dynamics of the labour market status distributions in cluster 8: Stable employment.

2016 **2018**



Legend:

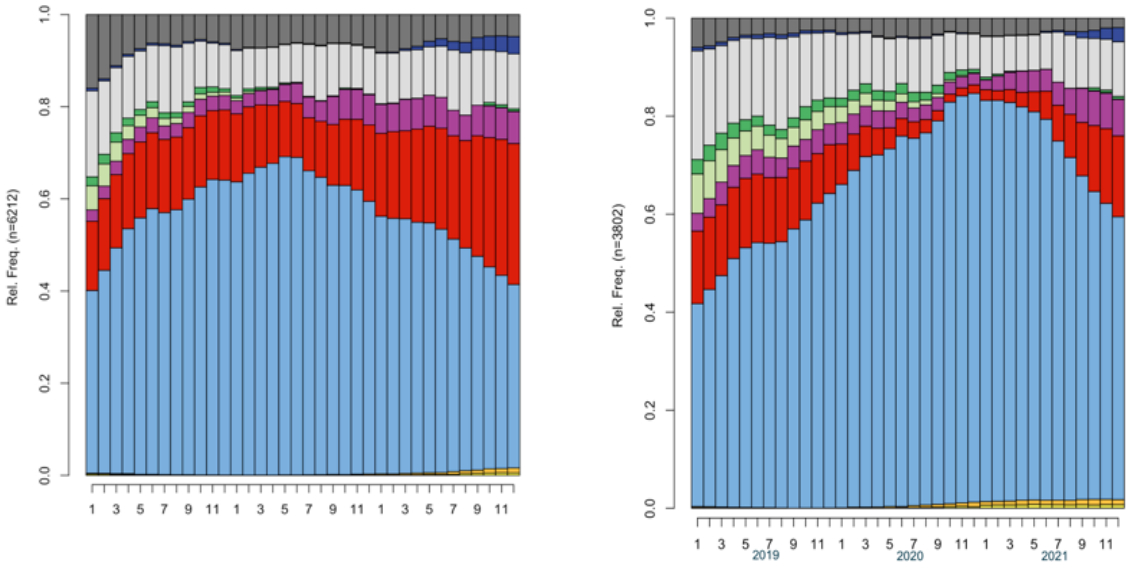
The charts above present the cluster with the most graduates. Almost three out of five graduates (59,1% of the 2016 cohort and 56,9% of the 2018 cohort) belong to the eighth cluster. The typical activity in the cluster is the employment contract.

The average earnings in this cluster were relatively high: 4061,23 PLN (952,96 EUR) for the 2016 cohort and 4761,29 PLN (1031,74 EUR) for the 2018 cohort.

The feminisation rate for this cluster was almost identical for both cohorts (respectively, 65,9% and 65,6%). The gender pay gap in this cluster was slightly higher for the 2016 cohort (26,1%) than for the 2018 cohort (23,8%).

Figure 10. Dynamics of the labour market status distributions in cluster 9: Unstable job.

2016 **2018**



Legend:

The main activity in the ninth cluster was an unstable form of employment – a civil law contract.

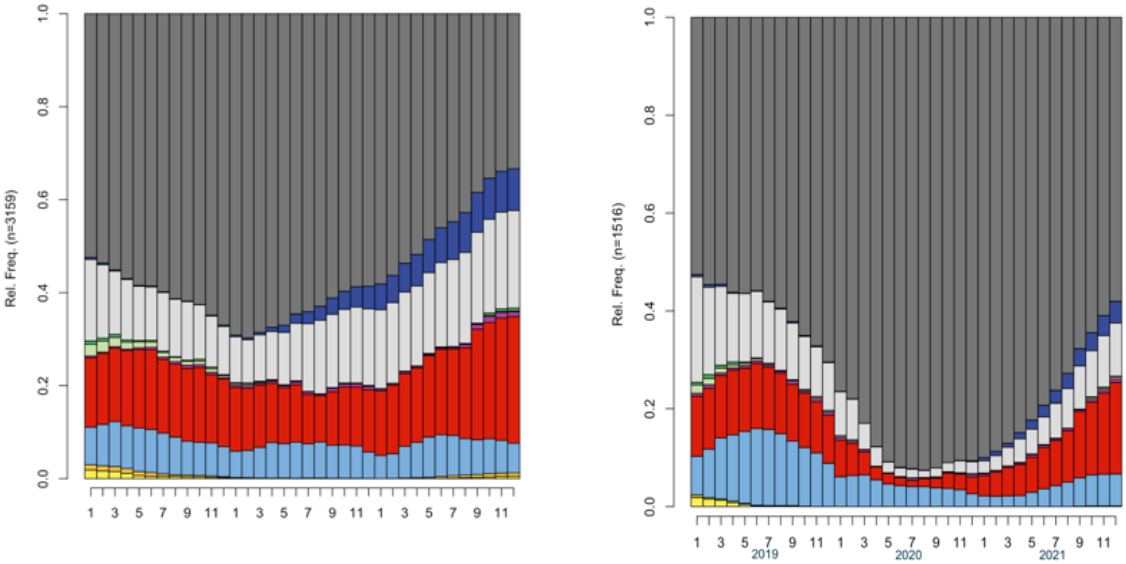
Shares of graduates of both cohorts belonging to this cluster were relatively low, respectively, 4,0% and 2,6%.

The average earnings in this cluster were 1976,88 PLN (463,87 EUR) for the 2016 cohort and 2242,46 PLN (485,93 EUR) for the 2018 cohort.

The feminisation rate for this cluster was similar for both cohorts (respectively, 68,1% and 65,3%). The gender pay gap in this cluster was relatively low for both cohorts: respectively, 10,8% and 7,2%.

Figure 11. Dynamics of the labour market status distributions in cluster 10: Unemployment fluctuations.

2016 **2018**



Legend:

The main experience of graduates in the tenth cluster was unemployment. This cluster was the smallest one. The percentage of graduates belonging to this cluster was, respectively, 2,0% and 1,0%.

The average earnings in this cluster were also low. Moreover, for the later cohort, the earnings were even lower than for the first one: 1874,97 PLN (439,96 EUR) for the 2016 cohort and 1490,21 PLN (322,92 EUR) for the 2018 cohort.

The feminisation rate for this cluster was quite similar for both cohorts (respectively, 71,7% and 70,0%). The gender pay gap in this cluster for both cohorts was one of the lowest: respectively, 2,6% and 1,5%.

Multinomial logistic regression model

We have calculated a multinomial regression model separately for each cohort: the 20218 cohort that has faced the COVID-19 pandemic, and – as a control group – the 2016 cohort with no pandemic experience in the analysed period. The dependent variable in the models was the labour market entrance sequence cluster as described in the previous subsection. The reference value of this variable was the eighth cluster – stable employment – which contains the majority of graduates and is the most similar to the general activity distribution.

The same set of nine independent variables has been used in both models. We have described three groups of them (individual features of graduates, features of their study programmes, features of their places of residence) in one of the previous sections – "The method".

The table below presents the values of the models' fit measure (R_N^2 by Nagelkerke) – both for the entire models and partial fit measures.

Table 1. Model fit measures for both models.

	2016 cohort model	**2018 cohort model**
Full model	28%	46%
All individual features	7,7%	12,0%
Sex	5,0%	7,1%
Being a foreigner	0,2%	0,4%
Pre-graduation job experience	2,7%	2,9%
All study programmes' features	6,0%	6,1%
Form of studies	0,6%	0,6%
Area of study	5,5%	5,5%
All places of residence features	14,0%	18,4%
Size of place of residence	13,3%	17,8%
Unemployment rate in the powiat of residence	0,3%	0,2%
Covid-19-related deaths in the powiat per 1 000 people	0,03%	0,05%
Covid-19 vaccinations in the powiat per 1 000 people	0,01%	0,01%

The value of R_N^2 by Nagelkerke was reasonably high for the 2016 cohort, and even higher for the 2018 cohort. The partial coefficients in both models were the highest for the size of the place of residence, while the second and the third positions belonged to two variables: sex and the area of study. These variables came up to be even more important than the pre-graduation job experience which was recognised as a key factor shaping graduates' labour market positions. The COVID-19-related variables didn't improve the prediction value of the models. We will come back to this issue in more detail in the next part of this subsection.

We have calculated the marginal effects for all independent variables for both models, which show the differences in the predicted probabilities of belonging to a given cluster when the independent variable increases by one unit, controlled for other variables. One should bear in

mind, that for each independent variable, the sum of all marginal effects of a given feature must always be 0. Therefore, if a given feature has a positive marginal effect in the case of some clusters, it has to have a negative marginal effect on some other clusters. The full set of values of the marginal effects is in the appendix. We are presenting the key results below.

Women were way more likely than men to belong to the first two clusters which are related to parenthood (respectively, without or with working). The effect was observed in both cohorts. The marginal effects of being a woman in the case of the parenthood cluster were +5,21% in the 2016 cohort and +5,06% in the 2018 cohort. In the case of the working parenthood cluster the effects were, respectively, +3,01% and +4,59%. The strongest negative effects can be observed in the case of some work-related clusters: expanding self-employment (respectively, -5,96% and -6,62%), stable employment (respectively, -1,30% and -1,91%), and unstable job (respectively, -0,58% and -0,78%). All other marginal effects are close to 0.

The high values of marginal effects for two parenthood-related clusters should be not a surprise. As we mentioned before, those clusters consist almost entirely of women. Fathers in Poland are way less likely to take a child-care leave than mothers and when they do – it is for a shorter period.

One can argue, that if women were not in parenthood-related clusters they would probably be in those work-related clusters for which we observed negative effects. However, these effects are not proportional to the size of these clusters. The strongest negative marginal effect was observed in the case of the expanding self-employment cluster, which is 7 times smaller than the stable employment cluster. It shows that women have different structure of employment forms at the early stage of their job careers.

The observations stated above show that child-care leave does not necessarily exclude from the labour market at the early stage of a career. The second cluster – working parenthood – shows that. It is worth noting though, that the first cluster – parenthood (with no job activity during child-care leave) – is bigger. Results show, that women after graduation are less active on the labour market – both in stable and unstable forms of employment – because of their procreative decisions. On top of that women are generally less inclined to become self-employed.

Discussion

Our results indicate that the labour market entry mechanism for higher education graduates in Poland was not modified by the COVID-19 pandemic. In the qualitative perspective we observe the same labour market entry patterns and apparent impact of Covid-19 is related on their sequences of entry on the labour market.

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