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The impact of sociodemographic factors on unemployment of young people in Poland[1]

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Abstract. The labour market is an area of a dynamic structure, sensitive to both external and internal factors. The aim of the research discussed in the article is to identify the sociodemographic factors that affect the level of unemployment of young people and to deepen our knowledge about their situation in the labour market in Poland. The study is based on a sample of 387 respondents aged 18–30 and uses data provided by the 2019 Human Capital Study, which was conducted by the Polish Agency for Enterprise Development in collaboration with the Jagiellonian University in Kraków. The objective of the survey was to monitor skills demand in the labour market. A logistic model was used to analyse the impact of selected variables on the employment of young people. The findings demonstrate that the risk of unemployment highly depends on gender and level of education. The study shows that women are substantially more likely to experience unemployment than men, while a higher level of education increases the chances of employment. Additionally, owning a driver's licence, which improves mobility, allows easier access to the labour market.

Keywords: labour market, young people, unemployment, logistic regression model, logit model
JEL: C35, E24, J21, J24, J64

Wpływ czynników społeczno-demograficznych na bezrobocie młodych ludzi w Polsce

Streszczenie. Rynek pracy to obszar o dynamicznej strukturze, który wykazuje wrażliwość na czynniki zarówno zewnętrzne, jak i wewnętrzne. Celem badania omawianego w artykule jest identyfikacja czynników społeczno-demograficznych wpływających na poziom bezrobocia młodych ludzi, a dzięki temu – pogłębienie wiedzy na temat sytuacji młodych ludzi na rynku pracy w Polsce. Badanie zostało przeprowadzone na próbie 387 respondentów w wieku od 18 do 30 lat. Wykorzystano dane z Bilansu Kapitału Ludzkiego za 2019 r. realizowanego przez Polską Agencję Rozwoju Przedsiębiorczości we współpracy z Uniwer-sytetem Jagiellońskim w Krakowie, którego celem jest monitorowanie zapotrzebowania na kompetencje na rynku pracy. Do analizy wpływu wybranych zmiennych na zatrudnienie wśród młodych osób wykorzystano model logistyczny. Z uzyskanych rezultatów wynika, że na ryzyko bezrobocia istotny wpływ mają płeć i poziom wykształcenia: kobiety są znacznie bardziej zagrożone bezrobociem niż mężczyźni, a wyższy poziom wykształcenia zwiększa szanse na zatrudnienie. Dodatkowo posiadanie prawa jazdy, poprawiające mobilność, ułatwia dostęp do rynku pracy.

Słowa kluczowe: rynek pracy, młodzi ludzie, bezrobocie, model regresji logistycznej, model logitowy

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1. Introduction

This article focuses on the unemployment of young people (aged 18–30) and the factors that significantly affect its level. This issue is very important from the scientific point of view, but it also provides an opportunity to gain comprehensive knowledge about a particular age group, which, in turn, might impact the employment policy. Finding optimal solutions that would enable young people to gain work experience and enhance their skills and qualifications would likely lead to an increase in the employment within this age group.

The reason behind choosing such a research problem was a noticeable gap in studies focusing on young people in the face of the dynamic structure of the labour market. Theoretical discussions and empirical research are essential to understand the market structure and to identify the factors influencing young people's employment situation. This study will help clarify how such factors as education, work experience and access to training affect their job opportunities. Focusing on these issues will also reveal the barriers young people face in accessing the labour market, which is crucial for developing effective policies to improve their employment prospects. This research will lead to a better understanding of the most effective strategies for integrating young people into the labour market, and will show how the above-mentioned factors may improve the overall market conditions.

The purpose of this study is to gain in-depth knowledge about the situation of young people on the Polish labour market, particularly by identifying the sociodemographic factors that influence unemployment levels within this group. To this end, the following research question was formulated: does education in the 18–30 age group, irrespective of its form, have any impact on the professional activity of young people? The research hypothesis, based on this research question, reads: in the 18–30 age group, the participation in education, regardless of its form, affects the unemployment levels.

2. Literature review

The apparent trend over the past two decades has been a noticeable decline in young people's participation in the labour force. One of the main reasons for this has been their increased engagement in formal, non-formal and informal education.[2] In many

[2] Formal education: 'provided by universities and other entities of the higher education system, within the framework of programs that lead to full qualifications, post-graduate qualifications or qualifications in professions.' Non-formal education: 'education and training provided as part of programmes that do not lead to full qualifications or qualifications referred to above. Non-formal education is learning organised institutionally, within the framework of programmes that are not part of formal education. Learning outcomes acquired through non-formal education can be validated, accumulated and transferred in the course of acquiring 'school' and 'academic' qualifications.' Informal education: 'the acquisition of learning

countries, the outcome of this trend has been positive, i.e. the labour force has become highly-qualified. However, this development also resulted in increased requirements for the employment, e.g., higher salaries demanded by employees, and more duties assigned by employers along with longer working hours. Young people aged 18–30 are more likely to be unemployed than older adults, which is partly due to their limited work experience; however there also seem to be structural barriers preventing their free entry into the labour market.

The mismatch between the education system and the needs of the labour market is a challenge faced by many countries worldwide. This is a problem that affects both developed and developing countries. Its numerous aspects can influence the effectiveness and sustainability of the education system, with changing labour market needs being one of the most prominent factors. In the era of globalisation and technological advancement, new technologies and economic sectors are emerging, and the labour market is evolving rapidly; as a consequence, some traditional professions lose their significance (Antoninis, 2020; Stasiak, 2011; Ziomek & Szubert, 2020). Education systems often struggle to keep up with these changes, and there is a mismatch between the curriculum and the current trends in the job market. This often results in a skills gap between graduates and employer expectations.

Stasiak (2022) rightly observes that education is one of the strongest determinants defining the chances of finding and retaining employment. The author describes phenomena in some aspects opposite to the above-mentioned developments, focusing on educational reforms in Poland that started in 1999. These reforms have led to significant changes in the labour market, influenced by both demographic and educational factors, and have been extensively analysed in the context of the human capital theory. In the current phase of economic development, a typical jobless economic growth is noticeable. It is linked to the growing labour productivity resulting from the fact that the technical equipment is becoming increasingly advanced. This process contributes to growing competition in the labour market and is responsible for the fact that in developed countries, secondary or even higher education has become a minimum requirement for an individual to enter the job market (Jedlińska, 2021).

Research by Żyra (2022) shows that in the long-term, education in engineering and technology benefits regional growth and reduces unemployment. However, short-term effects for both fields are negative, indicating insufficient quality of investments in human capital. The author also points out a significant decrease in the interest in these fields over the last decade. This decline contrasts sharply with the 2000s, when

outcomes through various activities outside formal education and non-formal education, e.g. self-directed learning (e.g. foreign language, computer skills).' (Stęchły, 2021).

both Poland and other countries experienced a marked increase in the number of students pursuing engineering and technology degrees. This shift may be attributed to various socio-economic factors, including changes in industry demands, economic incentives, and evolving career preferences among young people.

In his work, Mikiewicz (2021) addresses the issue of educationalisation, which signifies the increasing importance of formal-education institutions in areas previously unrelated to them. The author asserts that these processes are common in developed countries and result from the economic and technological development (including the era of Industry 4.0) and cultural transformations that require people to have a wide range of competencies and to apply sophisticated knowledge not only to professional situations. The author also mentions 'lifelong learning', a slogan which is gaining increasingly more importance. Education becomes a tool, a task, and an outcome defining the logic of contemporary individuals' actions. Constant skills development is crucial for functioning in a modern society.

In the study on adult education conducted by Statistics Poland in 2022 and in the analysis of human capital in Poland in the years 2018–2022, the focus was on the learning processes of adults. The findings indicated that 54% of individuals aged 18–69 actively pursued knowledge through various forms of education. The study also analysed the participation rates of young adults in formal and non-formal education. In the age group of 18–24, 21.2% of respondents participated in non-formal, and 65.6% in formal education. For the age group of 25–29, these rates were 27.2% and 10.8%, respectively. These data highlight differences in the engagement in formal and non-formal education based on age group, which could have implications for educational policies and labour market dynamics (Główny Urząd Statystyczny [GUS], 2023, 2024).

Kotliński (2017) astutely observes that young individuals find themselves in a particularly unfavourable situation during economic recessions, as their employment is more susceptible to business cycle fluctuations than that of other age groups. This is due, among other factors, to the fact that their jobs are predominantly concentrated in industries sensitive to cyclical events and that they engage more frequently in part-time or temporary employment (Wysocka, 2021). The significance of knowledge and skills has been emphasised for decades in the field of economics, where growth theories highlight the role of human capital (Wierzbicka, 2021). In the theory of endogenous growth, it is especially the scientific and technical knowledge that serves as a source of long-term economic growth (Lucas, 1988). Human capital is not only associated with formal education and skills (Cabrita et al., 2015), but also with informal and para-formal education, as well as practical skills, which ultimately influence the increasing role of the knowledge-based economy (Wierzbicka, 2021).

Meanwhile, educational policy is no longer associated only with formal education at the secondary or higher education levels. It begins to encompass aspects and stages of life previously linked to social or economic policy. The key medium of this expansion is the concept of lifelong learning, empowering educational policy officials to venture into new areas previously reserved for specialists from other fields. In Poland, these changes are being implemented through systemic solutions, such as the Integrated Skills Strategy 2030, with the Ministry of Education playing a pivotal role in creating development and skills utilisation strategies (Kula & Pękowska, 2022; Ministerstwo Edukacji Narodowej, 2020).

The European Union considers smart development as one of its most important goals. Consequently, Poland is implementing a systemic solution aimed at raising the level of human capital by describing, organising and collecting various qualifications in a single registry called the Integrated Qualifications System. Based on a detailed analysis of general recommendations, the development of the Polish Qualifications Framework was initiated, which covers the entirety of educational activities. These projects integrate both the spheres of formal and non-formal education, as well as aspects related to the informal learning process, ensuring a holistic approach to qualification development in a national context (Morańska & Ostrowska, 2021; Trawińska-Konador, 2020).

The EU also emphasises the importance of skills relevant to the job market. The European Commission invests in training, aligning skills with market needs, ecological and digital transformation, and increasing mobility and recognition of professional qualifications. Flaszyńska (2023) asserts that the key element in balancing supply and demand in the labour market is skills development. The author points to the deepening problem of skills mismatching the job market, which leads to a situation where vacancies are unable to absorb the majority of the registered unemployed, despite the growing level of formal education in the society. At the European level, there is an increasing emphasis on the need for the development of lifelong learning, considered one of the main indicators within the action plan for the implementation of the European Pillar of Social Rights (to be achieved by member states by 2030; Flaszyńska, 2023).

In Poland in 2019,[3] approximately 6.5 million of the total 'potential labour force' was constituted by young people aged 15–29 (while there were about 6 million people in the group of 18–30 year-olds). This group includes people who are ready to start in

[3] The study was conducted in 2022 and was based on the most recent data available at the time. The data were extracted from the Human Balance Survey conducted by the Polish Agency for Enterprise Development jointly with the Jagiellonian University in Kraków (Polska Agencja Rozwoju Przedsiębiorczości & Uniwersytet Jagielloński w Krakowie, 2019). It is for this reason that the data relate to 2019. The literature review on the subject has been supplemented with more recent items.

a job immediately, but cannot do it as they face a barrier. Another sub-group are people who are ready for employment, but do not actively seek it for personal reasons, e.g. discouragement after previous unsuccessful attempts, disability or the fact that they already work in the 'shadow economy' (Eurostat, n.d. a, n.d. c; Krause, 2016).

An undoubtedly negative condition that affects young people is NEET (Not in Education, Employment or Training). This term refers to young people who are unemployed and at the same time not in education or vocational training. In 2019, among people aged 18–24, the NEET rate totalled 11.1% (0.6 p.p. down from the previous year, and 5.3 p.p. down from 2013), among those aged 25–30 it was 17.7% (up by 0.5 p.p. compared to the previous year, down by 5 p.p. compared to 2013), and in the 30–34 age group it reached 16.5% (0.8 p.p. down from 2018 and 4 p.p. down from 2013).

What could also be observed was that young women in most cases were as much as twice or three times more likely to have a NEET status than their male counterparts. In 2019, in the 18–24 age group, the NEET rate among females equalled 13.1% (9.3% among men), in the group of women aged 25–29 it was 27.1% (8.7% among men), and among 30–34-year-old females it reached 26% (7.4% among men). These results are not surprising, bearing in mind that women continue to experience obstacles to employment (despite the EU's gender equality policy), and the fact that they still have to often play traditional social roles (e.g. mothers, carers; Eurostat, n.d. d; Saczyńska-Sokół & Łojko, 2016; Szcześniak & Rondón, 2011). Any form of stalling a young person's professional development and career in the early stages can significantly worsen the employment and earning prospects of this person in the future.

Gender inequality is still evident in the labour market. Despite the increase in the number of women employed on the Polish market, economic discrimination of this sex can still be observed. The working-age employment rate among women is lower than that of men (70% and 79% respectively), and the unemployment rate for women in the same age group is higher than that of men (4% and 3% respectively). Women are more likely than men to withdraw completely from the labour market, mostly due to caregiving responsibilities. Among women aged 18–30, 23% are economically inactive – fewer than in 2010 (28%), but still more than men (11%). The reason for women's professional inactivity in 64% of cases is caring for children, seriously ill adults or other personal or family obligations (among professionally inactive men, it is only 16% of cases). In Poland, the percentage of economically inactive women due to caring responsibilities is one of the highest in the EU, and shows an upward trend. On average, working women are paid 9% less than men (GUS, 2020). Women are better educated than men. In 2019, 25.8% of women had higher education, which was 11.2 p.p. more than men. Women are also less likely than men to drop out of school early in their education. Educational inequalities in Poland based on gender remain

high. The issue of premature school dropout affects both genders. In 2019, the dropout rate for women aged 18–24 was 3.6%, while for men from the same age group it was 6.7% (Eurostat, n.d. b).

Low levels of social activity is mentioned as one of the factors that have a significant impact on the increase in unemployment (Centrum Badania Opinii Społecznej, 2018). In the view of this, it can be inferred that the concept of the social economy is still not properly promoted (Reichel et al., 2021). The authors also highlight that significant challenges include effectively engaging young people by emphasising the importance of social economy concepts and developing comprehensive, widely accessible educational forms and tools. Simola (2018) shows that contemporary employment of young people in Europe is characterised by precarity, regardless of the young people's education level. This age group are most often offered jobs not matching their qualifications and competencies, which reinforces the negative effects associated with job insecurity (Ross, 2008). One factor, Grabowska (2019) notes, is that 'the impact of migration on social competence may not be apparent immediately. It can be apparent after some time, but it can also blur in the course of other experiences, which is why it is so difficult to determine the direct impact of migration on a person's life and human capital.'

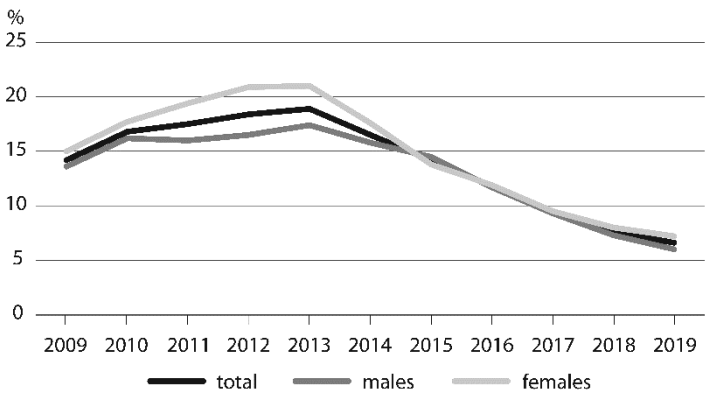
An important factor integrating and dynamising the lives of today's young people is personal development. This is dependent on paradigm shifts in the functioning of education and the perception of higher education which is considered the only opportunity for prosperity, despite, as Sukarieh and Tannock (2015, pp. 120) argue, a degree no longer guarantees a high standard of living. Also, young people spending increasingly long periods in formal, non-formal and informal education, and the need for constant further training and supplementation of competencies mean that the transition from education to employment (transition from school to work) is no longer linear and irreversible. This phenomenon is reinforced by the instability in the labour market and the lack of continuity of employment (Messyasz, 2021).

In 2019, the employment rate for young people (in the age group of 15–29) equalled 50.8%, which marked an increase by 0.6 p.p. year to year (Eurostat, n.d. e). The unemployment rate was 6.6% (7.2% for females and 6% for males), as demonstrated in the Figure. Over the 2009–2019 decade, in the unemployment rate decreased by as much as 7.6 p.p.[4] Despite this positive trend, the unemployment rate was still relatively high among young people. This was the emergence of several barriers in the labour market, which also negatively affected their health mentally and physically, and especially in

[4] In 2020, the unemployment rate among young people rose to 7.1% (up by 0.5 p.p. year to year), while 2021 saw an increase to 7.2% year to year. This growth was caused by the outbreak of the COVID-19 pandemic, which began in Poland in March 2020 (GUS, 2020). On 24th February 2022, Russia attacked Ukraine. The pandemic and the outbreak of the war had an impact on the relations in the Polish labour market.

terms of social integration because they suffers from material deprivation and worse, poverty (Trzpiot & Kawecka, 2021a, 2021b).

Figure. The unemployment rate of young people aged 15–29 in Poland



Source: author's work based on data from Eurostat (n.d. e).

3. Research method

The study uses micro-data from the Human Capital Study survey conducted in 2019 by the Polish Agency for Enterprise Development jointly with the Jagiellonian University in Kraków (Polska Agencja Rozwoju Przedsiębiorczości & Uniwersytet Jagielloński w Krakowie, 2019). The surveys are designed to monitor the demand for competencies in the labour market. The research features cross-sectional surveys that provide general information on the labour market situation, as well as industry-specific surveys.

Before proceeding with the analysis and model building, the collected data was evaluated for completeness and relevance of the given factors. The Human Capital Study included a total of 2,534 observations for the 18–70 age group. The participants were selected to provide a representative cross-section of young people in Poland, ensuring that the study captured a wide range of educational backgrounds and professional statuses. This comprehensive approach aimed to assess how different sociodemographic factors influenced the unemployment rate of young adults in the Polish dynamic labour market. The study focused on young people under 30.[5] It took into account the Act on Promotion of Employment and Labour Market Institutions (Pol. Ustawa z dnia 20 kwietnia 2004 r. o promocji zatrudnienia i instytucjach rynku

[5] Taking into account the merits and definitions that are used by both Statistics Poland and Eurostat, a group presenting the widest possible range of young people was selected. The data was subjected to a frequency analysis, which made it possible to select a representative group.

pracy), where particular emphasis is placed on assisting people under 30 years of age in entering the labour market and then remaining in employment). The results from 387 observations for people in the 18–30 age group qualified for the study. Taking into account the substantive rationale and statistical criteria, the study analysed variables describing young people in terms of education as well as categorising variables, such as age and gender (a total of 13 independent variables; see Table 1).

The Human Capital Study uses a demographically-comprehensive sample, 21.8% of which is constituted by young people aged 18–30. In terms of gender distribution, women represent 42.12%, and men 57.64% of this group. 7% of the participants do not know any foreign language. As regards skills and education, 78.9% of the respondents have a valid driver's licence. In terms of educational activities over the last 12 months, 39.7% participated in formal, 71.6% in non-formal, and 85.6% in informal education. As far as the level of education is considered, 14.7% lower secondary primary and incomplete primary or lower, 11.5% basic vocational, 48.4% secondary, and 25.2% tertiary education. To sum up, the sample was varied in terms of age, gender, degree of foreign language proficiency, ability to drive, participation in various forms of education, and the level of education. This group represents a broad section of the society, which can be useful in multiple research contexts.

In order to classify the status of a person labour market (employed or unemployed), the definitions used in the Labour Force Survey (LFS; GUS, 2022) were applied. We used a logit model, so for the unemployment, the dependent variable is represented by a dichotomous variable, where 1 means the respondent (a young person) is unemployed, whereas 0 denotes an employed person (according to the LFS methodology).

In the study, the rule of 10 events per variable was applied, providing a solid foundation for estimating parameters in a logistic regression model with 13 variables. The rule of 10 events per variable, applied in logistic regression analysis, refers to the minimum number of cases (observations) required for each independent variable in the model to enable reliable estimation. Accordingly, the number of observations (units) in the model should be at least ten times greater than the number of independent variables; in other words, there should be at least 10 cases (events) for each independent variable to evaluate its effect on the dependent variable. The rule does not say that each variable must take on at least 10 different values, but rather that there should be a sufficient number of observations for each independent variable to ensure that the estimations are statistically robust. Adhering to this rule is particularly important when the model includes a relatively large number of variables compared to the available observations. It helps avoid issues such as overfitting which can lead to incorrect conclusions and poor generalisability of the model with new data (Szaleniec, 2008). The 387 observations we used was even more than 10 events per variable, ensuring enough data for a robust and reliable analysis.

In the domain of statistical modelling, logistic regression is employed as a robust method for estimating the probabilities of a binary outcome based on a set of independent variables, which can be either categorical or continuous in nature. This model is particularly adept at handling situations where the dependent variable is dichotomous, thus facilitating the exploration of relationships between various predictor variables and the likelihood of a particular event occurring. Within this framework, the model under discussion incorporates both binary and continuous variables. The inclusion of a continuous variable, such as age, is a strategic choice, serving to capture the effect of incremental changes in this predictor on the log odds of the outcome. This approach allows a more granular analysis of how variations in age, treated as a continuous spectrum, systematically influence the probability of the occurrence of an event (here: becoming unemployed), as delineated in Hosmer et al. (2013).

The variables used for the study are presented in Table 1.

Table 1. Variables used in the survey

Variable	Details of the variables
Employment	0 – employed, 1 – unemployed
Age	continuous, quantitative variable
Gender	0 – men, 1 – women
Higher education	0 – does not have, 1 – has
Secondary education	0 – does not have, 1 – has
Basic and vocational education	0 – does not have, 1 – has
Participation in formal education (including but not limited to lower secondary primary and incomplete primary, upper secondary, post-secondary, tertiary) in the past 12 months	0 – no, 1 – yes
Participation in non-formal education (including adult schools, residential/internet courses and training, internships, apprenticeships) in the past 12 months	0 – no, 1 – yes
Participation in informal education (self-study) in the past 12 months	0 – no, 1 – yes
Frequency of Internet or e-mail use (for personal purposes, including further training)	1 – daily 2 – several times a week 3 – several times a month 4 – less frequently than several times a month
Formal confirmation of one's skills in the form of a certificate, diploma or licence	0 – no, 1 – yes
Valid driver's licence	0 – no, 1 – yes
Knowledge of at least one foreign language	0 – no, 1 – yes
Willing to develop skills and knowledge in the next 12 months	0 – no, 1 – yes

Source: author's work based on Polska Agencja Rozwoju Przedsiębiorczości and Uniwersytet Jagielloński w Krakowie (2019).

Considering the nature of the used variables, it is important to acknowledge certain limitations that might mean the data does not fully reflect current trends in the labour market, especially given the dynamic changes in the economic and social environment. The study's concentration on the 18–30 age group restricts the extrapolation of its findings to a wider demographic group. Moreover, the results may not comprehensively represent the entire young population in Poland. The author, aware of the limitations associated with the data set, would like to stress the necessity to acknowledge these constraints in order to interpret the results and formulate conclusions accurately. Despite some drawbacks, however, the study holds scientific relevance, as it offers insights into young people's conscious choices for their professional development and employment pursuits.

The logit model in statistics is also called a logit regression or logistic regression model. This model is used in explaining a dichotomous qualitative variable Y depending on the level of exogenous variables $X_1, X_2, \dots, X_k$ (qualitative or quantitative). The explained variable then has a zero-one form (Agresti, 2018; Borkowski et al., 2003; Hosmer et al., 2013):

$$Y = \begin{cases} 1 \text{ the incident occurred} \\ 0 \text{ the incident did not occur} \end{cases} \tag{1}$$

The logistic model function has the following form:

$$Y_t = \frac{e^{Z_t}}{1+e^{Z_t}}, \tag{2}$$

where $Z_t = a + bt$, a and b are the parameters, while the saturation level is 1. Variable t means that we still have a growth curve.

The logit model has the following form:

$$P(Y = 1|X_1, X_2, \dots, X_k) = \frac{e^{\alpha+\sum_{i=1}^{k}\beta_i X_i}}{1+e^{\alpha+\sum_{i=1}^{k}\beta_i X_i}}, \tag{3}$$

where $P(Y = 1|X_1, X_2, \dots, X_k)$ means the conditional probability of the explanatory (dependent) variable to reach the distinguished value (2) under the condition of specific values of the explanatory (independent) variables $X_1, X_2, \dots, X_k$. Then α is the logistic regression constant, β_i is the logistic regression coefficient for the i-th independent variable, while X_k is the k-th independent variable.

In statistics, the coefficient of determination, denoted as R-square (R^2), is commonly used to assess the fit of a linear regression model by quantifying how well it explains the variability of the dependent variable. However, in the context of logistic regression, applying traditional R^2 measures is less straightforward due to the binary nature of the

dependent variable. As a result, adaptations such as Cox and Snell's *R*-square and Nagelkerke's *R*-square are frequently employed. Cox and Snell's *R*-square is sensitive to the number of variables in the model and cannot reach the upper limit of 1, a restriction stemming from the inherent characteristics of logistic regression models. To overcome the limitations of Cox and Snell's *R*-square, Nagelkerke proposed a modified version that scales the *R*-square to the maximum of 1, making it more interpretable and useful in logistic regression analysis.

Additionally, the Hosmer and Lemeshow test is an important measure used in logistic regression models to assess the model's goodness-of-fit. This test evaluates the fit of the model by comparing the observed probabilities with the predicted probabilities. A non-significant result is desired, as it indicates that there is no significant difference between the observed and predicted values, and so that the model fits the data well (Agresti, 2018; Borkowski et al., 2003; Hosmer et al., 2013).

This method makes it possible to determine the strength, but also the direction of the relationship between a qualitative factor (class type) or quantitative factor (discrete or continuous type) and a dichotomous explanatory variable. The model has to meet the following criteria: the randomness of the sample, numerous observations (the number of observations should be greater than $10 \text{ x } (k + 1)$, where k is the number of independent variables; Stanisz, 2000), no collinearity of explanatory variables, and the independence of observations.

On the basis of the odds ratio, inference is carried out, which answers the question of the effect of independent variables on the dependent variable. This indicator expresses how many times the probability of the studied event increases or decreases if there is a change in the independent variable (at established values of independent variables). Thus, it determines the change in the probability of the occurrence of a specific value of one of the dependent variable as the independent variable increases by one unit, assuming that the other independent variables remain constant (Hosmer et al., 2013; O'Loughlin et al., 2012).

4. Results

The labour market is one of the most popular areas of scientific research and the object of politicians' interest. It is also one of the main elements of the economy. As observing the indicators and trends in the labour market is very important, researchers and other interested actors monitor them on a daily basis. The labour market is affected by many domestic economic factors as well as by global ones.

The author conducted a reliability quotient test to verify the estimation of the logistic model. It should be noted that in the case of large numbers, the test statistics

has a chi-square distribution (χ^2) with the number of degrees of freedom equal to (corresponding to) the number of variables in the estimated model (Table 2). Based on the results, it should be inferred that all variables in the model are statistically significant.

Table 2. Test results and the value of the log-likelihood and pseudo-R^2 for the model

Test	χ^2	Degrees of freedom	Significance
Chi-square	78,958	13	<0.01
Hosmer and Lemeshow	13,299	8	0.102

Note. Significance at *p*-value = 0.05. Model summary: –2 logarithm of credibility = 396,446, R^2 Cox and Snell = 0.514, R^2 Nagelkerke = 0.243.
Source: author's work based on Polska Agencja Rozwoju Przedsiębiorczości and Uniwersytet Jagielloński w Krakowie (2019).

In the model, Nagelkerke's *R*-square is 0.243, indicating that the model explains approximately 24.3% of the variance in the group membership of the dependent variable. The Hosmer and Lemeshow test yields a statistic of 0.102, indicating no significant difference between the observed and predicted values, which demonstrates a good fit of the model to the data.

Table 3 juxtaposes the observed values with the values predicted by the estimated model. The results demonstrate that the logistic function correctly predicts belonging to one of the two groups for about 81.5% of young people.

Table 3. Classification table for the Logistic Regression Model of unemployment

Specification	Observed	Predicted in the model	Percentage of correct classifications
Employed	375	361	96,2
Unemployed	96	23	23,8
Total	471	384	81,5

Note. The division point is 500.
Source: author's work based on Polska Agencja Rozwoju Przedsiębiorczości and Uniwersytet Jagielloński w Krakowie (2019).

From Table 4, which presents a logistic model for selected socioeconomic and demographic variables, we can see that only four variables are statistically significant, assuming that the *p*-value is smaller than or equal to 0.05. These variables have been highlighted in bold in the table, emphasising their importance in the analysed model.

Table 4. Estimated values of the parameters of the logistic regression model

Specification	β	Std. error	Wald test	Significance	Exp(β)	95% CI for exp(β)	
						lower	upper
Age	–0.071	0.054	1.740	0.187	0.931	0.838	1.035
Gender	**0.755**	**0.272**	**7.700**	**0.006**	**2.127**	**1.248**	**3.624**
Tertiary education	–0.761	0.482	2.491	0.115	0.467	0.182	1.202
Secondary education	**–0.979**	**0.355**	**7.582**	**0.006**	**0.376**	**0.187**	**0.754**
Basic and vocational education	**–2.526**	**0.774**	**10.651**	**0.001**	**0.080**	**0.018**	**0.365**
Participation in formal education (including but not limited to lower secondary primary and incomplete primary, upper secondary, post-secondary, tertiary) in the past 12 months	0.617	0.334	3.416	0.065	1.853	0.963	3.565
Participation in non-formal education (including adult schools, residential/internet courses and training, internships, apprenticeships) in the past 12 months	–0.255	0.362	0.494	0.482	0.775	0.381	1.577
Participation in informal education (self-study) in the past 12 months	0.136	0.515	0.069	0.792	1.145	0.417	3.145
Frequency of Internet or e-mail use (for personal purposes, including further training)	0.092	0.364	0.064	0.801	1.096	0.537	2.239
Formal confirmation of one's skills by obtaining a certificate, diploma or a licence	0.590	0.376	2.460	0.117	1.804	0.863	3.773
Valid driver's licence	**–0.740**	**0.317**	**5.450**	**0.020**	**0.477**	**0.256**	**0.888**
Knowledge of at least one foreign language	–0.276	0.608	0.206	0.650	0.759	0.230	2.500
Willing to develop skills and knowledge in the next 12 months	0.126	0.160	0.617	0.432	1.134	0.829	1.551
Constant	0.708	1.730	0.168	0.682	2.030	.	.

Note. Degrees of freedom = 1. Statistically significant variables are marked in bold (significance ≤ 0.05).
Source: author's work based on Polska Agencja Rozwoju Przedsiębiorczości and Uniwersytet Jagielloński w Krakowie (2019).

The first significant variable in the model is the gender of the respondents, coded as 0 for male and 1 for female. The obtained result (significance = 0.006) indicates that this variable is statistically significant. More specifically, the odds ratio (exp(β) = 2.127) with a 95% confidence interval ranging from 1.248 to 3.624 shows that women

face more than double the odds of being unemployed compared to the situation of men. This result highlights a significant gender disparity in the likelihood of the unemployment within the studied population.

The second significant variable identified in the model is secondary education, compared to the reference category of lower secondary primary and incomplete primary or lower. The findings indicate considerable differences in the unemployment likelihood depending on the education level. For people with secondary education, the likelihood of being unemployed is 62.4% lower ($\exp(\beta) = 0.376$, with a 95% confidence interval of 0.187 to 0.754) than for those with lower secondary primary and incomplete primary or lower education. This demonstrates that secondary education significantly reduces the risk of unemployment. Also, individuals with vocational and basic education are up to 92% less likely to be unemployed ($\exp(\beta) = 0.080$, with a 95% confidence interval of 0.018 to 0.365) than the reference group. This shows that having vocational and basic education reduces the unemployment risk even more pronouncedly, proving that the qualifications earned through this type of education are highly valued in the labour market and equip individuals with more marketable skills.

The last statistically significant factor in the model is the respondent's ability to drive. The analysis shows that people holding a driver's licence are 52.3% less likely to be unemployed ($\exp(\beta) = 0.477$, with a 95% confidence interval of 0.256 to 0.888) than those who do not. The influence of this variable is considerable and aligns with contemporary expectations and demands in the labour market. The ability to drive is increasingly seen as an asset, particularly for young people in the age of mobility. In many cases, it has become a necessary or even mandatory requirement for many types of jobs, especially in places where public transportation is poor or in jobs that require travelling or transportation of goods. Therefore, being able to drive broadens the employment possibilities and enhances job prospects.

5. Conclusions

The study focuses on a group of young people who are either entering the labour market or are already present there. The objective of the article was to examine the influence of socioeconomic and demographic factors on the unemployment among young people in Poland using a logistic model. This study successfully meets this objective, concentrating on the analysis of how different education levels impact the unemployment risk for individuals aged 18–30. The research shows a statistically significant correlation between the education level and the employment status of young people: the higher the education level, the lower the risk of unemployment.

The study primarily dealt with education-related factors affecting the unemployment of young people. The results indicate that a young person's gender plays a significant role in this context, with women being more likely to be unemployed – a trend reflecting the persisting disparities in wages and employment conditions between two genders. Higher level of education correlates strongly with the reduced unemployment risk among young people, which emphasises the importance of academic achievement in enhancing one's job prospects. Another important skill boosting the employment opportunities is the ability to drive, which highlights the significance of mobility in the current job market. Lack of a driver's licence might be a substantial obstacle for young people in finding employment.

In response to the research question, 'does education in the 18–30 age group, irrespective of its form, have any impact on the professional activity of young people?', the analysis of data from the 2019 Human Capital Study demonstrates that the level of education significantly affects the professional activity of the 18–30 age group. The findings show that as young people's education level increases, their chances for employment grow. More specifically, having tertiary, secondary, basic or vocational education reduces the unemployment risk among young people. Variables connected to secondary, basic and vocational education were statistically significant.

Data from the 2019 Human Capital Study reveals that gender inequality has persisted for decades despite the efforts to promote equality. The 2020 'Poland on the Path of Sustainable Development' Statistics Poland report indicates that one of the main goals for 2030 is to achieve gender equality and empower women. In Poland, despite higher educational attainment, women continue to face significant labour market disparities – their employment rate is lower than that of men (70% and 79%, respectively), and their unemployment rate is higher (4% and 3%, respectively). Additionally, 23% of women aged 25-59 are economically inactive, primarily due to caregiving responsibilities, which is one of the highest rates in the EU. Women earn on average 9% less than men, with the largest disparities in the financial, insurance, and ICT sectors. Despite an increase in women's political representation due to legal regulations, their participation remains below the EU average.

International investments in education significantly influence the global development by fostering economic growth, reducing poverty, and promoting socio-political stability. Education, as a catalyst for development, is essential to encouraging innovation and economic competitiveness, and it plays a pivotal role in sustainable development. This study could serve as an encouragement for further research into the impact of socioeconomic and demographic factors on the unemployment of young people, which is a global issue. The author would like to broaden the scope of her future research to encompass a global perspective in order to receive a more comprehensive analysis of how international trends and worldwide socioeconomic

and demographic factors influence the unemployment rates among young people. Such a comprehensive analysis will require adopting several research methodologies that would address the complexity of the issue.

In conclusion, it is extremely important and relevant to observe a country's economy, but also to study it in order to be able to identify the determinants of the increase in the unemployment. Young people are a much varied group, as they might participate in several forms of education and at the same time be employed, sometimes on less favourable terms (e.g., civil law contracts, part-time contracts). They might also belong to the NEET category. There are several possibilities of the employment status of people in this age group. However, it should be remembered that these are the people who predominantly are just entering the labour market. It is important, therefore, to expand the employment policy to cover this group and offer other forms of support to them that will result in their increased employment.

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