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Socioeconomic aspects of long-term unemployment in the context of the ageing population of Europe: the case of Poland

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ABSTRACT

In view of the ageing populations of Europe, an important current challenge for labour markets is to increase the professional activity of those social groups whose participation in the labour market is insufficient. This work focuses on people unemployed for 12 months or more. The main purpose of this study is designation of those social groups which have the greatest problems with getting out of long-term unemployment, and assessment of the consequences of long-term unemployment, depending on its duration, in the context of the ageing society. We have investigated this problem using the example of Poland, which suffers from particularly low fertility rates. In this study, data from the Labour Force Survey (L.F.S.) for Poland have been used to model the duration of long-term unemployment. In the analysis the accelerated failure time models (A.F.T.) in the Bayesian approach have been used. Our results show, among other things, that difficulties in getting out of long-term unemployment mainly affect women and people who have children or who looked after children directly before the start of their job search. This, in consequence, may deepen the problem of the decrease in labour supply caused by the ageing population.

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1. Introduction

The currently observed changes in the demographic structure of European societies have an impact on the current and future situation in labour markets. Reduced fertility rates and the rising proportion of people aged 65 or over are among the key factors under consideration, which can result in a reduced labour supply. Moreover, population ageing can cause an excessive demographic burden and may affect the sustainability of the public sector (Istenič et al., 2018). Due to economic dependency, this situation may pose challenges for the social security system (Fuchs et al., 2018). In the context of these risks, the attention of researchers is focused on the unused

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labour resources, with emphasis on unemployed people. In this article, long-term unemployment (L.T.U.) has been investigated, due to its large negative social, economic and political consequences in the context of the ageing population.

In many countries, in spite of the decline in the general unemployment rate, a high share of L.T.U. is still observed (Spermann, 2015; Eurostat, 2016a). Moreover, the professional activation of long-term unemployed people is more difficult than in the case of other groups of the unemployed (Machin & Manning, 1999). According to Spermann (2015), high-risk factors of L.T.U. include a lack of professional qualifications, age, health, and family status, but the high-risk groups may vary by country (Kieselbach, 2003) and region (Mondschean & Oppenheimer, 2011). The scale of L.T.U. in individual countries and regions is largely influenced by the macroeconomic situation including the economic situation of a given country and the microeconomic situation related to the local labour market. Furthermore, the institutional conditions of a labour market also have an impact on the L.T.U. rate. In this context, Lee (2013) paid attention to employment protection legislation, unemployment benefits and statutory minimum wages. At a micro level, the duration of L.T.U. may depend on the individual behaviours of unemployed people. These behaviours can be differentiated by many characteristics, including the possession of various features of human capital (Mondschean & Oppenheimer, 2011).

The success of activities related to the vocational development of the long-term unemployed requires an in-depth understanding of this phenomenon at an individual level and identification of barriers influencing the effectiveness of job-searching. Individual factors contributing to the problem depend on the age of the unemployed. Taking into account the large potential of the unused labour force, but also the psychological aspects (Peregoy & Schliebner, 1990) in this study, the L.T.U. aged between 18 and 44 are analysed. This time span is a period of multiple changes in personal and professional careers, which include the end of education, starting and raising families, taking a first job and changing jobs for the first time. The professional and family situation of women in this age group has a significant impact on their fertility (Matysiak, 2009) and, consequently, on the age structure of the population.

The primary objective of this study is to distinguish social groups most exposed to L.T.U., through the identification and estimation of the features affecting finding a job by L.T.U. aged between 18 and 44. These features have been investigated in view of demographic changes taking place currently that relate to the ageing of Polish society. Many L.T.U. studies are based on analysing L.T.U. rates for different groups or on stock-flow analysis of the labour market. However, since the chances for leaving unemployment get lower as unemployment extends, the time aspect is also of crucial importance when analysing individual L.T.U. cases (Dolton & O'Neill, 1996; Jensen & Svarer, 2003; Kyyrä & Wilke, 2007). Including it in the analysis of unemployment is made possible for example by survival models (Blossfeld & Rohwer, 1995). Hence, in this study, the analysis of the determinants of L.T.U. has been based on accelerated failure time models (A.F.T.) (Lawless, 2003; Kalbfleisch & Prentice, 2011). A.F.T. models belong to the class of parametric survival models and make it possible to consider time aspect in the analysis. Thus, the research methods used in this study made it possible to assess the impact of the studied factors on professional activation

of long-term unemployed people depending on the time spent in unemployment. One aspect of this study, extending prior research on individual features of L.T.U. people, is the use of the Bayesian approach in the modelling (Gelman et al., 2000; Ibrahim et al., 2001).

2. Review of the literature

L.T.U. has many negative consequences both for the individuals suffering from it and for the economy of the country as a whole. The direct socio-economic consequences at the macroeconomic level concern, among other things, the cost of its financing, reduced gross domestic product, and the related increase in poverty. Moreover, an important aspect in the context of the ageing of European society and hence the reduced labour supply, is unused human capital.

At an individual level, L.T.U. is linked to the loss of human capital possessed by a person, and the greater difficulty of returning to work (Kroft et al., 2013). In economic terms, being unemployed worsens the financial situation of the household of the unemployed. In the case of people who are unemployed for a long time, this is observed not only during unemployment periods, but also after leaving unemployment, due to the reduction of human capital. Furthermore, being unemployed involves not only economic, but also psychological aspects. Not being able to retain one's previous social status and material status can result in the loss of self-confidence and withdrawal. Furthermore, an unsuccessful job search may convince unemployed people that they are incapable of finding one and discourage them from further attempts. Hence, being unemployed may become their way of life. L.T.U. at an individual level may also have many other negative consequences, the most dangerous of them being social exclusion (Silver, 1995). The consequences of L.T.U. may be considered to be the most significant in the case of young and middle aged people, since the role of work is potentially most important for these age groups. Long-term problems with finding a job are also reflected in reduced self-esteem, which in turn may largely influence future professional and family life. An insightful analysis of the mechanisms by which L.T.U. of youth leads to social exclusion has been presented by (Kieselbach, 2003); moreover, he proposed solutions that can reduce the personal and societal costs of unemployment.

In our article, we consider L.T.U. under two main aspects connected with the ageing of society. The first concerns the insufficient labour supply and includes the indication of social groups most exposed to this negative phenomenon; the second is connected with exacerbating the ageing process of the population. Compared to other European countries, particularly difficult demographic trends are observed in Poland, where accelerated ageing of the population structure is observed (Kielkowska, 2013). This is due to low birth rates, and hence a lower proportion of young people in the population of Poland. According to Eurostat (Eurostat, 2018a), the total fertility rate in 2015 for Poland was as low as 1.32. Predicted fertility rates in Poland in the period 2014–2050 are moderate and vary between 1.217 and 1.375 (CSO, 2014). These trends are clearly reflected in the growing proportion of people aged 65 and above in the population of Poland, which is expected to rise from the currently observed 15% to

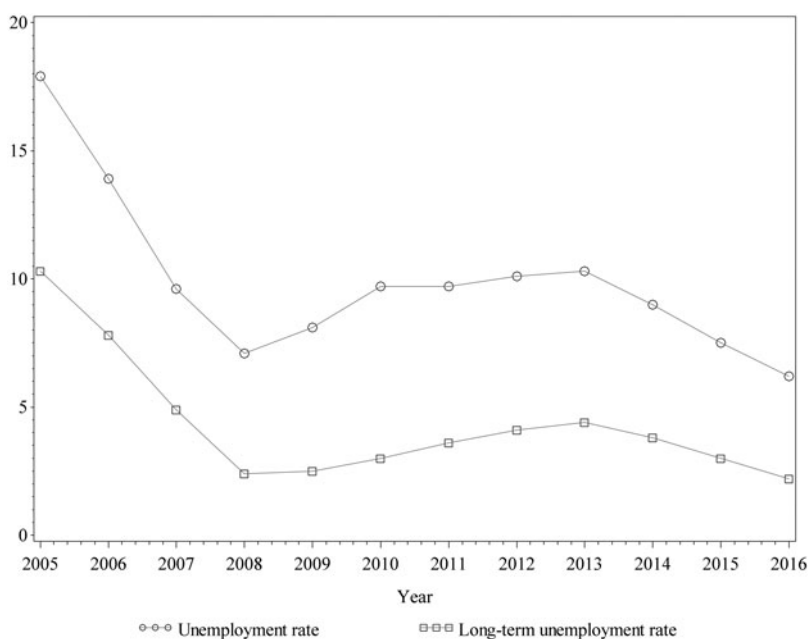


Figure 1. Unemployment rate and long-term unemployment rate in Poland, 2005–2015. *Source:* Author's presentation; Eurostat data (Eurostat, 2016a, 2016b).

35% by 2060 (Kielkowska, 2013). Furthermore, Eurostat data (Eurostat, 2017) reveals that the inactivity rate of older people aged 55–64 in Poland for men is as high as 40% and reaches 60% for women, which makes these rates some of the highest in the European Union. Such a low rate of professional activity of older people and one of the lowest fertility rates in Europe makes Poland face many challenges related to the labour market. Many countries are responding to the ageing society phenomenon and reduction of the labour force by developing active ageing programs (Walker, 2009). Moreover, European Commission recommendations indicate that the most efficient way of preparing for the ageing society phenomenon is raising employment levels (Caliendo & Schmid, 2016). In Poland, due to the lowering of the retirement age in 2017, one of the main ways to achieve these goals may be more effective vocational development of the long-term unemployed.

In recent years, the situation on the labour market in Poland has significantly improved; according to data from Eurostat (Eurostat, 2016b) the unemployment rate in Poland in 2016 was 6.2 and was the lowest since 1997. Worrying is the fact that the L.T.U. rate was relatively high. About one third of all the unemployed were people unemployed longer than 12 months. In addition, in the years 2014–2016 the level of the L.T.U. rate had not been decreasing as quickly as the total unemployment rate (Figure 1). Also other earlier studies on worker flow indicators from the unemployment to employment in Poland show that their values are much lower in the case of L.T.U. people than in the case of short-term unemployed people (Kwiatkowski & Kucharski, 2009).

According to Eurostat data from 2016 (Eurostat, 2016a), the L.T.U. rate in Poland compared to other European countries was on an average level (Table 1). In 2016,

Table 1. Unemployment rate (U) and long-term unemployment rate (L.T.U.) in Europe, 2009–2016.

	2009		2010		2011		2012		2013		2014		2015		2016	
	U	L.T.U.	U	L.T.U.	U	L.T.U.	U	L.T.U.	U	L.T.U.	U	L.T.U.	U	L.T.U.	U	L.T.U.
Austria	5.3	1.2	4.8	1.2	4.6	1.2	4.9	1.2	5.4	1.3	5.6	1.5	5.7	1.7	6.0	1.9
Belgium	7.9	3.5	8.3	4.0	7.2	3.5	7.6	3.4	8.4	3.9	8.5	4.3	8.5	4.4	7.8	4.0
Bulgaria	6.8	3.0	10.3	4.7	11.3	6.3	12.3	6.8	13	7.4	11.4	6.9	9.2	5.6	7.6	4.5
Croatia	9.3	5.1	11.8	6.6	13.7	8.4	15.8	10.2	17.4	11.0	17.2	10.1	16.1	10.2	13.4	6.6
Cyprus	5.4	0.6	6.3	1.3	7.9	1.6	11.9	3.6	15.9	6.1	16.1	7.7	15	6.8	13.0	5.8
Czech Republic	6.7	2.0	7.3	3.0	6.7	2.7	7.0	3.0	7.0	3.0	6.1	2.7	5.1	2.4	4.0	1.7
Denmark	6.0	0.6	7.5	1.5	7.6	1.8	7.5	2.1	7.0	1.8	6.6	1.7	6.2	1.7	6.2	1.4
Estonia	13.5	3.7	16.7	7.6	12.3	7.1	10.0	5.5	8.6	3.8	7.4	3.3	6.2	2.4	6.8	2.1
Finland	8.2	1.4	8.4	2.0	7.8	1.7	7.7	1.6	8.2	1.7	8.7	1.9	9.4	2.3	8.8	2.3
France	9.1	3.3	9.3	3.9	9.2	4.0	9.8	4.1	10.3	4.4	10.3	4.5	10.4	4.6	10.1	4.6
Germany	7.6	3.5	7.0	3.3	5.8	2.8	5.4	2.4	5.2	2.3	5.0	2.2	4.6	2.0	4.1	1.7
Greece	9.6	3.9	12.7	5.7	17.9	8.8	24.5	14.5	27.5	18.5	26.5	19.5	24.9	18.2	23.6	17
Hungary	10.0	4.2	11.2	5.5	11.0	5.2	11.0	5.0	10.2	4.9	7.7	3.7	6.8	3.1	5.1	2.4
Ireland	12.6	3.6	14.6	6.9	15.4	8.8	15.5	9.2	13.8	8.0	11.9	6.7	10.0	5.4	8.4	4.3
Italy	7.7	3.4	8.4	4.0	8.4	4.3	10.7	5.6	12.1	6.9	12.7	7.7	11.9	6.9	11.7	6.7
Latvia	17.5	4.5	19.5	8.8	16.2	8.8	15.0	7.8	11.9	5.7	10.8	4.6	9.9	4.5	9.6	4.0
Lithuania	13.8	3.3	17.8	7.4	15.4	8.0	13.4	6.6	11.8	5.1	10.7	4.8	9.1	3.9	7.9	3.0
Luxembourg	5.1	1.2	4.6	1.3	4.8	1.4	5.1	1.6	5.9	1.8	6.0	1.6	6.5	1.9	6.3	2.2
Malta	6.9	2.9	6.9	3.1	6.4	3.0	6.3	3.1	6.4	2.9	5.8	2.7	5.4	2.4	4.7	1.9
Netherlands	4.4	0.8	5.0	1.2	5.0	1.6	5.8	1.9	7.3	2.5	7.4	2.9	6.9	3.0	6.0	2.5
Poland	8.1	2.5	9.7	3.0	9.7	3.6	10.1	4.1	10.3	4.4	9.0	3.8	7.5	3.0	6.2	2.2
Portugal	10.7	4.2	12.0	5.7	12.9	6.2	15.8	7.7	16.4	9.3	14.1	8.4	12.6	7.2	11.2	6.2
Romania	6.5	2.2	7.0	2.4	7.2	2.9	6.8	3.0	7.1	3.2	6.8	2.8	6.8	3.0	5.9	3.0
Slovakia	12.1	6.5	14.5	9.2	13.7	9.2	14.0	9.4	14.2	10.0	13.2	9.3	11.5	7.6	9.7	5.8
Slovenia	5.9	1.8	7.3	3.2	8.2	3.6	8.9	4.3	10.1	5.2	9.7	5.3	9.0	4.7	8.0	4.3
Spain	17.9	4.3	19.9	7.3	21.4	8.9	24.8	11.0	26.1	13.0	24.5	12.9	22.1	11.4	19.6	9.5
Sweden	8.3	1.1	8.6	1.6	7.8	1.5	8.0	1.5	8.0	1.4	7.9	1.4	7.4	1.5	6.9	1.3
United Kingdom	7.6	1.9	7.8	2.5	8.1	2.7	7.9	2.7	7.5	2.7	6.1	2.2	5.3	1.6	4.8	1.3

Source: Author's presentation; Eurostat data (Eurostat, 2016a; 2016b).

the L.T.U. rate in the European Union was on average equal to 4%. It was the lowest in the U.K., where it was equal to 1.3%, and the highest in Greece, where it was as much as 17%, while in Poland it was 2.2% (Table 1). The level of the L.T.U. rate in most European countries is closely related to the level of the total unemployment rate (Table 1). Table 1 presents the ratios from 2009, which was the last named economic crisis. In the following year, for most of the European countries presented, increases in unemployment were recorded, in Poland too. The next increase in unemployment took place in 2013, which was related to what has been called the European debt crisis. The effects of this crisis were most noticeable in the labour markets in southern European countries such as Greece, Portugal, Spain, Croatia and Cyprus, where the highest increase in the unemployment rate was noted compared to 2009. In Poland, compared to other European countries, only a slight increase in unemployment rates was noted. In subsequent years in Poland, as in most of the considered countries, the unemployment rate decreased. In the case of Poland, it is well-worth paying attention to the relatively high L.T.U. rate compared to the total unemployment rate. In comparison, for example in Sweden, where in 2016 the unemployment rate was slightly higher than in Poland, the L.T.U. rate was 1.3, while for Poland it was 2.2. These differences may result, among others things, from mismatches within the labour market in Poland, mainly profound skills mismatches (Nešporová, 2017).

The relatively high level of the L.T.U. rate compared to the unemployment rate is perceived by some researchers as a hysteresis effect (Nešporová, 2017). According to this researcher, the long periods of high unemployment tend to increase the share of long-term unemployment, because they cause strengthening of unemployment. The concept of unemployment hysteresis was proposed by Blanchard and Summers (Blanchard & Summers, 1986) and constituted an attempt to explain the causes of high and permanent unemployment in the eighties in Europe and the differences on the labour markets in the U.S. and Europe. The authors introduced how temporary shocks can have a permanent effect on the level of employment and indicated a very high dependence of current unemployment on past unemployment. In papers by Bolat et al. (2014) and Lee (2010) the existence of the unemployment hysteresis effect in selected European countries has been examined. The obtained results indicated the existence of hysteresis in some of them, but not in Poland.

The presented differences in the level of unemployment rate and the L.T.U. rate result from various features of the labour markets in individual European countries. However, some aspects are common to all these markets. In the context of long term unemployment, these include: high unemployment among young people (Kieselbach, 2003), a worse situation of women compared to men (Scott et al., 2010), and low professional activity of older people (Eurostat, 2017).

Discrimination on the grounds of sex is observed to affect mostly women (Parpart & Stichter, 2016). Becker (2010) emphasises that in spite of the same efficiency of men and women in different fields, including the labour market, women are discriminated against by employers, which is clearly confirmed by a gender pay gap (Istenič et al., 2018). Caliendo and Künn (2015) show on the example of Germany that women are more exposed to L.T.U. than men, although they are better educated than unemployed men. Furthermore, Eurostat data (Eurostat, 2016a) shows that similar to most European countries, L.T.U. in Poland affects women more than men. The situation of women on the labour market may result from a traditional understanding of the social roles of women and men in households (McDonald, 2002). The attitude of employers combined with domestic responsibilities may make women less eager to look for a job, which in turn may increase their risk of L.T.U.

Another group, which is potentially at serious risk of L.T.U. is young people, as they more frequently suffer from unemployment than older workers (Caliendo & Schmidl, 2016). Eurostat data from 2013 shows that while L.T.U. in the European Union was on average at the level of 5.1% (Eurostat, 2016a), it was even higher in the 15–24 age group, at 8% (Eurostat, 2018b). Unemployment most frequently affects graduates and is a major barrier to starting their professional careers. One of the key barriers to finding a job by young unemployed people is the lack of practical skills and domain knowledge. Difficulties in finding a job have an impact on future professional careers, including future salaries (Kahn, 2010). Taking into account the negative trends caused by ageing societies, young people are the social group that requires the most extensive work aimed at increasing professional activity rates.

To what extent individuals are affected by L.T.U. depends on many of their characteristics, including the human capital they possess (Becker, 1991, 1993). In the context of this research, such characteristics of human capital as education and

qualifications play a key role. The importance of the impact of prior education on the duration of unemployment periods has been pointed out by (Nunez & Livanos, 2010). However, knowledge itself is not the only element of human capital (Schultz, 1982). This is because human capital is inherent to any human being and apart from knowledge includes social and personal features. The latter features are directly related to soft skills and most frequently are not measurable. The chances for leaving unemployment also depend on one's family situation and family patterns, which can strengthen or reduce motivation for looking for a job. Unfortunately, key surveys regarding the labour market, including the Labour Force Survey (L.F.S.) do not include data enabling analysis of the latter features. What should also be emphasised is the attitude of an unemployed person to this status, which unquestionably changes as the unemployment period continues. This attitude is expressed by the intensity and variety of job search-related activities, which may largely influence their ultimate result.

3. Research design

3.1. Reference data

On the basis of Eurostat data (Eurostat, 2016a; 2016b), it can be concluded that the currently observed positive changes in the labour market in Poland started in 2014 (Figure 1). In this study, data from 2015 have been used. This year was the second, which was characterised by a relatively good situation on the labour market in Poland. Data from the L.F.S. for Poland have been used to model the duration of long-term unemployment. These data constitute the main source of information on the situation on the labour market in Poland. The L.F.S. is a quarterly panel study with a sample rotation scheme. Individual personal data used in this study have been obtained through household surveys, therefore in the modelling weights have been used. The L.F.S. survey covers people aged 15 and older who are members of randomly drawn households. According to the aim of the study, in the first stage, a sample covering people aged 18–44 was distinguished. In the second stage, out of these people, those who did not have a job and were looking for a job were distinguished. Unfortunately, this study does not directly provide exact information on the time spent in unemployment. In cases when the respondent found a job, this time was determined based on information about when the respondent stopped working and information about the time of starting work provided in the next questionnaire. In the case of respondents who still did not have a job during the second study, the time was counted up to the time of the study. Due to the rotational nature of the survey, it is not possible to follow the further career of these respondents. In addition, for the purposes of modelling, a censoring variable was created, which was assigned a value of 1 in case of an event and 0 if the respondent was still looking for a job based on the last information available for him/her. Only those who remained unemployed for more than 12 months were selected for the final sample.

In this way, a sample of 1,517 respondents was obtained, among whom 104 respondents found a job in the investigated period. The study included both non-professional characteristics as well as those directly related to previously acquired

Table 2. Sample characteristics.

Variable	Categories	Labels of levels	Percent
Sex	Woman	0	51.35
	Man	1	48.65
Age group	From 18 to 24 years old	1	24.98
	From 25 to 34 years old	2	42.91
	From 35 to 44 years old	3	32.10
Marital status	Married	0	61.90
	Unmarried, a widower, a widow, separated or divorced	1	38.10
Education	Higher	1	15.62
	Post-secondary and secondary professional	2	23.80
	Secondary general	3	13.45
	Basic vocational	4	30.98
	Primary school	5	16.15
Presence of a child under 15 in a household in which the respondent or his/her spouse is its head	No	0	67.17
	Yes	1	32.83
Place of residence	Village	0	47.00
	Town	1	53.00
Region of Poland	Central (łódzkie, mazowieckie)	1	13.12
	Southwest (dolnośląskie, opolskie)	2	10.09
	South (małopolskie, śląskie)	3	12.59
	Northwest (wielkopolskie, zachodniopomorskie, lubuskie)	4	13.84
	North (kujawsko-pomorskie, warmińsko-mazurskie, pomorskie)	5	17.80
	East (lubelskie, podkarpackie, świętokrzyskie, podlaskie)	6	32.56
Work experience	No work experience or no information	1	36.72
	Up to five years	2	34.54
	Over five years	3	28.74
Type of job wanted	Other	0	58.54
	Full-time	1	41.46
Reasons for looking for a job	Job loss	1	29.40
	Resignation from previous job or other reason	2	3.30
	Return to work after a career break	3	39.75
	Taking the first job in life	4	27.55
Situation immediately before starting to look for a job	Other than study, childcare or job/practice/free internship	1	26.70
	Study	2	16.61
	Childcare	3	16.28
	Job/practice/free internship	4	40.41
Willingness to start working within the two weeks following the week in question	No or lack of information	0	4.94
	Yes	1	95.06

Source: Author's calculations; data from the Labour Force Survey, Poland.

professional qualifications. A set of potential explanatory variables is presented in Table 2. It is worth noting here that among the surveyed long-term unemployed people up to 95.06% could take up employment within two weeks following the audited week. This analysis aims to indicate those characteristics that affect the fact that respondents remain longer without work under the *ceteris paribus* condition.

3.2. The estimation methods

A.F.T.s (Lawless, 2003; Kalbfleisch & Prentice, 2011) have been used to model the impact of selected determinants on the duration of L.T.U. These models belong to the group of parametric survival models characterised by the fact that the probability distribution of a dependent variable, which is the time until the occurrence of any

event, is known. These models enable the identification of factors that delay or accelerate the exit of an individual from some state. In this article, transition from the long term unemployed state to the state of having a job, has been investigated.

A.F.T. models belong to a broad class of regression models, therefore the A.F.T. model can be written in the following form:

$$Y = \ln(T) = \mathbf{x}'\boldsymbol{\beta} + \sigma\epsilon. \quad (1)$$

Hence

$$T = \exp(\mathbf{x}'\boldsymbol{\beta}) \times \exp(\sigma\epsilon), \quad (2)$$

where \mathbf{x} is the vector of explanatory variables, $\boldsymbol{\beta}$ is the regression vector, σ is the scaling factor and ϵ a random component. For various distributions of the random component ϵ , different distributions for the event time T are obtained.

In this article, the following probability distributions were considered to describe the time of unemployment: the exponential model, the Weibull model, the log-logistic model and the log-normal model. These models have been considered in the Bayesian approach (Walker & Mallick, 1999; Ibrahim et al., 2001). In this approach, the entire statistical inference is based on posterior distributions determined by the formula:

$$p(\boldsymbol{\theta}|D) = \frac{p(D|\boldsymbol{\theta})p(\boldsymbol{\theta})}{\int p(D|\boldsymbol{\theta})p(\boldsymbol{\theta})d\boldsymbol{\theta}} = \frac{p(D|\boldsymbol{\theta})p(\boldsymbol{\theta})}{p(D)}, \quad (3)$$

where D denotes the observed data, $\boldsymbol{\theta}$ is the vector of unknown parameters., $p(\boldsymbol{\theta})$ is the a priori joint probability distribution, and $p(D)$ the marginal density of observation. The Markov Chain Monte Carlo Methods (MCMC) have been used to estimate the vector of parameters (Congdon, 2006).

The use of the Bayesian approach in modelling makes it possible to obtain broad information about the studied phenomenon based on the results of the estimation. As a result of Bayesian estimation, distributions of parameters are obtained, not only fixed values, as is the case in the classical approach. This makes it possible to compare the parameters both in terms of their value and diversity. In addition, this approach provides a number of methods, which can be used to compare competing models. Bayesian methods make it possible to compare nested and not nested models using the Bayes factor (B.F.) and other criteria of model selection (Wasserman, 2000).

3.3. Modelling of Long-Term unemployment

In the first stage of the research, a distribution was selected to enable the best description of the phenomenon, which is the length of time of L.T.U. For this purpose, the Bayesian estimation of the exponential, Weibull, log-logistic and lognormal models were used. Bayesian estimation was performed using the Gibbs sampler. Due to the large sample size, the non-informative prior distributions were used for all parameters of these models. The comparisons of the estimated models were

Table 3. The statistics of Bayesian models fit.

	Exponential model	Weibull model	Lognormal model	Log-logistic model
<i>DIC</i>	876.273	877.515	858.811	874.136
$\ln(p(y M_i))$	-438.345	-439.025	-430.914	-434.976
$\ln(BF)$	7.440	8.111	0	4.062
<i>EAIC</i>	876.288	877.515	858.785	874.191
<i>EBIC</i>	882.6269	890.1928	871.4628	886.8688

Source: Author's calculations; data from the Labour Force Survey, Poland.

conducted using the deviance information criterion (D.I.C.), the B.F., the expected Akaike information criterion (E.A.I.C.) and the expected Bayesian information criterion (E.B.I.C.) (Wasserman, 2000). Based on D.I.C. statistics, the lognormal model turned out to be the best Bayesian model to fit the data. The values of E.A.I.C. and E.B.I.C. criteria also indicate the log-normal model. Next, the value of the B.F. was calculated for each model in relation to the log-normal model (Table 3). For each of the considered models, exponential, Weibull and log-logistic, it was found that a posterior hypothesis about the best explanation of data by each of them is less likely than the equivalent hypothesis defined for the lognormal model. Therefore, the log-normal model was found to have the greatest explanatory power in modelling the phenomenon in question, i.e., the duration of L.T.U. of people aged 18–44. Therefore, this model was used for further analysis in this article.

The main advantage of survival models is the ability to analyse the studied phenomenon at any time of its duration. In this article, the analysis of the diversity of the duration of periods of individuals who remain in a state of L.T.U. was carried out using the survival function. For this purpose, log-normal survival functions in various cross-sections with regard to selected factors presented in Table 2 were estimated with the a priori assumptions made earlier.

The first of the factors considered was belonging to a specific age group. On the basis of the survival function shown in Figure 2, it can be concluded that the probability of finding a job for particular age groups varies over time. In the first thirty months, it is most difficult to get out of unemployment for people aged 18 to 24. In the later period of unemployment, older people have greater difficulties. In the case of people from two older age groups, from 25 to 34 and from 35 to 44, the probability of leaving unemployment is similar, with people from the older age group less likely to find a job.

Previous work experience of an individual is most often related to his or her age, but in the case of long-term unemployment, it does not always have to be that way. Therefore, in the next stage, the survival functions in groups designated by the seniority feature were determined (Figure 3). The third chart shows the clear differences in the values of the probabilities of leaving unemployment between people with professional experience and those having no professional experience at any moment of the phenomenon under concern. In addition, these differences increase with the time spent on unemployment. However, differences in the probabilities of not having a job between people with experience of up to five years and those with longer work experience are small. At the same time, people with over five-years' experience had the best chance of getting out of the state of L.T.U.

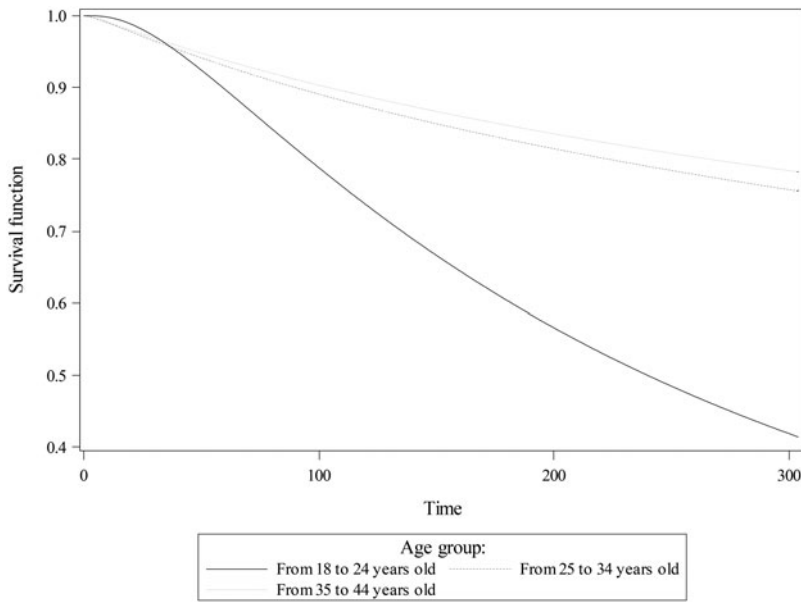


Figure 2. The survival functions for different age groups. *Source:* Author's estimations; data from the Labour Force Survey, Poland.

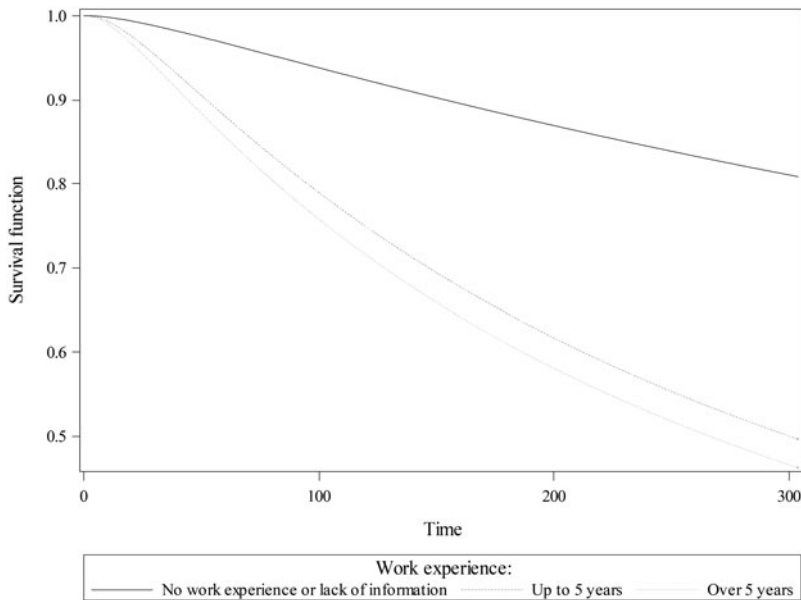


Figure 3. The survival functions for work experience. *Source:* Auhtor's estimations; data from the Labour Force Survey, Poland.

The probability of finding a job was also influenced by the situation of the respondent directly before the start of his/her job search. In the case of this feature, the probability of finding a job changes largely with the duration of the phenomenon (Figure 4). In the initial months of its duration, the lowest probability of leaving

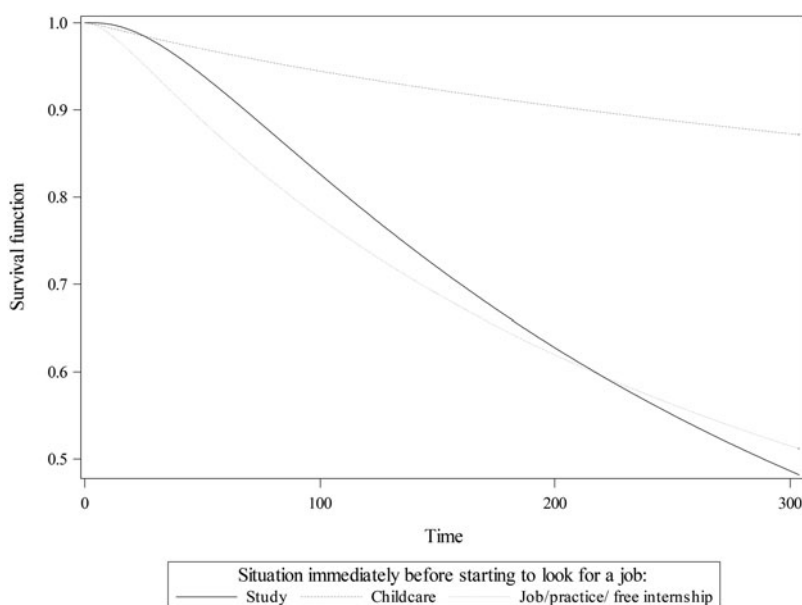


Figure 4. The survival functions for situations immediately before starting to look for a job. *Source:* Author's estimations; data from the Labour Force Survey, Poland.

unemployment was for people who were in education directly before the start of their job search, and the largest for people who were working. In addition, in the case of people who were working just before the start of their job search, the probability of finding a job was the highest for the majority of the period under consideration. Only in the final period were these people less likely to find a job than people who were studying immediately before the start of their job search. The worst situation was clearly seen by people who were looking after a child directly before the start of their job search (except in the first months). They had the lowest probability of finding a job, and this decreased only slightly as time passed. This means that only some individuals in the surveyed period found a job.

In the next stage, the differences in the likelihood of leaving L.T.U. due to sex were examined (Figure 5). It was found that for about the first three years, both women and men had a similar probability of finding a job. After this period, men were more likely to find a job. Moreover, as time passed, these differences deepened more and more to the detriment of women.

One of the reasons for the worse situation of women on the labour market may be their performance of household duties to a greater extent, including caring for children. The graphs presented in Figures 6 and 7 confirm these assumptions. The presence of a child under 15 in a household has a negative impact on the probability of leaving L.T.U. in almost the whole of the analysed period (Figure 6). Only in the first few months does the presence of a child under 15 in the household not differentiate the probability of getting out of unemployment. In contrast, in the case of men, the presence of a child under 15 in a household in which the respondent or his spouse is its head, had a positive impact on the likelihood of leaving L.T.U. for the majority of the period considered (Figure 7).

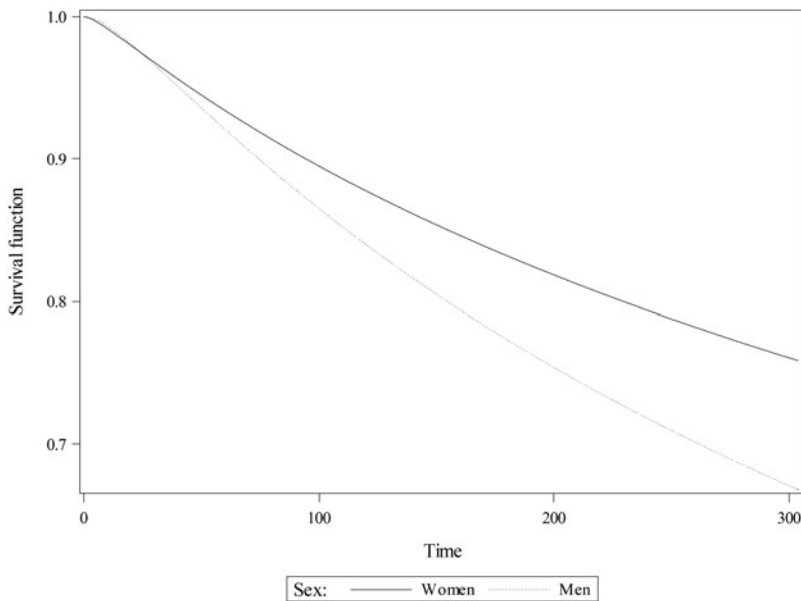


Figure 5. The survival functions for women and men. *Source:* Author's estimations; data from the Labour Force Survey, Poland.

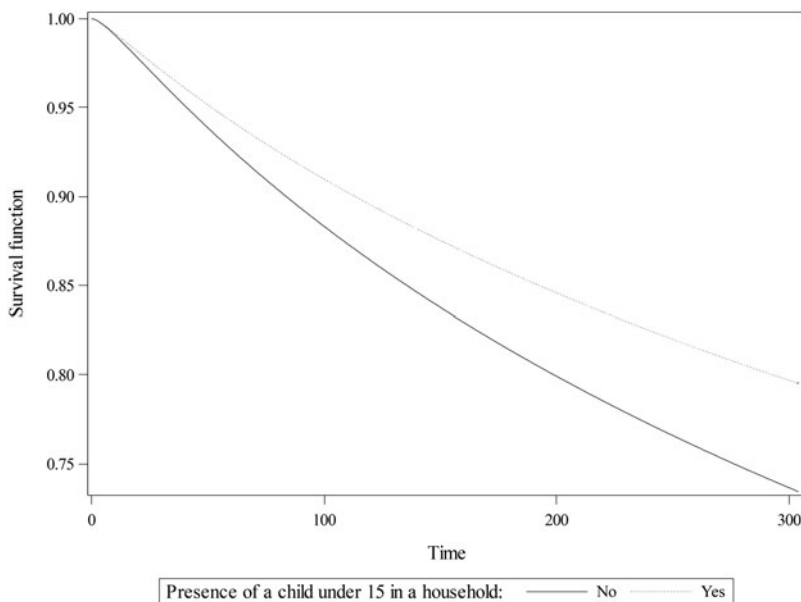


Figure 6. The survival functions for women who have children and who do not have children. *Source:* Author's estimations; data from the Labour Force Survey, Poland.

In the next stage of the research, a log-normal model was constructed with the variables presented in Table 2. As a result of the preliminary estimation, a model was constructed in which all variables were placed, for which at least one level turned out to be statistically significant. The results of the final model estimation are presented

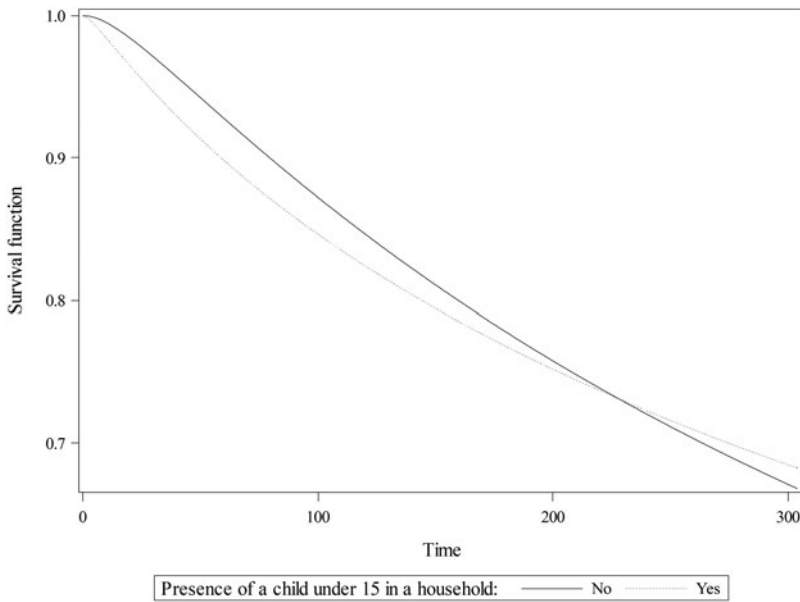


Figure 7. The survival functions for men who have children and who do not have children. *Source:* Author’s estimations; data from the Labour Force Survey, Poland.

Table 4. Statistics of the posterior samples and Geweke convergence diagnostics for the lognormal model.

Description of the parameter	Mean	Standard Deviation	Highest Probability Density Interval ($\alpha=0.05$)		Geweke Diagnostics	
			z	p-value		
Intercept*	5.8085	0.2911	5.2734	6.4160	-0.7185	0.4724
Age from 18- to 24-years- old *	-0.8718	0.2257	-1.3322	-0.4450	1.1997	0.2303
Age from 25- to 34-years-old	-0.2380	0.1638	-0.5668	0.0671	1.2696	0.2042
Married ***	-0.2563	0.1531	-0.5573	0.0403	-0.1109	0.9117
Higher education *	-0.8948	0.2466	-1.3922	-0.4296	0.0674	0.9463
Post-secondary and secondary professional education **	-0.5224	0.2230	-0.9659	-0.0840	0.0642	0.9488
Secondary general education **	-0.7070	0.2392	-1.1902	-0.2495	-0.0083	0.9933
Basic vocational education **	-0.4637	0.2168	-0.8948	-0.0302	0.2801	0.7794
No work experience *	1.5469	0.2041	1.1618	1.9669	-1.1107	0.2667
Work experience up to five years **	0.5081	0.1761	0.1622	0.8528	-1.2111	0.2259
Other than study, childcare, job/practice/free internship before starting to look for a job **	0.4612	0.1732	0.1132	0.7974	-0.6807	0.4960
Study before starting to look for a job	-0.1170	0.2438	-0.6069	0.3428	-0.2187	0.8269
Childcare before starting to look for a job **	0.6447	0.2060	0.2437	1.0490	-0.1271	0.8989
Scale**	1.1857	0.0974	1.0039	1.3788	-1.7078	0.0877

Notes: * p 0.001, ** p 0.05, *** p 0.1.

Source: Author’s calculations; data from the Labour Force Survey, Poland.

in Table 4. Estimation in the Bayesian approach requires the assessment of the convergence of generated Markov chains. On the basis of the Geweke test, there were no grounds to reject the hypothesis about the convergence of the generated chains at any level of significance.

Due to the statistical dependencies between some of the explanatory variables, only selected variables were included in the model. In addition, the characteristics

Table 5. Statistics of the posterior samples and Geweke convergence diagnostics for lognormal model for women.

Description of the parameter	Mean	Standard Deviation	Highest Probability Density Interval ($\alpha = 0.05$)		Geweke Diagnostics	
			z	p-value		
Intercept*	6.1496	0.5377	5.2061	7.2608	1.2831	0.1994
Age from 18- to 24-years- old **	-0.6757	0.3615	-1.3616	0.0630	-1.0779	0.2811
Age from 25- to 34-years-old	-0.0718	0.2563	-0.5884	0.4320	-1.3901	0.1645
Married **	-0.5883	0.2301	-1.0429	-0.1405	-0.2613	0.7939
Higher education **	-1.1444	0.4138	-1.9870	-0.3744	-1.1429	0.2531
Post-secondary and secondary professional education	-0.2642	0.4131	-1.1194	0.5200	-1.1150	0.2648
Secondary general education *	-0.6799	0.4084	-1.4857	0.1243	-1.1554	0.2479
Basic vocational education	0.0771	0.4488	-0.7879	0.9612	-1.3492	0.1773
No work experience ***	1.6927	0.3758	0.9752	2.4586	-0.5615	0.5744
Work experience up to five years	0.1073	0.2659	-0.4370	0.6034	0.2797	0.7797
Other than study, childcare, job/practice/free internship before starting to look for a job *	0.4555	0.2967	-0.1286	1.0308	0.1257	0.9000
Study before starting to look for a job	-0.2280	0.4227	-1.0806	0.5850	0.9003	0.3680
Childcare before starting to look for a job **	0.5581	0.2561	0.0458	1.0519	0.3627	0.7169
Scale **	1.2684	0.1539	0.9884	1.5901	0.9706	0.3317

Notes: * $p < 0.001$, ** $p < 0.05$, *** $p < 0.1$.

Source: Author's calculations; data from the Labour Force Survey, Poland.

describing the place of residence of the respondent, the reasons for the job search and the possibility of working within the two weeks following the audited week were statistically insignificant. The last one was characterised by a very low percentage of negative responses. Before interpreting the obtained results, it should be emphasised that the obtained values are average values obtained for the entire examined period.

Based on the posterior averages (Table 4) for the first of the variables considered, it can be stated that in the case of people aged 18–24, the time for finding a job was accelerated compared to the oldest of the age groups considered. Also for each group of people with higher education beyond junior high school or primary school, the moment of finding a job was accelerated. However, in the case of people who had no work experience or had general work experience of up to five years, the time of starting work was delayed compared to people with professional experience over five years. However, these differences were larger for people without work experience and people with professional experience over five years. In addition, people who took care of their children immediately before the start of looking for a job delayed the time of starting work in comparison to people who were doing some work immediately before the start of their job search.

Interesting results were also provided by the estimation of such a model in groups determined by the variable describing the respondent's sex (Tables 5 and 6). There is a visible differentiation of the impact of individual factors on the moment of starting work. In addition, in the case of men, many variables turned out to be statistically irrelevant.

In the case of women, most of the variable levels considered in the first model turned out to be significant. Women from the age group of 18 to 24 managed to find a job faster compared to women from the oldest age groups. In the case of the education feature, only two levels of this variable turned out to be statistically significant.

Table 6. Statistics of the posterior samples and Geweke convergence diagnostics for lognormal model for men.

Description of the parameter	Mean	Standard Deviation	Highest Probability Density Interval ($\alpha = 0.05$)		Geweke Diagnostics	
					<i>z</i>	<i>p-value</i>
Intercept*	5.2256	0.2628	4.7672	5.7856	0.2934	0.7693
Age from 18- to 24-years- old *	-1.1912	0.2936	-1.7805	-0.6168	-0.9495	0.3423
Age from 25- to 34-years- old ***	-0.4073	0.2395	-0.8699	0.0665	-1.4427	0.1491
No work experience *	1.7355	0.2537	1.2517	2.2387	0.7592	0.4477
Work experience up to five years *	1.1012	0.2955	0.5319	1.6857	1.4097	0.1586
Scale**	1.2051	0.1433	0.9372	1.4934	0.2549	0.7988

Note: * p 0.001, ** p 0.05, *** p 0.1.

Source: Author's calculations; data from the Labour Force Survey, Poland.

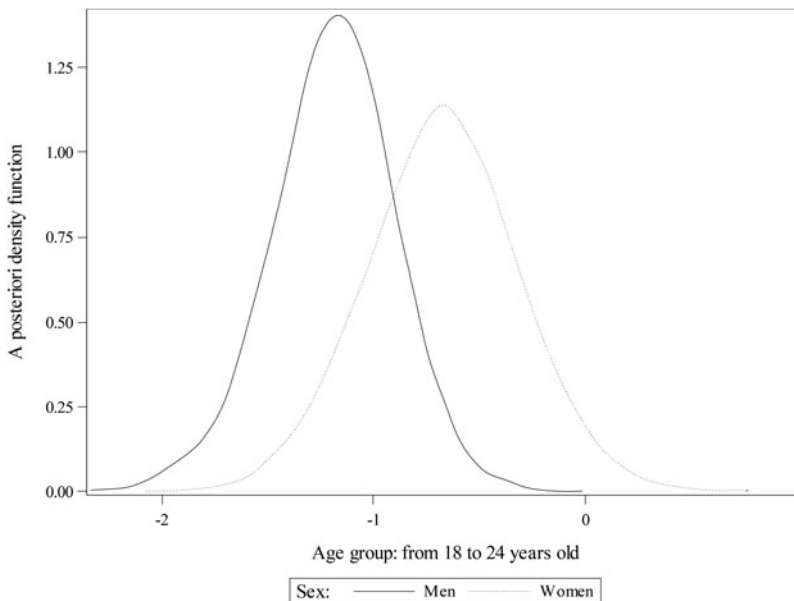


Figure 8. The posterior densities for the 18–24 age group for women and men. Source: Author's estimations; data from the Labour Force Survey, Poland.

In the case of women with the highest level of education and secondary general education, the time of finding a job was accelerated in comparison to the least-educated women. In addition, lack of professional experience was important, in the case of such women the time of starting work was delayed compared to women with professional experience of over five years. In the case of women who took care of their children, the time of starting work was also delayed compared to women who had been doing some work immediately before the start of job search.

In the case of men, all the levels of the variables included in the model were observed to be statistically significant. The direction of the impact of individual levels of these variables on the duration of L.T.U. is analogous to that of women, but a more detailed analysis of the obtained posterior distributions indicates different behaviours of these two groups of respondents on the labour market. [Figure 8](#)

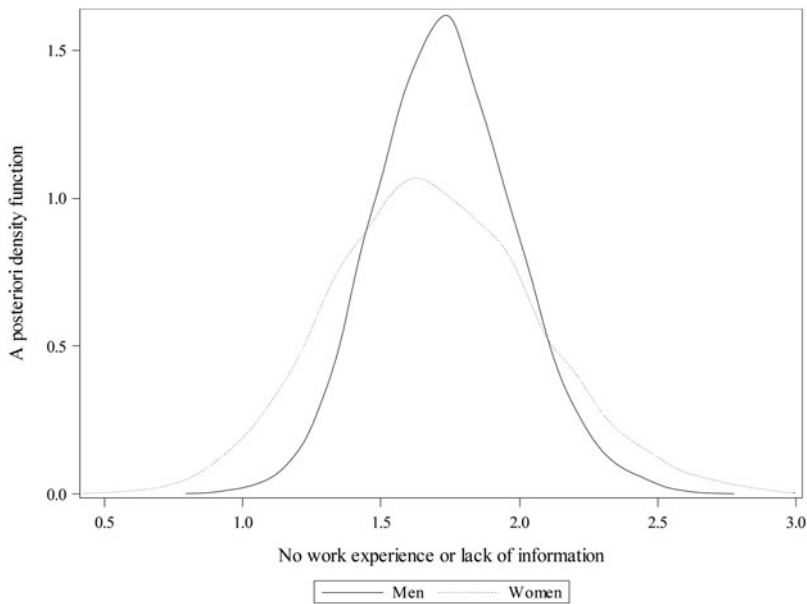


Figure 9. The posterior densities for no work experience for women and men. *Source:* Author's estimations; data from the Labour Force Survey, Poland.

presents the posterior density function for the first group variable age (18–24 years) for men and women. The average posterior obtained for this parameter differs in the case of women and men. Moreover, the distribution in the case of men is more concentrated than in the case of women. However, for the first level of the experience variable, the posterior averages for the scale parameter do not differ significantly for women and men, although the distribution in the case of men is much more concentrated than in the case of women (Figure 9).

4. Discussion

Eurostat data (Eurostat, 2016a, 2016b) shows a major improvement in the labour market situation in Poland in recent years (Figure 1). In the years 2014–2016, a reduction in the overall unemployment rate to 6.2%, and in the L.T.U. rate to 2.2%, was observed. However, these relatively low rates are largely due to the definition of unemployment adopted by Eurostat. In particular, the rates reported by the Ministry of Labour and Social Policy, though decreasing, are significantly higher. The positive changes on the labour market in Poland observed within recent years, including the reduction of unemployment, may turn out to be insufficient to address the major changes in the age structure of the population of Poland. What is needed are actions that could significantly increase the economic activity of people who, for various reasons, remain professionally inactive, and could potentially increase the resources of the workforce. These include as, investigated in this article, the L.T.U., who are looking for a job.

Active labour policy demands knowledge of the structure of long-term unemployed jobseekers and identification of their characteristics (Svabova & Durica, 2015). L.T.U.

people have a much lower chance of finding a job compared to people who are short-term unemployed. As shown in the analysis of the U.S. labour market (Kroft et al., 2013), the probability of being invited to a job interview becomes significantly lower as the duration of unemployment increases. Moreover, most of the reduction in this probability is observed within the first eight months. Therefore, proper identification of those social groups most exposed to long-term unemployment, taking into account the time aspect, is extremely important. Furthermore, in this study we found that the impact of individual features influencing success in finding a job by L.T.U. people is not constant and depends on the duration of unemployment.

The analyses presented in this article underlines the work experience importance in the exit from L.T.U.. The obtained results are in conformity with the results of other previous surveys for Poland. In the article by Kwiatkowski and Kucharski (2009), on the basis of the structures of short-term unemployment and L.T.U. with respect to the duration of employment in the last workplace, it has been found that the number of years worked affects the duration of both of these states in a similar manner. The professional experience is often related to the age of the unemployed. In the same article, the authors point out that it is the most difficult for the youngest (under 35 years) to get out of unemployment. It should be noted that the conclusions presented in the article by Kwiatkowski and Kucharski (2009) were based on the logistic regression model, and therefore they do not take into account the duration of L.T.U. for individual people. The results presented in this article are more detailed, but the general conclusions remain consistent.

Our analysis shows that young people have the lowest chance of leaving L.T.U. during the first two and up to three years. Although later in most cases they find a job, this L.T.U. period has a major negative influence on their future careers and the demographic situation of the country. The fact that the education period is followed by unemployment may delay family decisions and childbearing, which in turn results in a lower number of children (Matysiak, 2009). According to Nešporová (2017) unskilled youth have particularly difficult situation in the labour market in Central Europe. Young people frequently have no professional experience, which has a major impact on their chances of finding a job. Kieselbach (2003) indicated that lack of qualifications, which are needed to escape unemployment, is observed to be a major challenge, because youth with low qualifications had a chance only to get poor and precarious jobs. Furthermore, our study indicated the important role of human capital defined not only by professional experience, but also by education. This confirms the importance of young people continuing their education. Even vocational education increases their chances of being employed. Interestingly, our study shows that although higher education yields the greatest chance of finding a job, these differences are not as large as might be expected. This may suggest the positive role of additional courses and trainings in finding a job.

Another key aspect, which has been addressed by this study is the impact of having a child, and taking care of the child, on the chances of finding a job. Our study shows that the group with the lowest chance of finding a job are those, who immediately before starting to look for a job were taking care of a child. This problem mostly affects women, because, in their case, the presence of a child aged less than

15 years in a household, reduces the probability of exit from unemployment. Interestingly, in the case of men, a reverse tendency has been identified. This shows that in Poland, traditional social roles are still largely influencing social processes. A similar result was obtained for female youths in Ireland (Kelly et al., 2012), moreover, for these women, the amount of welfare benefits had a negative impact on the exit from unemployment to employment before 12 months. However, what should be noted here is that the problem of returning to work is observed mostly among people who were not professionally active for more than two years because of caring for a child. The main reason for this, according to (Mincer & Ofek, 1982; Becker, 1991), is the extensive loss of human capital. Moreover, this may be due to the attitude of women, who may perceive being employed again as difficult or even impossible due to family reasons.

Other studies also indicate that L.T.U. is mainly a problem for females (Kwiatkowski & Kucharski, 2009). Our analysis reveals that, in the case of women, leaving unemployment becomes difficult after approximately three years from the beginning of the unemployment period. During the first three years of being unemployed, the chances of finding a job are the same for men and women. This may be due to the fact that young women with no major family obligations find it easier to get a job. The situation of women in the context of L.T.U., which follows from this study, is particularly important in view of the current demographic structure of the population of Poland. According to (Sobotka et al., 2011), lack of long-term employment is one of the reasons influencing fertility decisions of women. Furthermore, (Matysiak, 2009) shows that having a job has a positive impact on having children. Hence, unemployment among women can even exacerbate the ageing society phenomenon.

In summary, the results presented in this article, the results of earlier studies (Kwiatkowski & Kucharski, 2009) and the results of studies carried out immediately after the transformation period in Poland (Góra & Schmidt, 1998) indicate that some features of the labour market in Poland remain constant. It follows from all the aforementioned studies that married women or women caring for children, and the least-educated people encounter major difficulties in getting out of long-term unemployment. However, the situation of young people on the labour market in Poland has changed. In the recent period, in comparison to the nineties, young people find it more difficult to find a job, the consequence of which may be reduced tendency to starting and raising families.

5. Conclusion

In Poland, despite the drop in the unemployment rate observed recently, due to the demographic situation, the labour supply is reduced. There is a shortage of workers at the moment in Poland, mainly those who are qualified, and workers from beyond the eastern border may not fill this gap. Moreover, in view of low fertility rates, changes in the age structure of the economically active population become factual. Taking into account the negative influences of the ageing population of Europe on the labour market, professional activation of long-term unemployed people is extremely important.

Our analysis reveals a number of factors determining the chances of the long-term unemployed in finding employment. These factors may have an impact on the

ultimate success of labour market policies and institutions aimed at the vocational activity of this group. A key aspect of the development of vocational activity programmes should be linking them to specific social groups, while taking into account the duration of the unemployment period. Due to the ageing of Polish society, special attention should be paid to women and the elderly.

In the case of older people, economic education regarding the demographic situation in Poland and the necessity to introduce changes, including increasing the retirement age, are extremely important. It is also worth paying attention to the directions of family policy activities, which should better support women's professional activities so that they can combine informal care and household duties with work. As shown in this article, taking on longer childcare significantly hinders returning to work. It is important that during the period of parental leave, women do not completely break contact with employers. The solution, if it is possible, can be performance of commissioned work or an earlier return to part-time work.

Staying in L.T.U. reduces chances on returning to work, therefore for people out of employment the most important is to not postpone the job search and to actively look for one. Moreover, in this article we indicated that the chances of the unemployed to find a job depend on their situation in the labour market immediately before starting a job search and their work experience. Therefore it is important that people who cannot find a permanent job for a long time take up at least temporary work or a part time job.

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