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Women's Economic Inactivity and Age. Analysis of the Situation in Poland and the EU

Abstract: The group of economically inactive women is heavily diversified. The reasons for staying outside the labour market are the important factors that differentiate this group. They depend on the age or level of education among others. In addition, there is great geographical heterogeneity of the reasons for economic inactivity. Hence, two questions arise. Firstly, how significant is the geographical diversity of the reasons for staying outside the labour market in the European Union? Secondly, have these geographical differences been changing over time? The main aim of the analysis is the classification of the EU countries taking into consideration reasons for women's economic inactivity in different age groups. The analysis is carried out applying descriptive statistics and the *k*-means method. The data are taken from the publicly available Eurostat's Labour Force Survey datasets. The study of general tendencies in women's economic inactivity covers the years 2000–2016. In turn, cluster analysis was carried out for data from 2006, 2010 and 2014. The obtained results confirmed significant diversity of the EU states. In addition, this geographical diversity has been changing over time. We receive the greatest similarity of classification obtained for different periods for the 50–64 age group and the smallest for the 25–49 age group. Moreover, there are noticeable tendencies of a significant decrease in the share of the economically inactive in the group of the oldest individuals (aged 50–64) in the sample. On the other hand, in the youngest group (individuals aged under 25), there are opposite tendencies observed – the share of those who remain outside the labour market increases.

Keywords: labour market, female economic inactivity, cluster analysis, *k*-mean method

JEL: J21, C38

1. Introduction

One of the key priorities of the European Union is to increase employment in the 20–64 age group to 75% by 2020 (see *Europe 2020* strategy). Primarily this could be achieved by activating people who are economically inactive. The scale of economic inactivity is a worrying phenomenon and a serious economic problem (see e.g.: Góra, 2004; Woźniak, 2007; Niewiadomska, 2013). In the European Union, 22.4% of people aged 20–64 were not included in the labour force in 2016. This problem affects women to a greater extent. Despite the fact that over the past few decades the occupational activity of women has increased significantly, nearly 30% of them remain outside the labour market. There are many reasons for staying outside the labour market. The most important ones are retirement, education, illness or disability, and family responsibilities including looking after children or incapacitated adults. The reasons for economic inactivity depend heavily not only on sex or the education level but also on age (see e.g.: Münch, van Wijnbergen, 2009). Education prevails in the group of the youngest people, while retirement predominates in the oldest group. In the prime age group, women mostly point to looking after children and men to their own illness or disability. However, the declared reasons vary considerably across the EU.

The main aim of the analysis is the classification of the EU countries in regard to women's inactivity causes in different age groups. This analysis will allow to identify the similarities and differences in the lack of involvement of women of all age groups in the labour market in different regions of the EU. This, in turn will allow to assess the potential needed to achieve increased employment – especially among women. The analysis is carried out using descriptive statistics (for the description of the most important quantitative information associated with the economic inactivity of women) and the *k*-means method (for the EU states clustering). The data are taken from the European Union Labour Force Survey – Eurostat's databases. The study of general situation covers the years 2000–2016. The clustering was prepared for the years 2006, 2010 and 2014.

2. People outside the labour market in Poland and the European Union

Economically inactive (outside the labour force) people are defined as persons who are neither employed nor unemployed. They are not included in the labour force (see e.g.: Blanchard et al., 1990; Kryńska, Kwiatkowski, 2013). The European Commission sees the economically inactive, especially women, as a source of la-

bour supply (see *Europe 2020* strategy). According to Eurostat's statistics (EU27)¹, in 2016 the percentage of people aged 20–64 outside the labour market in the European Union was 22.4% (16.2% among men and 28.6% among women). Eurostat's statistics indicate that the economic inactivity rate depends heavily on age and sex among others. In this study, age groups were defined as follows²:

- 1) young people starting their professional career – aged 15–24;
- 2) prime-age employees developing their professional career – aged 25–49;
- 3) older employees – aged 50–64³.

In 2016, 56% men and 61.1% women aged 15–24, 8.1% men and 20% women aged 25–49, and 25.1% men and 38.8% women aged 50–64 stayed outside the labour market in the European Union. For Poland, these values were as follows: 60.2% men and 71.1% women aged 15–24, 7.7% men and 20.4% women aged 25–49, and 34.3% men and 50.5% women aged 50–64. Firstly these statistics show that many more women than men stayed economically inactive. Secondly, the inactivity rate in the prime-age group in Poland is very close to the EU level. Thirdly, among the young and the older, this rate is much higher in Poland. In the younger group, the differences are approximately 4 p.p. for men and 10 p.p. for women. In the oldest group, these values are higher by 9.2 p.p. and 11.7 p.p. for men and women respectively.

These differences are due to many factors. The two main factors are (1) remuneration offered in the economy, and (2) regulations in the pension system (see e.g.: Niewiadomska, 2013). Wages in Poland are quite low. According to the Structure of Earnings Survey in 2014, Polish people earned on average 67% per hour of what the Europeans did (in Purchasing Power Standard). This may be one of the reasons why young people delay the entry into the labour market. Secondly, this may result in older people leaving the labour force earlier. In Poland, this trend is enhanced by the government regulation allowing women to retire at the age of 60. As Niewiadomska (2013) has noted, an unfavourable relation of low wages to offered social benefits can also discourage economic activity.

¹ Croatia was excluded from the analysis.

² The LFS-target respondents considered as labour force people aged 15–74. In turn, in the presented study, we consider the population aged 20–64, and consequently this population is analysed in the following age groups: 20–24, 25–49 and 50–64. However, in Eurostat's public data there is no information on the 20–24 age group, so we investigate the population aged 15–24.

³ This age group is also called "50+". Such people usually have the greatest difficulty getting into the labour market, so many programmes (measures) are dedicated to this age group.

3. Causes of economic inactivity

A great number of factors contributing to labour market inactivity are discussed in the literature. Most of them can be included in the following groups: (1) demographic processes, (2) the construction of the social security system, (3) education, (4) economic factors, and (5) the family model.

Demographic processes (population ageing, low fertility, migration, etc.) have the greatest impact on the size of the group of people who stay outside the labour force. Longer life expectancy and a low fertility rate cause the economically inactive group to increase, and consequently the workforce shrinks (the problem is widely discussed by Dixon, 2003; Russel, Fahey, 2004; Rudawska, 2010; Serban, 2012; Kotowska, 2008; Kielkowska, 2013; Strzelecki, 2013; Pleśniak, 2014; Kłos, Russel, 2016 among others). The construction of the social security system is another factor influencing the size of the group outside the labour market. Góra (2004) and Woźniak (2007) draw attention to two aspects: pension system regulations and availability of social benefits. The pay-as-you-go pension plan is the most popular in the European Union. In this plan, we assume the transfer of output of today's workers to today's retirees (see Willmore, 2004). The stability of such a system can be preserved, among others, by maintaining appropriate proportions between the employed and the group outside the labour market (see Łojek, 2011).

Due to demographic processes, mainly the ageing of the European population and the resulting growth of the economically inactive group, the proportions are being increasingly distorted. As a consequence, the functioning of the pension system and thus public finances will be adversely affected. As regards the reform of the pension system, the following solutions are postulated (see Eatock, 2005): (1) increasing statutory pension ages (to reflect changes in life expectancy and align the retirement age with this phenomenon in the future); (2) equalising state pension ages for men and women, as well as (3) limiting early retirement and integrating special pension schemes into the mainstream. Additional activities are proposed, such as (see Eatock, 2005): (4) increasing the employability and participation of older workers, and (5) promoting active labour markets including older groups.

Extending the education period causes young people to delay entering the labour market. In addition, supplementing the education by prime-age people causes their temporary exit from the labour market (in the EU this is the main reason for inactivity of 20.4% men and 8.3% women aged 25–49).

This can be caused by several factors. Firstly, education is seen as a factor increasing competitiveness in the labour market (see e.g.: Leśniewska, 2012; Chłoń-Domińczak, Strawiński, 2013; Piróg, 2013). Statistics indicate that people with a high level of education earn more. They are also more active and stay longer in the labour market. Secondly, for many people extending the education period

is a way of avoiding unemployment (see e.g.: Woźniak, 2007). According to the Eurostat's Labour Force Survey data, in 2016 17.4% people aged 20–24 in the EU were unemployed. The ratio of young and prime-age (25–49 years old) unemployment rates is about 2.1 and has persisted since at least 2000. This means that youth unemployment is a serious problem. However, the causes of this problem are related mainly to structural problems in the labour market as reported by Jansen et al. (2016) (see also Drozdowicz-Bieć, 2014). An important factor is also the adjustment of education to the labour market needs (see e.g.: Allmendinger, 1989; Fasih, 2008; Ionescu, 2012).

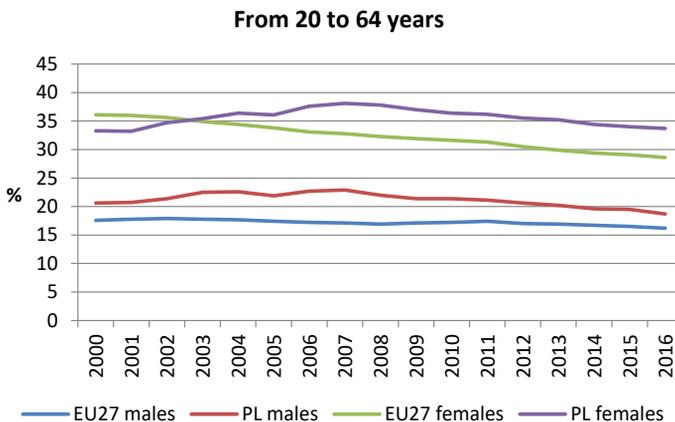
Many researchers report that the relation between the female economic activity rate and economic growth is U-shaped (see Durand, 1975; Psacharopoulos, Tzannatos, 1989; Goldin, 1994; Luci, 2009; Olivetti, 2014; Lechman, Kaur, 2015). Generally the U-shaped hypothesis assumes that one can expect higher female participation rates in poor countries, a lower rate in middle-income countries (mostly because of the transition of men to industrial jobs), and a higher rate in developed countries where women have on average a higher level of education and the fertility rates have fallen so women are more likely to enter the labour market (see e.g.: Verick, 2014). Moreover, factors such as employment opportunities, the offered wage level and labour costs are also of great importance (see Góra, 2004; Niewiadomska, 2013).

Female activity in the labour market is also related to the economic family model (see Kotowska, 2007). Women are more likely to reduce the paid work for the sake of family responsibilities. Therefore, women work part-time more often than men (see e.g.: Elias, 1990; Bardasi, Gornick, 2000; Gash, Cooke, 2010). Jau-motte (2003) notes that the increased possibility of part-time work has raised the participation of women in the labour market.

It is necessary to mention that many authors have pointed in the literature to the negative relationship between increasing women's employment and fertility. Low fertility is a serious problem, not only a demographic one but also an economic one (some aspects of this problem have been referred to earlier). Therefore, the question arises whether pursuing a considerable increase in the female economic activity is a positive solution. For more discussion, see Rękas (2017), Ochocki (2014), Kotowska (2007), Brewster and Rindfuss (2000), Sundström and Stafford (1992) among many others.

4. Economic inactivity rate in Poland and the EU27 – changes over time

Figure 1 presents the values of the economic inactivity rate for men and women in different age groups in Poland and the EU in the years 2000–2016. The inactivity rate of women in the EU decreased by about 4.8 p.p. for the prime-age group and 19 p.p. for the “50+” group in 2016 in comparison to 2000. The average annual pace of change in these cases was 1.34% and 2.46% respectively (see Table 1). In the group of men in this period, we can observe that the inactivity rate rose by 1.2 p.p. in the prime age group and decreased by 11 p.p. in the older group. It can be seen that in the “50+” group this rate was shrinking faster in the period 2008–2016, on average 2.72% per year for men and 2.97% for women. In the previous period (2000–2007), those values were 1.71% and 1.97% for men and women respectively. Interestingly, the percentage of prime-age men outside the labour force was increasing faster between 2016 and 2008 (1.48% on average per year) than in the period 2000–2007 (0.81%). In Poland, the share of the economically inactive in the population aged 50–64 decreased by 10.2 p.p. for men and 8.3 p.p. for women. The decline was faster in the period between 2008 and 2016 (2.15% on average per year for men and 2.43% for women). In the period 2000–2007, the group of men was shrinking by 0.79% every year and the group of women was increasing by 0.97% yearly. In the entire period, the group of economically inactive women of the prime age increased slightly (by 0.2 p.p.), while the comparable group of men decreased by 1.1 p.p. When we look at this phenomenon more closely, we can notice that in the period 2000–2007 both the male group and the female group expanded by 0.7 p.p. and 1 p.p. respectively. In the period 2008–2016, they shrank by 1.8 p.p. and 0.8 p.p. respectively.



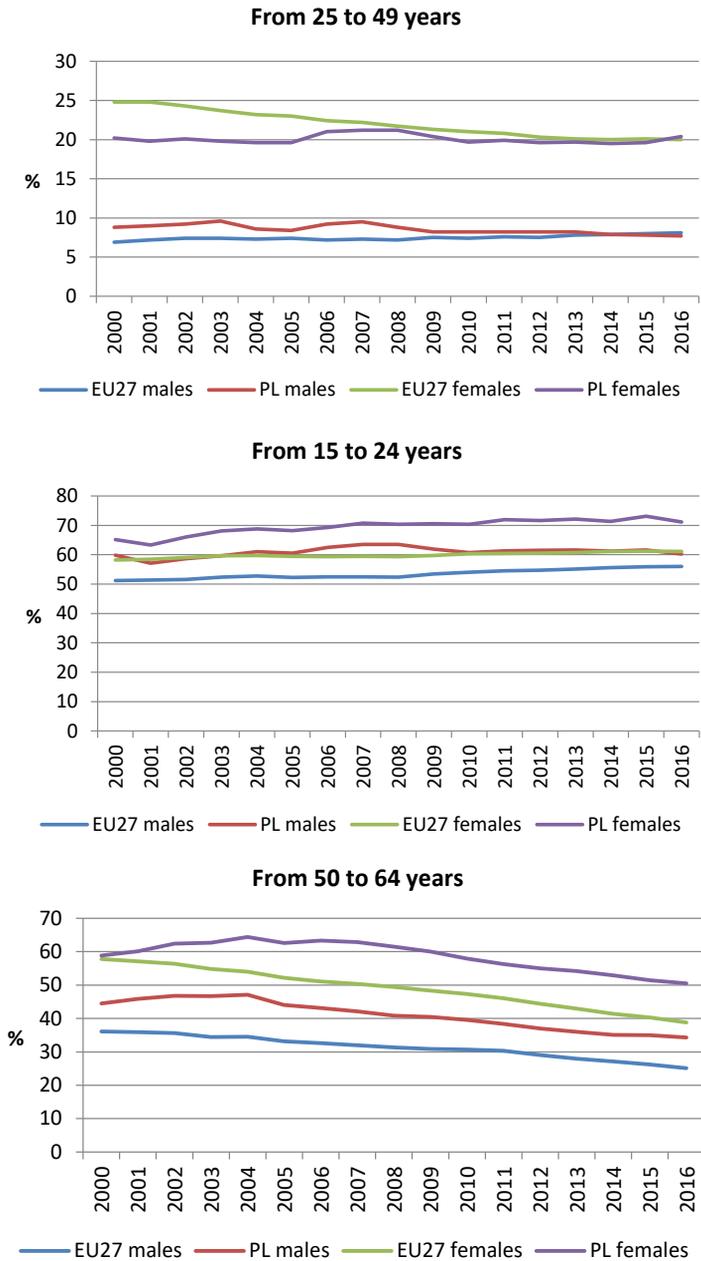


Figure 1. Percentage share of economically inactive men and women in the total population aged 20–64, 15–24, 25–49 and 50–64 in Poland and the EU27

Source: own elaboration based on Eurostat-LFS data

In the youngest group, we can observe an increase in the economically inactive population (of 4.8 p.p. in the EU27 and 0.4 p.p. in Poland for men and of

2.9 p.p. in the EU27 and 6 p.p. in Poland for women). We can also note that tendencies in sub-periods were different, especially in Poland. Between 2000 and 2007, we can observe a faster growth rate of inactivity of young people, on average 0.86% for men and 1.19% for women per year. In turn, in the years 2008–2016, the average annual pace of change was 0.66% and 0.12% for men and women respectively.

Table 1. The average pace of changes in the economic inactivity rate in Poland and in the EU region in selected age groups

Age group	Period	EU27 males	PL males	EU27 females	PL females
From 20 to 64 years	2000–2016	-0.52%	-0.60%	-1.44%	0.07%
	2000–2007	-0.41%	1.52%	-1.36%	1.94%
	2008–2016	-0.53%	-2.01%	-1.51%	-1.42%
From 15 to 24 years	2000–2016	0.56%	0.04%	0.30%	0.55%
	2000–2007	0.36%	0.86%	0.29%	1.19%
	2008–2016	0.83%	-0.66%	0.37%	0.12%
From 25 to 49 years	2000–2016	1.01%	-0.83%	-1.34%	0.06%
	2000–2007	0.81%	1.10%	-1.57%	0.69%
	2008–2016	1.48%	-1.66%	-1.01%	-0.48%
From 50 to 64 years	2000–2016	-2.25%	-1.61%	-2.46%	-0.95%
	2000–2007	-1.71%	-0.79%	-1.97%	0.97%
	2008–2016	-2.72%	-2.15%	-2.97%	-2.43%

Source: own elaboration based on Eurostat-LFS data

5. The main reasons for not seeking employment in Poland and the EU

Reasons for economic inactivity can be defined in various ways. Eurostat's surveys take into account the following variants: (1) own illness or disability, (2) other family or personal responsibilities, (3) looking after children or incapacitated adults, (4) in education or training, (5) retired, (6) think no work is available, (7) awaiting recall to work (on lay-off), and (8) other reasons. Tables 2 and 3 present the current (2016) structure of economic inactivity (declared main reasons for staying outside the labour market) in age groups in the EU27 and in Poland.

We can see that economically inactive people are a highly diverse group and age plays a big differentiating role. Among the young, the main reason for staying outside the labour market is education. It is named by approximately 87% of economically inactive women and more than 90% of men. A sizeable difference is visible as far as one reason is concerned. Looking after children or incapacitated adults was indicated by more than 4% of women in the EU (in Poland

5.6%), while only 0.1% of men in the EU27 (in Poland it could be even less) pointed to this reason. Other determinants were indicated with a similar frequency. In this age group, there is a very high value of structure similarity index for both sexes. In this case, the similarity of structure for the declared reasons between men and women is 95.7% for the EU27 and 93.5% for Poland. When we compare a group of women in Poland to the EU27, we will get the similarity index equal to as much as 96%. The value of this indicator is so high because the vast majority of young people (up to the age of 24) are still in education.

Table 2. The main reasons for staying outside the labour market declared by men and women in 2016 in the EU27

Reason for economic inactivity	Aged 20–64		Aged 15–24		Aged 25–49		Aged 50–64	
	M	F	M	F	M	F	M	F
Own illness or disability	27.7	16.1	2.5	1.7	35.9	14.4	32.2	21.2
Looking after children or incapacitated adults	1.9	19.3	0.1	4.1	4.0	39.5	1.5	5.5
Other family or personal responsibilities	2.4	12.3	0.9	1.6	4.3	15.0	1.8	12.8
In education or training	22.3	13.4	90.1	87.3	20.4	8.3	0.3	0.3
Retired	26.1	17.2	0.1	0.0	2.6	0.7	48.5	35.3
Think no work is available	7.0	5.9	1.6	1.1	11.5	6.8	6.0	6.1
Awaiting recall to work (on lay-off)	0.6	0.4	0.1	0.1	1.3	0.7	0.4	0.2
Other reasons	11.9	15.4	4.7	4.0	20.0	14.7	9.2	18.5
Structure similarity index* M vs. F		69.2		95.2		53.9		75.5
Structure similarity index EU27 vs. PL	81.2	84.0	95.7	96.0	67.5	79.1	82.3	81.7

* The structure similarity index is calculated as: $W_s = \sum_{i=1}^k \min\{w_i^A; w_i^B\} \cdot 100$, where $W_s \in \langle 0; 100 \rangle$; w_i^A – percentage frequency of i -th category of variable in sample A ; w_i^B – percentage frequency of i -th category of variable in sample B .

Source: own elaboration based on Eurostat-LFS data. M – males, F – females

Table 3. The main reasons for staying outside the labour market declared by men and women in 2016 in Poland

Reason for economic inactivity	Aged 20–64		Aged 15–24		Aged 25–49		Aged 50–64	
	M	F	M	F	M	F	M	F
Own illness or disability	39.9	16.5	2.5	1.6	50.3	15.3	45.6	20.8
Looking after children or incapacitated adults	2.0	19.7	na	5.6	4.9	47.1	1.5	3.6
Other family or personal responsibilities	8.0	17.8	3.1	3.8	15.4	27.2	5.2	14.4
In education or training	15.6	11.3	92.1	87.6	7.2	2.5	na	na
Retired	24.7	27.0	0	0	7.5	0	38.8	51.8
Think no work is available	7.8	5.5	1.5	0.5	12.4	6.2	7.0	6.3
Awaiting recall to work (on lay-off)	0	0.2	na	na	na	0.4	na	na

Reason for economic inactivity	Aged 20–64		Aged 15–24		Aged 25–49		Aged 50–64	
	M	F	M	F	M	F	M	F
Other reasons	1.9	2.1	0.7	0.9	2.0	1.1	2.0	3.1
Structure similarity index M vs. F		69.9		93.5		45.4		74.6
Structure similarity index EU27 vs. PL	81.2	84.0	95.7	96.0	67.5	79.1	82.3	81.7

Source: own elaboration based on Eurostat-LFS data. M – males, F – females, na – data not available

In the 25–49 age group, considerable diversity of reasons for not being in the labour force between men and women can be seen. The structure similarity index equals 53.9 for the EU27 and 45.4 for Poland. These differences may be caused by the fact that women more often than men indicate two reasons: looking after children or incapacitated adults and other family or personal responsibilities, together 54.5% in the EU27 and 74.3% in Poland. In the case of male individuals, these values are 8.3% in the EU and 20.3% in Poland. Men from this age group most often pointed to their own illness or disability (35.9% in the EU and 50.3% in Poland). The similarity of the structure of economic inactivity of women in Poland and the EU27 is equal to 79.1%, while for men the value of this index is lower by 11.6 p.p. Men across the EU pointed to the fact that their professional inactivity is caused by staying in education or training (20.4%) and other reasons (20%), while in Poland these reasons were pointed to by 7.2% and 2% men respectively. Men in Poland indicated their own illness (50.3%) and other family responsibility (15.4%) more often than men in the whole EU (35.9% and 4.3% respectively). In addition, in Poland many more women from this age group remain outside the labour market because of: looking after children or incapacitated adults (47.1%, while in the EU 39.5%) and other family or personal responsibilities (27.2%, in the EU 15%). Polish individuals aged 25–49 are less frequently economically inactive because of education and other reasons than the Europeans in general. The next analysed group is 50–64. People from this age group are beginning to intensively withdraw from the labour market⁴. Most of these people withdraw from the labour market because of retirement or their own illness or disability. It should be noted that significantly more women point to retirement in Poland than in the whole EU area, 51.8% and 35.3% respectively. The structure of male and female economic inactivity in Poland and in the EU is much more similar in the age group 50–64 than in the younger group (aged 25–49). The structure similarity index is equal

⁴ It is important to note that the retirement age is different in the EU countries. Currently, according to official statistics, it is 58 years (for women, e.g.: in the Czech Republic) and 61 years (for men, such a possibility exists in Sweden, for example). Ultimately, however, in all the EU countries this age is extended. The longest presumed retirement age is currently assumed in Ireland (68 years since 2028). It should also be borne in mind that sometimes the rules allow one to retire earlier than the standard age, e.g.: in Poland such a possibility is still available to some people working in uniformed services.

to 75.5% for the EU and 74.7% for Poland. In contrast to the whole EU's statistics, their own illness or disability is a more common reason of Polish men's economic inactivity than retirement. It is also worth mentioning that the similarity of the structure of economic inactivity in Poland and the EU27 is over 80% for both men and women.

Summarising, the intensity of the cause of staying outside the labour force depends on the age group. The most diverse collectives in terms of economic inactivity are people aged 25–49 years. This means that similar approach strategies can be formulated for younger and older groups for the whole EU area, though it will be much more difficult for the prime-group. Activation measures will strongly depend on the specificity of the general conditions in a particular country (availability of social benefits, jobs and external child care services among others).

6. Results of EU states clustering

Information related to the labour market activity in the EU is collected under the Labour Force Survey (LFS). The presented analysis uses publicly available LFS data from the years: 2006, 2010 and 2014⁵. The study refers to 25 EU states. The following countries were excluded: Croatia (formally in the EU structures since 2013), Ireland and France (because of a significant lack of data)⁶. As mentioned earlier, the analysis concerns women from three age groups: 15–24, 25–49 and 50–64. Diagnostic variables were shares of people pointing to individual reasons for their economic inactivity. They were as follows: (1) own illness or disability, (2) other family or personal responsibilities, (3) looking after children or incapacitated adults, (4) in education or training, (5) retired, (6) think no work is available, and (7) other reasons. Due to substantial missing data, the analysis did not take into consideration the reason of awaiting for recall to work (on lay-off).

The *k*-means method (see McQueen, 1967 and e.g.: Gatnar, Walesiak, 2004) was applied for the clustering and STATISTICA software was used. In turn, the procedure for conducting cluster analysis was taken from the work of Walesiak (2006). Data were standardised and the Euclidean distance was applied as a distance measure. The *k*-means method is one of the most widely applied methods for data clustering. It consists in dividing the analysed sample of objects into a pre-defined number of clusters. In the first phase of analysis, objects (states) were divided into different numbers of clusters: groups: from 2 to 12 ($k = 2, 3, \dots, 12$).

⁵ The presented analysis is linked to a broader study on the situation of women in the labour market which also uses Structure of Earnings Survey data (SES). SES is carried out four times yearly (regularly since 2002). Therefore, to ensure the comparability of the results, the analysis is limited to the years 2006, 2010 and 2014.

⁶ Some missing data for other states were supplemented with the existing data.

Then, based on the silhouette index (SI, see Kaufman, Rousseeuw, 1990), the best divisions were selected⁷. The procedure was performed for 9 samples including data from 2006, 2010 and 2014 and for three different age groups: 15–24, 25–49, 50–64. The similarity of EU states classification was assessed using the adjusted Rand index (AR, see Hubert, Arabie, 1985).

The obtained results show that, depending on the sample, divisions into 8, 9 or 10 clusters were the best (see Table 4, where the highest values of Rousseeuw silhouette index are highlighted). Whereas for the greatest number of samples (for 6 out of 9), the best division is into 10 groups. But SI values are equal to or greater than 0.5 for the other three samples in the case of 10 groups. This means that such a division is acceptable. Therefore, the number of clusters equal to 10 is considered in further analysis.

Table 4. Values of Rousseeuw silhouette index (SI) for the obtained divisions

No. of clusters	Sample								
	Female aged 15–24			Female aged 25–49			Female aged 50–64		
	2006	2010	2014	2006	2010	2014	2006	2010	2014
8	0.550	0.476	0.534	0.716	0.553	0.569	0.598	0.547	0.503
9	0.582	0.549	0.691	0.677	0.572	0.509	0.471	0.606	0.692
10	0.739	0.659	0.701	0.721	0.586	0.500	0.649	0.532	0.662

Source: own elaboration

Table 5. Values of adjusted Rand index (AR) for ten clusters

Age group	Compared years		
	2006 and 2010	2010 and 2014	2006 and 2014
15–24	0.1346	0.2229	0.1970
25–49	0.3151	0.1428	0.3481
50–64	0.3697	0.5049	0.3771
Year	Compared age groups		
	15–24 and 25–49	25–49 and 50–64	15–24 and 50–64
2014	0.1253	0.1375	0.1253
2010	0.0514	0.0107	0.2665
2006	0.0965	0.0660	0.0259

Source: own elaboration

⁷ Walesiak reports that values over 0.5 indicate that a reasonable structure has been found, then the number of clusters is acceptable.

Table 6. Results of EU states clustering for women aged 15–24

Cluster	2006	2010	2014
1	UK	UK	UK
2	Romania	Bulgaria, Romania	Romania
3	Bulgaria, Finland	Finland	Bulgaria
4	Sweden	Sweden	Netherlands, Finland, Sweden
5	Denmark	Denmark, Spain, Netherlands	Belgium, Denmark
6	Netherlands	Italy	Spain, Hungary
7	Italy, Hungary	Germany	Italy, Portugal
8	Czech Rep., Germany	Belgium, Czech Rep., Lithuania, Luxembourg, Hungary, Austria, Poland, Portugal, Slovenia, Slovakia	Czech Rep.
9	Estonia, Latvia, Lithuania, Austria, Slovakia	Estonia, Latvia	Germany, Estonia, Greece, Cyprus, Latvia, Lithuania, Luxembourg, Austria, Poland, Slovenia, Slovakia
10	Belgium, Greece, Spain, Cyprus, Luxembourg, Malta, Poland, Portugal, Slovenia	Greece, Cyprus, Malta	Malta

Source: own elaboration

Table 6 shows the results of EU states clustering for the age group 15–24. There were obtained 5 one-object clusters for each analysed year. There were the UK, Romania, Sweden, Denmark and the Netherlands for the year 2006, the UK, Finland, Sweden, Italy and German for the year 2010, and the UK, Romania, Bulgaria, the Czech Republic and Malta for the year 2014. As it can be noticed, the UK was always classified to a separate group. The UK is distinguished by a high proportion of young women attributing their inactivity to looking after children (from 16.1% in 2006 to 13.1% in 2014). One very large group was obtained in each division. There were 9 states in 2006, 10 states in 2010 and 11 states in 2014. In addition, it should be noted that the AR index is greater for the divisions in 2010 and 2014 than for the divisions in 2006 and 2010 (see Table 5). So the cluster composition for 2010 is more similar to that from 2014 than from 2006. This can be interpreted in two ways. Firstly, the results obtained reflected the effects of the economic crisis. Economic turmoil had a significant impact on young people. We could observe a significant increase in the youth unemployment rate and an increase of percentage frequency of young people outside the labour market in that period. The inactivity rate was increasing much more faster in the 2008–2016 period than in the

2000–2007 period in the whole EU for this age group (see Table 1). The crisis has a different impact on the individual EU countries. Hence, the diversity of the structure of young women outside the labour market could increase, which is shown in small similarity of divisions in 2006 and 2010. Secondly, economic and demographic processes and also the implementation of various support programmes make the structure of economically inactive young people more similar across Europe (greater similarity of divisions in 2010 and 2014). Poland was assigned to the largest cluster (together with Luxembourg and Slovenia in every analysed year). This group is characterised by a very high average percentage of young women who declared education as the main reason for their economic inactivity (in 2006 it was 90.34%, in 2010 – 91.54% and in 2014 – 90.82%).

Table 7. Results of EU states clustering for women aged 25–49

Cluster	2006	2010	2014
1	Czech Rep.	Czech Rep.	Czech Rep.
2	Denmark, Sweden	Denmark, Sweden	Denmark, Sweden
3	Italy	Italy	Bulgaria, Italy
4	Bulgaria	Bulgaria, Latvia	Spain, Latvia, Portugal, Slovenia
5	Slovenia	Belgium, Portugal, Slovenia	Belgium, Germany
6	Germany, Spain, Cyprus, Latvia, Luxembourg, Austria, Poland	Germany, Austria, Finland	Finland
7	Hungary	Spain, Cyprus, Luxembourg, Poland	Estonia, Cyprus, Hungary, Austria, Poland, Slovakia, UK
8	Estonia, Netherlands, Slovakia, Finland, UK	Estonia, Hungary, Slovakia, UK	Romania
9	Belgium, Lithuania, Portugal, Romania	Lithuania, Netherlands	Lithuania, Netherlands
10	Greece, Malta	Greece, Malta, Romania	Greece, Luxembourg, Malta

Source: own elaboration

Table 7 shows the results of EU states clustering for the age group 25–49. We can notice that there is a much greater variation in the structure of female economic inactivity for this age group than for the other ones. The AR index (see Table 5) shows that more similar are divisions for 2006 and 2010 than divisions for 2010 and 2014. The Czech Republic (cluster 1), Denmark and Sweden (cluster 2) were separate clusters in every analysed year. The Czech Republic is characterised by a high percentage of women who declared looking after children as the main

reason for not being in the labour force (in 2006 it was 73.8%, in 2010 – 75.7% and in 2014 – 74%). In turn, in Denmark and Sweden own illness or disability (about 40% of responses on average) and education (about 30% of responses on average) dominated. Relatively few women declared looking after children as a reason in this group. This is because the Scandinavian countries have a highly developed external childcare service. In the groups to which Bulgaria was assigned, women often pointed to no work (about 20% on average or more). Greece, Malta and Romania were classified to the clusters that were characterised by a high percentage of declarations indicating the following two reasons: other family or personal responsibilities and other reasons. Poland was assigned to the largest cluster (together with Cyprus) in every analysed year, as in the case of women aged 15–24.

Table 8. Results of EU states clustering for women aged 50–64

Cluster	2006	2010	2014
1	Italy	Italy	Italy
2	Spain, Cyprus	Spain, Cyprus	Spain, Cyprus
3	Netherlands, UK	Netherlands, UK	UK
4	Belgium	Belgium, Latvia	Belgium, Netherlands
5	Bulgaria, Germany, Estonia, Latvia, Lithuania, Poland, Portugal	Bulgaria, Czech Rep., Hungary, Austria, Poland, Slovenia, Slovakia	Bulgaria, Estonia, Latvia, Lithuania, Hungary, Poland
6	Czech Rep., Hungary, Austria, Slovenia, Slovakia	Germany, Luxembourg, Malta, Portugal	Czech Rep., Austria, Slovenia, Slovakia
7	Denmark, Finland	Denmark, Estonia, Lithuania	Finland
8	Sweden	Sweden	Denmark, Sweden
9	Luxembourg	Finland	Portugal
10	Greece, Malta, Romania	Greece, Romania	Germany, Greece, Luxembourg, Malta, Romania

Source: own elaboration

Table 8 shows the results of EU states clustering for the age group 50–64. Values of AR index indicate that divisions for this age group are much more similar across the selected years than in other age groups. In particular, the classifications obtained for 2010 and 2014 have the highest level of similarity (with AR = 0.5). As for the previous age groups, we can also distinguish here two groups that have the same composition regardless of the year. They are: Italy (cluster no. 1) and Spain and Cyprus (cluster no. 2). Italy has the highest percentage of women declaring other reasons for their economic inactivity (about 40%). In turn, in cluster 2 (Spain and

Cyprus), we can observe the highest average percentage of designation pointing to other family or personal responsibilities. However, we can observe a decrease of this value (56.5% in 2006, 48.5% in 2010 and 39.7% in 2014). The largest share of responses about retirement was observed in the clusters with the Czech Republic, Austria, Slovenia and Slovakia. Own illness or disability is the main reason in states from cluster no. 8 (Sweden in 2006 and 2010, or Sweden and Denmark in 2014). The value of the average share was more than 50%. Poland was included in the largest cluster (together with Bulgaria) in every analysed year as in the previous age groups.

7. Conclusions

Statistics show that the female labour force participation in the EU region has increased significantly over the last decades. The female inactivity rate was lower by about 7.5 p.p. in 2016 than in 2000. However, when we look at this indicator in different age groups, we can see that the largest decrease in the percentage of women outside the labour market was recorded for women aged 50–64: 19 p.p. in the EU27 and 8.3 p.p. in Poland between the years 2000 and 2016. This results from the fact that the pension policy in the European Union has had a considerable impact on increasing labour market activity. Firstly, the retirement age of men and women has been equalised in many countries. Secondly, the retirement age has been increased in many countries or there are plans to increase it. In contrast, the economic inactivity rate has slightly increased in the 15–24 age group. As the main reason, we can consider an increase in the proportion of people who stayed in education. It is necessary to note that the share of people declaring education as the main reason for inactivity increased by 7.3 p.p. among women and 6.6 p.p. among men in the whole population aged 15–24 in the EU28 in the years 2000–2016.

The percentage of women outside the labour market and the main reasons for their inactivity vary significantly across the EU countries. This means that the problems with activity in the labour market in the individual EU states are very different, despite the efforts of the European Commission and other institutions. Such a situation is influenced by many economic and non-economic factors: institutions, public policies (see e.g.: Winkler, 2016), the family policy (Gehring, Klasen, 2017), different welfare structures in the individual European countries (see e.g.: Cipollone et al., 2014), and preferences (see Hakim, 2004 and 2006) among others. The results indicate that the best classifications of 25 objects (countries) were into 10 or 9 clusters. This confirms the great diversity of the analysed feature (female labour market inactivity) among the EU states. Additionally, considerable differences between the classifications obtained for different age groups indicate that this

diversity is multidimensional. Women with different individual characteristics can react in different ways to the institutional settings connected with the labour market (see Jaumotte, 2003; Genre, Gomez-Salvador, Lamo, 2010; Cipollone, Patacchini, Vallanti, 2013), which largely affects this multidimensionality.

The obtained EU states divisions have also changed over time. We have the greatest similarity of classification for the age group 50–64. We can see that the shares of the declared main reasons for staying outside the labour force for this age group have not changed as much as in the other age groups. This is an interesting starting point for further analyses of the causes of inactivity in the labour market among women in the EU countries. First of all, the results suggest that changes in the institutional settings and the economic environment (such as an economic crisis, among other things) affect to a great extent the female economic activity in the younger groups. In turn, it suggests that labour market policies and measures addressed to the younger groups should be more flexible than the ones addressed to the older groups.

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APPENDIX

Table A1. Variable values/average values of variables in particular clusters for the age group 15–24 in the years 2006, 2010 and 2014

Reason	Own illness or disability	Family or personal responsibilities	Looking after children	Education	Retired	No work	Other
No. of cluster	2006						
1	2.80	0.50	16.10	76.90	0.00	0.00	3.60
2	1.10	4.00	3.20	77.60	0.00	1.90	12.10
3	2.15	6.80	7.05	73.20	0.00	5.70	5.00
4	2.80	0.00	2.80	75.30	0.00	2.10	16.40
5	4.30	3.50	0.00	89.10	0.00	0.00	3.10
6	4.20	0.50	4.10	83.40	0.00	1.30	6.50
7	1.35	1.05	5.00	83.70	0.05	2.60	6.05
8	0.70	1.40	4.75	90.65	0.80	0.15	1.55
9	0.84	1.78	6.88	86.54	0.00	0.00	2.14
10	1.04	3.14	1.86	90.34	0.04	0.24	2.82
No. of cluster	2010						
1	3.40	0.80	13.40	78.80	0.00	0.00	3.50
2	1.05	5.70	5.30	77.85	0.00	4.60	5.35
3	4.00	1.70	5.80	80.80	0.00	3.80	3.90
4	3.30	0.00	3.80	78.30	0.00	2.80	11.40
5	3.20	2.13	1.30	86.33	0.10	1.10	5.33
6	1.20	1.30	2.80	85.00	0.00	4.20	5.20
7	0.80	1.80	3.70	88.50	1.10	0.20	3.90
8	0.95	1.17	3.75	91.54	0.05	0.33	1.63
9	0.55	2.60	8.60	86.75	0.00	0.00	1.25
10	0.50	4.43	2.53	87.37	0.00	0.03	4.23
No. of cluster	2014						
1	4.10	0.00	13.10	79.60	0.00	0.00	2.90
2	1.00	5.30	2.70	81.80	0.00	3.00	6.10
3	0.70	7.10	6.30	78.10	0.00	4.70	3.10
4	5.23	0.40	3.70	78.30	0.00	2.80	9.27
5	2.95	1.55	0.55	88.15	0.00	0.15	6.15
6	1.45	1.30	4.10	88.50	0.00	1.55	3.15
7	1.45	0.70	1.90	88.30	0.00	3.95	3.65
8	0.50	0.00	7.30	91.30	0.50	0.00	0.40
9	0.70	1.54	3.68	90.82	0.01	0.18	1.93
10	0.00	3.80	3.60	83.40	0.00	0.00	8.90

Source: own elaboration

Table A2. Variable values/average values of variables in particular clusters for the age group 25–49 in the years 2006, 2010 and 2014

Reason	Own illness or disability	Family or personal responsibilities	Looking after children	Education	Retired	No work	Other
No. of cluster	2006						
1	3.30	2.60	73.80	4.40	10.70	0.80	4.00
2	39.65	5.10	13.05	31.10	2.15	1.30	7.35
3	5.30	10.80	35.80	8.70	0.20	14.10	23.20
4	16.40	14.60	28.70	3.20	0.30	25.20	9.20
5	25.00	27.00	9.70	22.40	3.40	5.40	6.30
6	11.10	34.59	36.06	6.31	0.90	3.57	6.84
7	13.70	7.90	43.10	5.20	6.90	6.90	15.50
8	20.14	5.25	56.05	8.14	0.14	3.25	7.03
9	15.53	35.48	16.75	6.99	2.35	4.09	18.80
10	3.15	57.35	17.65	2.95	0.75	0.30	17.80
No. of cluster	2010						
1	4.30	1.30	75.70	6.10	8.50	0.80	2.90
2	43.65	3.10	12.65	28.00	0.85	2.30	9.35
3	5.30	10.60	32.00	7.90	0.00	16.90	24.90
4	15.15	17.95	33.00	5.80	0.00	19.45	7.45
5	22.97	30.73	15.43	12.20	3.57	3.83	11.20
6	12.73	14.10	44.87	13.57	3.10	1.57	8.70
7	13.70	28.63	39.38	6.18	0.05	4.98	6.48
8	15.73	4.80	62.78	5.26	0.75	4.70	5.71
9	32.15	10.10	33.60	6.76	0.00	6.19	11.15
10	5.63	46.83	17.23	3.10	0.90	4.20	21.10
No. of cluster	2014						
1	4.20	3.50	74.00	4.30	9.40	0.90	2.60
2	40.00	3.30	13.90	29.00	1.60	2.30	9.40
3	8.40	17.30	30.60	7.55	0.00	20.40	13.70
4	18.78	22.63	23.60	11.73	0.63	10.98	10.85
5	20.35	16.80	33.00	10.80	2.00	2.30	14.80
6	16.40	2.10	44.40	23.80	2.10	3.60	7.60
7	16.34	12.26	54.86	5.89	0.29	4.91	4.54
8	6.00	48.30	9.50	3.00	0.90	11.60	20.60
9	33.75	10.00	34.35	4.50	0.00	6.40	11.00
10	7.63	35.50	26.30	6.77	0.67	1.27	20.33

Source: own elaboration

Table A3. Variable values/average values of variables in particular clusters for the age group 50–64 in the years 2006, 2010 and 2014

Reason	Own illness or disability	Family or personal responsibilities	Looking after children	Education	Retired	No work	Other
No. of cluster	2006						
1	7.90	10.20	8.30	0.70	23.90	7.80	40.60
2	19.00	56.50	5.70	0.05	8.00	3.80	6.85
3	28.25	9.15	8.00	0.20	36.00	1.65	16.75
4	9.80	25.40	1.70	0.60	28.80	13.40	20.50
5	21.46	10.34	2.51	0.06	53.14	5.06	7.20
6	12.90	7.42	1.48	0.00	74.22	1.54	2.12
7	41.35	5.60	0.95	0.45	42.40	2.10	7.15
8	66.90	1.40	0.60	1.00	20.30	1.80	8.00
9	12.50	0.00	0.00	0.00	10.50	0.00	2.40
10	9.63	32.03	2.07	0.00	23.47	1.17	31.63
No. of cluster	2010						
1	6.60	9.40	6.80	0.10	27.60	8.00	40.80
2	19.60	48.50	6.00	0.10	9.90	9.35	6.30
3	29.50	6.05	7.80	0.35	40.85	1.65	13.75
4	17.55	16.75	1.80	0.15	40.10	13.65	9.35
5	16.41	6.96	2.50	0.00	67.70	3.61	2.50
6	12.10	28.78	3.68	0.05	34.65	2.20	18.43
7	35.47	3.77	1.50	0.27	52.53	3.50	2.97
8	65.10	0.80	0.60	1.40	21.60	2.40	8.00
9	23.20	1.50	1.20	1.60	59.30	6.30	6.60
10	13.20	17.40	1.15	0.00	31.80	3.30	33.15
No. of cluster	2014						
1	6.60	13.50	8.10	0.10	20.10	12.20	38.60
2	21.65	39.70	6.00	0.15	13.50	14.40	4.55
3	26.80	7.30	11.20	0.40	43.80	0.60	10.00
4	32.15	13.50	4.75	0.25	25.80	7.95	15.60
5	29.83	7.30	2.92	0.00	48.67	6.90	4.23
6	12.40	7.13	2.13	0.00	74.08	2.23	1.60
7	28.40	1.90	2.00	1.70	43.90	9.90	12.10
8	56.80	1.75	0.95	1.30	31.85	1.05	6.25
9	34.50	11.40	6.70	0.00	20.60	20.90	4.80
10	13.38	21.42	3.24	0.06	31.86	2.98	26.96

Source: own elaboration

Bierność zawodowa kobiet a wiek. Analiza sytuacji w Polsce i UE

Streszczenie: Grupa kobiet biernych zawodowo charakteryzuje się znaczną heterogenicznością. Jednym z czynników różnicujących tę grupę są powody pozostawania poza rynkiem pracy. Zależą one między innymi od wieku czy poziomu wykształcenia. Dodatkowo istnieje duża niejednorodność geograficzna przyczyn bierności zawodowej. Stąd nasunęły się dwa pytania: 1) „jak znaczna jest niejednorodność geograficzna powodów pozostawania poza rynkiem pracy na obszarze Unii Europejskiej?”, 2) „czy to zróżnicowanie geograficzne zmienia się w czasie?”. Celem prezentowanej analizy była klasyfikacja państw UE ze względu na przyczyny bierności zawodowej kobiet w różnych grupach wiekowych. Analiza została przeprowadzona z wykorzystaniem metody *k*-średnich. Dane wykorzystane w analizie pochodzą z ogólnodostępnych baz danych Eurostatu, z Badania Aktywności Ekonomicznej Ludności (EU-Labour Force Survey). Ocena tendencji związanych z biernością zawodową w grupach wiekowych została przygotowana na bazie danych obejmujących okres 2000–2016. Z kolei analiza skupień została przeprowadzona dla danych z lat 2006, 2010 i 2014. Uzyskane wyniki potwierdziły znaczne zróżnicowanie państw UE ze względu na przyczyny bierności zawodowej kobiet w różnych grupach wiekowych. Dodatkowo ta różnorodność geograficzna zmienia się w czasie. Największe podobieństwo klasyfikacji między poszczególnymi okresami uzyskano dla grupy wiekowej 50–64 lata, a najmniejsze dla grupy 25–49 lat. Ponadto w analizowanym okresie zauważalne jest znaczne zmniejszanie się zjawiska bierności zawodowej w grupie najstarszych osób. Z kolei w grupie najmłodszej, obejmującej osoby do 25. roku życia, tendencje są odwrotne – udział pozostających poza rynkiem pracy zwiększa się.

Słowa kluczowe: rynek pracy, bierność zawodowa kobiet, analiza skupień, metoda *k*-średnich

JEL: J21, C38

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