
THE ‘*WORKING POOR*’ PHENOMENON IN EUROPE – A TAXONOMIC ANALYSIS*

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Abstract: The article discusses the problem of people who are working, but struggle with poverty. The phenomenon of ‘working poor’ is subjected to a taxonomic analysis, in which the subjective scope is limited to selected European states and the time span to the last twelve years. The aim of the article is to show the relation between work and poverty on European labour markets, including clarifying the level and structure of ‘working poor’. In order to achieve such a research goal, the results of *The European Union Statistics on Income and Living Conditions* were used, and thanks to the information obtained from the Eurostat database, it was possible to carry out comparable statistical analyses. On the basis of the obtained results, it can be concluded that the *working poor* phenomenon exists in Europe and in future may get stronger and pose a serious challenge for European labour markets.

Keywords: working poor, labour market, Poland, European Union.

1. Introduction

The issue of ‘working poor’ was a pressing problem in the United States of America, which confirms the fact that the term ‘working poor’ was used to characterize the situation on the American labour market earlier than in Europe. For a long time, the problem of ‘working poor’ has been put aside in public, political and academic discourses. Proper scientific research concerning this phenomenon appeared around the late 1990s [Marx, Verbist 1998; Nolan, Marx 2000]. The question of ‘working poor’ has become more present in public European debate since the introduction of the European Employment Strategy in 1997 and especially since 2000 and 2010 when the EU implemented the Lisbon Strategy and the ‘Europa 2020’ Strategy.

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The (relative) focus on quality of employment and the (relative) objective to fight poverty and social exclusion at European level, have contributed to place the 'working poor' group in a better position in the European Union's socio-economic development strategies. The existence of 'working poor' signals that, even if employment is still the best way to avoid poverty, it is nevertheless not always sufficient.

A lot of researchers note that in general view, it is very typical to think of 'the poor' as non-working people, but nowadays it seems to be untrue that employment totally protects from poverty [OECD 2009]. The currently available Eurostat estimates show that poverty among working people is emerging as a serious problem for the European Union. In 2016, 24.2% of the entire EU population aged 18-64 years was at risk of poverty and social exclusion (23.3% – males, 25.0% – females) – see [Eurostat, *People at risk...*]. In 2016 the EU population aged 18-64 amounted to 316.9 million, therefore 76.6 million was at risk of poverty (24.2%) – see [Eurostat, *Population on 1 January...*]. For the same year, Eurostat data shows that 9.6% of all employed persons at the age of 18 to 64 was at risk of poverty – which means that thereabout 30.4 million people were at risk of poverty while working – see [Eurostat, *In-work at-risk-of-poverty rate...*]. The conclusion is that almost a quarter of all poor people in the EU was at risk of poverty and social exclusion. Moreover, almost every tenth person was working but the fact that he/she was employed has not protected them from this unfavorable situation.

To sum up, the complexity of 'in-work poverty' as a phenomenon derives in part from it being a hybrid concept [Lohmann, Marx (eds.) 2018]. Various approaches and different operational choices may result in substantial differences in the magnitude and structure of 'in-work poverty'¹. Focusing on Europe, in this paper the commonly accepted European indicators to measure income poverty and material deprivation were used (for a more detailed discussion see below).

In light of these considerations, the purpose of this article is to highlight the main relation between 'work' and 'poverty', as well as to analyze and evaluate the 'working poor' phenomenon, focusing on defining the level and structure of people who are called 'working poor' over recent years in Europe. In order to achieve this goal, the author used the following method: the analysis of the source material for the studied phenomenon, the method of statistical data analysis and taxonomic analysis. The results and conclusions of the analyses are presented in the final part of the article.

¹ For Europe, see: [Eurofound 2017; European Commission 2010]. For the United States of America, see: [Kenworthy, Marx 2017; Thiede et al. 2015].

2. Theoretical analysis of the ‘working poor’ in Europe – literature review, data and research methodology

To begin the discussion about the ‘working poor’, it makes sense to have some basic theoretical and empirical background information about this phenomenon. The questions to be answered concern work, poverty and its measures, to be precise, what does ‘work’ and ‘poverty’ mean? Based on the literature, it can be concluded that there is a variety of ‘poverty’ definitions and measures and it is not possible to discuss all of these.

The European Council had already agreed with the multidimensional concept of poverty (and also social exclusion) in 1975: ‘People are said to be living in poverty if their income and resources are so inadequate as to preclude them from having a standard of living considered acceptable in the society in which they live. Because of their poverty they may experience multiple disadvantages through unemployment, low income, poor housing, inadequate health care and barriers to lifelong learning, culture, sport and recreation. They are often excluded and marginalised from participating in activities (economic, social and cultural) that are the norm for other people and their access to fundamental rights may be restricted’. As we can see, ‘poverty’ is often linked to the notion of ‘social exclusion’, which is a more unclear and indistinct concept than ‘poverty’. The European Commission defines social exclusion as: ‘A process whereby certain individuals are pushed to the edge of society and are prevented from participating fully by virtue of their poverty, or lack of basic competencies and lifelong learning opportunities, or as a result of discrimination. This distances them from job, income and education opportunities as well as social and community networks and activities. They have little access to power and decision-making bodies and thus often feeling powerless and unable to take control over the decisions that affect their day to day lives’ [European Commission 2004]. The author emphasizes the bond connecting this two notions, but deliberately focus only on the ‘poverty’, because it is the center of further considerations of ‘working poor’. Focusing only on the first issue, on 22 July 1975 the Council of the European Communities proposed the following definition of ‘poverty’ (article 1 point 2):

- ‘persons beset by poverty: individuals or families whose resources are so small as to exclude them from the minimum acceptable way of life of the Member State in which they live’,
- ‘resources: goods, cash income, plus services from public and private sources’ [Council Decision... 1975].

On 19 December 1984, the Council of the European Communities extended the ‘poverty’ definition as follows (article 1 point 2): ‘the poor shall be taken to mean persons, families and groups of persons whose resources (material, cultural and social) are so limited as to exclude them from the minimum acceptable way of life in the Member States in which they live’ [Council Decision... 1984]. This is the ‘official’ definition of poverty that is used in the European Union for all Member States.

The United Nations (UN) defined absolute poverty as 'a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services' [UN 1995]. Overall poverty was considered to take various forms, including 'lack of income and productive resources to ensure sustainable livelihoods; hunger and malnutrition; ill health; limited or lack of access to education and other basic services; increased morbidity and mortality from illness; homelessness and inadequate housing; unsafe environments and social discrimination and exclusion. It is also characterized by lack of participation in decision-making and in civil, social and cultural life. It occurs in all countries: as mass poverty in many developing countries, pockets of poverty amid wealth in developed countries, loss of livelihoods as a result of economic recession, sudden poverty as a result of disaster or conflict, the poverty of low-wage workers, and the utter destitution of people who fall outside family support systems, social institutions and safety nets' [UN 1995].

The above-mentioned definitions of poverty are clearly relative because all of them refer to poverty in terms of the minimum standards of living applicable to a certain Member State and within a person's own society. Many approaches to the measurement of poverty tie in with the above and similar definitions have been proposed by other authors, including Peter Townsend². To sum up this part, it is worth quoting an interesting point of view of David Gordon: 'It often seems that if you put five academics (or policy makers) in a room you would get at least six different definitions of poverty. The literature on poverty is full of controversies, implying that there are considerable differences of opinion on how poverty should be defined and measured' [Gordon 2006]. He explains that this is a consequence of the fact that a lot of these controversies arise from a misunderstanding of the difference between definition and measurement³.

It is worth noting that in the European discourse since the 2001 Laeken summit, the notion of 'poverty' has received the epithet 'at risk of'. This phrase – 'at risk of poverty' – suggests how the multidimensional concept of 'poverty' should be translated into a single indicator. This is noted for example by Mary Daly, who argues that the term 'at risk of poverty' actually destabilizes what we mean by the concept of 'poverty'. Some of the relevant points of contention are discussed in an article

² For example, Peter Townsend defined poverty as 'objectively and applied consistently only in terms of the concept of relative deprivation (...). The term is understood objectively rather than subjectively. Individuals, families and groups in the population can be said to be in poverty when they lack the resources to obtain the types of diet, participate in the activities and have the living conditions and amenities which are customary, or at least widely encouraged or approved, in the society to which they belong. Their resources are so seriously below those commanded by the average individual or family that they are, in effect, excluded from ordinary living patterns, customs and activities' [Townsend 1979].

³ He refers to Spinoza's words: 'This is an old and common problem, which was described by Spinoza in the 17th century: 'Many errors, in truth, consist merely in the application of the wrong names of things' [Gordon 2006].

entitled *The Evolution of Poverty in the European Union: Concepts, Measurement and Data* [Decancq et al. 2013]. In their opinion, the phrase ‘at risk of poverty’ should be reserved for the official headline of poverty indicator that means living in a household with an equivalized net disposable household income below 60% of the national median equivalized net disposable household income, which is equal to the sum of the income of all household members net of taxes⁴.

To sum up, returning to the term of ‘working poor’, it should be clearly explained what it really means. The overview of the problem of definition was described in *The Oxford Handbook of the Social Science of Poverty* entitled *Employment and the Working Poor* [Gautié, Ponthieux 2016]. While the ‘working poor’ may be quite easily portrayed as ‘a person who is a worker and who is poor’, it is a long way from the ‘obviousness’ of the notion to an operational definition – that is, as they explain, ‘one that can be used to measure the extent of the problem’ [Gautié, Ponthieux 2016]. Therefore, since ‘working poor’ is located between ‘work’ and ‘poverty’, the operational definition necessarily depends on the criteria used to define each of these terms – this conceptual dilemma was presented in Table 1.

Table 1. Definitions of the ‘working poor’ in the literature and official statistics

Country	Source	Work definition	Poverty threshold
1	2	3	4
European Union	Eurostat	Employed at least 15 hours / Most frequent activity status in the last year New indicator: in-work at-risk-of-poverty rate individuals classified as employed (according to their most frequent activity status, hence at least 6 months in the labour market in the previous year)	Low-income threshold: less than 60% of the median equivalised household income (relative monetary poverty) At risk of poverty: individuals living in a household with an equivalised disposable income below 60% of the median
France	Institut National de la Statistique et de l’Economie (INSEE) / Academics / National action plan for Social Inclusion 2001-2003/2003-2005	Individuals who have spent at least six months of the year on the labour market (working or searching for a job) / Working at least six months / Have had a job for at least one month during a year	Low-income threshold: less than 50% (60%-70% occasionally) of the median equivalised household income (relative monetary poverty)

⁴ More information about ‘at risk of poverty’ indicator and other EU-SILC-based indicators can be found in: [Atkinson et al. 2002; Marlier et al. 2007].

1	2	3	4
Belgium	National Action Plan for Social Inclusion	Individuals who have spent at least six months of the year on the labour market (working or searching for a job) / Working at least six months	Low-income threshold: less than 60% of the median equivalised household income (relative monetary poverty)
Switzerland	Swiss Federal Statistical Office / Academics	All 'active' individuals, regardless of the number of hours they work / all individuals working full-time (i.e. 36 hours or more weekly / at least one individual having a lucrative activity for at least 40 hours a week (one full-time job) – new indicator: individuals who work and live in a household in which the overall volume of work (of all members) amounts to at least 36 hours a week	Administrative flat rates of social security modified (monetary administrative poverty)
United States of America	US Census Bureau (USCB)	Total hours worked by family members greater than or equal to 1,750 hours (44 weeks)	Federal Poverty Line (absolute monetary poverty)
	US Bureau of Labor Statistics (USBLS)	Individuals who have spent at least six months (27 weeks) of the year on the labour market (working or searching for a job)	Federal Poverty Line (absolute monetary poverty)
	US researchers in general	Adults working, on average, at least half time (approximately 1,000 hours) / Definition of USCB and USBLS (see above)	Less than 125%-150%-200% of Federal poverty line (absolute monetary poverty)
Canada	National Council of Welfare (NCW)	More than 50% of total family income come from wages, salaries or self-employment	Statistics Canada's Low-income cut-offs (LICOs) (absolute monetary poverty)
	Canadian Council on Social Development (CCSD)	Adult members have, between them, at least 49 weeks of either full-time (at least 30 hours a week) or part-time work	CCSD relative low-income threshold (relative monetary poverty)
	Canadian Policy Research Networks (CPRN)	Full time, full year	Relative low-income threshold; less than \$20,000 per year (relative monetary poverty)
Australia	Social Policy Research Centre	All 'active' individuals, regardless of the number of hours they work	Henderson absolute poverty line (absolute monetary poverty)

Source: [Crettaz, Bonoli 2010].

This brief review shows how researchers have dealt with the definitional issues concerning ‘work’ and ‘poverty’. Obviously, it is not exhaustive and it mainly focuses on official definitions. However, on this basis it can be concluded that there is a total lack of agreement among academics and official organs on the definition of ‘working poor’.

As shown in Table 1, there are a lot of different points of view and possibilities to form a conceptual framework of the ‘working poor’ in the literature and official statistics, but the vast majority of them show that:

- personal characteristics (gender, age and education),
- job characteristics (professional status, full-time or part-time work, type of employment contract, months worked in year etc.),
- the household context (single parenthood/person, households with dependent children or without etc.),

define the extent to which the population is affected by the in-work poverty risk. As depicted in Figure 1, the roots of in-work poverty lie in the interaction of a variety of factors at different levels. This is confirmed by the recent research results carried out by Eurofound [Eurofound 2017; European Commission 2010; Eurofound 2010] and European Commission [European Commission 2012]. According to Eric Crettaz and Giuliano Bonoli, there are three mechanisms or immediate causes of ‘working poor’ status, i.e. low earnings, low labour force attachment and large family size [Crettaz, Bonoli 2010]. Emilia Herman, quoting other researchers, states that different studies show one thing – ‘in-work poverty’ can be the result of the different dysfunctions on the labour market, job instability, involuntary temporary and part-time work, reduced salaries, household structure of the person working, etc. [Herman 2014].

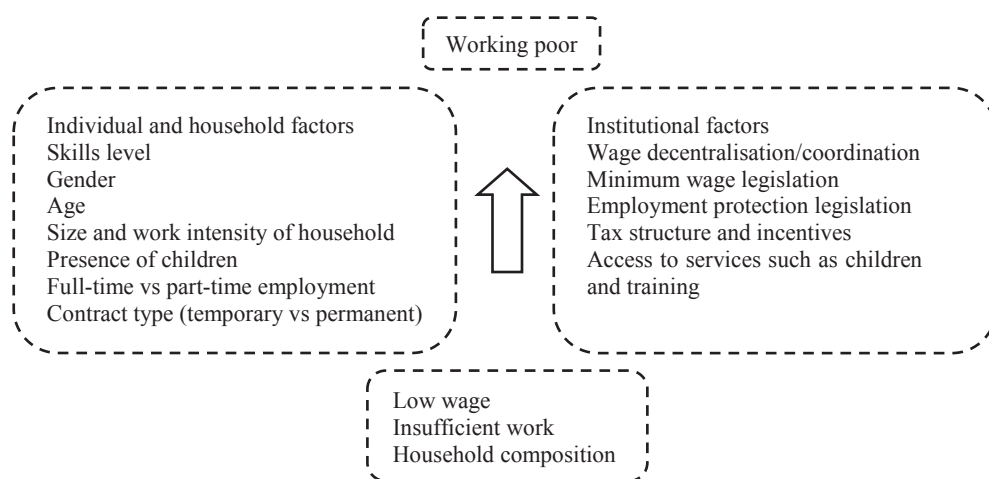


Fig. 1. Factors influencing ‘in-work poverty’

Source: [Eurofound 2017].

In order to highlight the empirical relationships between ‘work’ and ‘poverty’, in the conducted analysis, the definitions and measurement of the ‘working poor’ applied by the European Union and the statistical data collected from Eurostat Database were used.

Therefore it is necessary to conclude that to get an overall definition, in this paper The author had to take into consideration only a few parameters. For this reason the comparative analysis carried out is based on the main indicators that measure the ‘working poor’ phenomenon in Europe, presented in Table 2.

Table 2. Definitions of the main indicators measures of ‘working poverty’ by Eurostat

Database (cod)	Indicator (cod)	Definition
1	2	3
Income distribution and monetary poverty (ilc_ip), Monetary poverty (ilc_li)	At-risk-of-poverty rate (ilc_li)	<ul style="list-style-type: none"> • The at-risk-of-poverty rate is the share of people with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income after social transfers. • This indicator does not measure wealth or poverty, but low income in comparison to other residents in that country, which does not necessarily imply a low standard of living. • The at-risk-of-poverty rate before social transfers is calculated as the share of people having an equivalised disposable income before social transfers that is below the at-risk-of-poverty threshold calculated after social transfers. Pensions, such as old-age and survivors’ (widows’ and widowers’) benefits, are counted as income (before social transfers) and not as social transfers. This indicator examines the hypothetical non-existence of social transfers. • The persistent at-risk-of-poverty rate shows the percentage of the population living in households where the equivalised disposable income was below the at-risk-of-poverty threshold for the current year and at least two out of the preceding three years. Its calculation requires a longitudinal instrument, through which the individuals are followed over four years.
Income distribution and monetary poverty (ilc_ip), In-work poverty (ilc_iw)	In-work at-risk-of-poverty rate (ilc_iw)	<ul style="list-style-type: none"> • In-work at-risk-of-poverty rate refers to the percentage of persons in the total population who declared to be at work (employed or self-employed) who are at-risk-of-poverty (i.e. with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers)).
Material deprivation (ilc_mdd), Material	Severe material deprivation	<ul style="list-style-type: none"> • The material deprivation rate is an indicator in EU-SILC that expresses the inability to afford some items considered by most people to be desirable or even necessary to lead

Table 2, cont.

1	2	3
deprivation by dimension (ilc_mddd)	rate (ilc_mddd)	<p>an adequate life. The indicator distinguishes between individuals who cannot afford a certain good or service, and those who do not have this good or service for another reason, e.g. because they do not want or do not need it.</p> <ul style="list-style-type: none"> • The indicator adopted by the Social protection committee measures the percentage of the population that cannot afford at least three of the following nine items: (1) to pay their rent, mortgage or utility bills; (2) to keep their home adequately warm; (3) to face unexpected expenses; (4) to eat meat or proteins regularly; (5) to go on holiday; (6) a television set; (7) a washing machine; (8) a car; (9) a telephone. • Severe material deprivation rate is defined as the enforced inability to pay for at least four of the above-mentioned items.
Living conditions (ilc_lv), Health and labour conditions (ilc_lvhl)	People living in households with very low work intensity (ilc_lvhl)	<ul style="list-style-type: none"> • The indicator persons living in households with very low work intensity is defined as the number of persons living in a household where the members of working age worked less than 20% of their total potential during the previous 12 months. • The work intensity of a household is the ratio of the total number of months that all working-age household members have worked during the income reference year and the total number of months the same household members theoretically could have worked in the same period. • A working-age person is a person aged 18-59 years, with the exclusion of students in the age group between 18 and 24 years.

Source: own study based on: [Eurostat Statistics Explained, *Glossary*; Eurostat Statistics Explained, *Database*].

In this paper the statistical data analyzed and interpreted have been collected from the Eurostat Database and relate to the 2005-2016 period. The author chose to analyze this period because it corresponds to the availability and completeness of data referring to the studied problem (in exceptional cases, when the condition of availability and completeness of data is not met, the time frame for the analysis is shorter).

3. Empirical analysis of the ‘working poor’ in Europe – results and discussions

According to currently available Eurostat estimates, in 2016 in the European Union (EU-28) the at-risk-of-poverty rate among employees aged 18-64 was around 9.6%. This means that every tenth working person between the ages of 18 and 64 in the

EU-28 was at risk of poverty. Based on the analysis of data taken from the Eurostat database and additional calculations, it can be concluded that it is around 30.4 million people in the EU-28. In the years 2005-2010 fluctuations in the indicator were small, i.e. on a scale from 8.0% in 2006 to 8.5% in 2008 for EU-27. From 2010 to 2016 there was a clear and systematic increase – from 8.3% to 9.6% for both the EU-27 and EU-28. Large discrepancies between individual Member States are also noteworthy – from 3.1% in Finland to 14.0% in Greece (data for 2016). Against this background, the situation of working people in Poland is unfavorable. In the working population aged 18-64, Poland, with an index of 10.9%, belonged to the group of countries with the highest rate of employees at risk of poverty (higher index values were recorded only in six countries: Bulgaria (11.6%), Italy (11.8%), Luxembourg (12.0%), Spain (13.1%), Greece (14.0%) and Romania (18.6%). The phenomenon of 'working poor' in Europe:

- mostly affects single-person households (10.1% in 2005 and 13.9% in 2016), single-person households with dependent children (16.0% in 2005 and 21.6% in 2016), households with dependent children (10.1% in 2005 and 11.2% in 2016) – the most at-risk people, despite having a job, are single-parents raising children,
- to a greater extent affects people employed part-time (11.1% in 2005 and 15.8% in 2016),
- is not subject to the explicit 'masculinization' or 'feminization' process, although working men are slightly more at risk than working women (8.9% in 2005 and 10.1% in 2016 compared to 7.2% in 2005 and 9.0% in 2016); the situation is reversed for young employees (in the 18-24 age group) – in this case, women are more vulnerable to deprivation of needs than men (9.5% in 2005 and 12.7% in 2016 compared to 9.7% in 2005 and 11.6% in 2016),
- 'working poor' is subject to the process of 'juvenalization'⁵ – among all age groups, young employees (in the 18-24 age group), are the largest group of workers at risk of poverty (9.6% in 2005 and 12.1% in 2016).

In the further part of the study, the results of taxonomic analysis will be presented, thanks to which it is possible to observe the similarity of individual European countries in terms of size and changes in the level of poverty risk among the 'working poor'. This analysis complements previous observations regarding the relationship between work and the problem of poverty in this group. One of the methods of multidimensional comparative analysis was applied, i.e. the taxonomic method⁶.

Taxonomic analysis is multidimensional and based on the grouping method using the Ward agglomeration method:

⁵ More information about this can be found in: [Cymbranowicz 2016a, pp. 17-30; Cymbranowicz 2016b, pp. 137-151].

⁶ More information about multivariate statistical analysis in theory and practice can be found in: [Balicki 2013; Domański, Kupis-Fijałkowska (eds.), 2013].

- subject area: 28 EU Member States (the EU-28),
- time span: three periods – 2005-2008, 2009-2012, 2013-2016 (in case of all analyzed variables, the statistics data are available that can be used to conduct analysis),
- scope of work: three basic indicators for measuring the working poor phenomenon (reflecting the relationship between work and poverty).

In the first stage of the conducted analysis, a selection of diagnostic variables determining the level of working poor was made⁷:

- x1 – an indicator of at-risk-of-poverty among people having a job, with disposable income below 60% of the median of equivalent incomes (aged 18-64),
- x2 – an indicator of deep material deprivation among people who have a job (aged 18-64),
- x3 – an indicator of very low work intensity in the household among people having a job, with disposable income below 60% of median equivalent income, with low work intensity [0.2-0.45] (aged 18-59).

The above indicators are calculated on the basis of the European Union Statistics on Income and Living Conditions (EU-SILC). EU-SILC is the reference source for comparative statistics on income distribution and social inclusion in the EU. It is used for policy monitoring within the ‘Open Method of Coordination (OMC)’. EU-SILC is based on the idea of a common ‘framework’ and no longer a common ‘survey’, which defines:

- the harmonised lists of target primary (annual) and secondary (every four years or less frequently) variables to be transmitted to Eurostat,
- common guidelines and procedures,
- common concepts (household and income) and classifications aimed at maximising comparability of the information produced.

Then:

- statistical verification of diagnostic variables,
- normalization of the values of diagnostic variables based on the standardization method using the arithmetic mean and the standard deviation was made (see: Table 3).

During the second stage, for each analyzed period the inverse matrix of matrix correlation coefficients between the aforementioned variables was conducted⁸.

During the third stage, for each analyzed period the normalization of diagnostic variables based on the standardization method using arithmetic mean and standard deviation was conducted. Since the selected diagnostic variables are destimulants, there was no need to transform the variables to give them a uniform character (see Table 4).

⁷ The variability analysis was based on a classical variation factor, with a critical value of 0.1. The correlation of the analysis of the variables was based on the method of inverse matrix of the correlation factor, with a critical value of 10.

⁸ In the case of inverse matrices, the values of all diagnostic variables on the main diagonal did not exceed the number 10, so there was no need to reduce the set of variables.

Table 3. Values of diagnostic variables and their selected statistical characteristics

EU-28	Period	2005-2008			2009-2012			2013-2016		
	Cod	x1	x2	x3	x1	x2	x3	x1	x2	x3
Belgium	BE	4.2	2.4	19.3	4.4	2.5	25	4.6	2.2	24.7
Bulgaria	BG	:	:	:	7.7	31.5	52	9.0	23.1	45.4
Czech Republic	CZ	3.5	5.2	30.4	3.9	3.8	31.6	3.9	3.4	27
Denmark	DK	4.6	1.1	17.9	6.0	1.2	25.6	5.2	1.7	20.2
Germany	DE	6.2	3.0	24.9	7.3	2.7	30.6	9.4	2.5	35.4
Estonia	EE	7.7	4.3	44.4	7.9	5.0	40.5	9.9	3.3	42.6
Ireland	IE	6.0	1.8	24.6	5.3	2.9	14.5	5.0	3.7	18.6
Greece	EL	13.7	8.5	33.9	13.7	10.5	41.4	13.4	14.9	39.8
Spain	ES	10.6	2.6	33.5	11.1	3.0	34.2	12.4	3.6	38.3
France	FR	6.3	3.4	30.4	7.2	3.5	30.2	7.8	2.9	36.7
Croatia	HR	:	:	:	6.3	10.0	29.1	5.8	7.5	27.3
Italy	IT	9.1	4.3	33.3	10.5	6.8	39	11.4	8.0	39.8
Cyprus	CY	6.6	10.0	25.3	7.4	10.0	28.7	8.6	12.1	29.5
Latvia	LV	10.2	20.7	49.4	9.9	18.5	45.3	8.8	11.7	41.2
Lithuania	LT	9.5	15.2	50.7	10.1	11.3	43.9	9.1	8.1	49.6
Luxembourg	LU	9.7	0.7	32	10.2	0.8	37.3	11.5	1.2	31.5
Hungary	HU	6.8	14.8	29.5	5.9	16.5	32.6	8.2	16.0	42.8
Malta	MT	4.5	2.4	21.1	5.6	4.4	27.6	5.7	4.8	27.6
Netherlands	NL	4.9	0.8	17.8	5.0	1.1	18.6	5.1	1.2	24
Austria	AT	6.9	2.7	29.4	7.9	2.4	29.4	7.8	2.1	32.1
Poland	PL	12.5	18.0	32.4	11.0	9.2	36.5	10.9	5.9	42.8
Portugal	PT	10.6	6.4	37.6	10.0	5.5	40.3	10.7	6.1	43.5
Romania	RO	:	:	:	18.2	26.4	49.9	18.8	20.3	59.3
Slovenia	SI	4.8	3.7	20.4	5.7	4.4	25.7	6.6	3.9	31.2
Slovakia	SK	6.5	12.1	27.6	5.9	6.4	30.3	6.0	4.9	36.7
Finland	FI	4.6	1.5	25.3	3.8	1.1	20.9	3.5	0.9	17.9
Sweden	SE	6.7	1.0	22.5	7.5	0.9	33.7	7.6	0.5	34.3
United Kingdom	UK	7.9	2.3	45	7.4	2.7	37.6	8.5	3.6	39.6
Arithmetic average	x	7.4	6.0	30.3	8.0	7.3	33.3	8.4	6.4	35.0
Standard deviation	s	2.65	5.70	9.12	3.11	7.51	8.76	3.27	5.86	9.51
Coefficient of variation	V	0.35	0.95	0.30	0.39	1.02	0.26	0.38	0.91	0.27
Minimum value	MIN.	3.5	0.7	17.8	3.8	0.8	14.5	3.5	0.5	17.9
Maximum value	MAX.	13.7	20.7	50.7	18.2	31.5	52.0	18.8	23.1	59.3

Note: (:) – not data or incomplete data: Bulgaria, Croatia, Romania were excluded from the analysis for the period 2005-2008.

Source: own study based on: [Eurostat, *At-risk-of-poverty rate...*; Eurostat, *Severe material...*; Eurostat, *In-work at-risk-of-poverty...*].

Table 4. Values of standardized diagnostic variables

EU-28	Period	2005-2008			2009-2012			2013-2016		
	Cod	x1	x2	x3	x1	x2	x3	x1	x2	x3
Belgium	BE	-1.19	-0.62	-1.20	-1.14	-0.64	-0.94	-1.16	-0.72	-1.07
Bulgaria	BG	:	:	:	-0.08	3.21	2.13	0.18	2.84	1.09
Czech Republic	CZ	-1.46	-0.13	0.00	-1.30	-0.46	-0.19	-1.37	-0.51	-0.83
Denmark	DK	-1.04	-0.85	-1.36	-0.62	-0.81	-0.87	-0.97	-0.80	-1.55
Germany	DE	-0.44	-0.51	-0.59	-0.21	-0.61	-0.30	0.30	-0.67	0.04
Estonia	EE	0.11	-0.29	1.53	-0.01	-0.30	0.82	0.45	-0.53	0.80
Ireland	IE	-0.52	-0.72	-0.62	-0.85	-0.58	-2.14	-1.03	-0.46	-1.72
Greece	EL	2.37	0.44	0.38	1.84	0.42	0.92	1.52	1.44	0.50
Spain	ES	1.20	-0.58	0.34	1.01	-0.57	0.10	1.22	-0.48	0.34
France	FR	-0.40	-0.44	0.00	-0.24	-0.50	-0.35	-0.18	-0.60	0.18
Croatia	HR	:	:	:	-0.53	0.35	-0.47	-0.79	0.18	-0.80
Italy	IT	0.64	-0.29	0.32	0.81	-0.06	0.65	0.91	0.26	0.50
Cyprus	CY	-0.29	0.70	-0.55	-0.17	0.35	-0.52	0.06	0.96	-0.57
Latvia	LV	1.05	2.58	2.08	0.62	1.48	1.37	0.12	0.89	0.65
Lithuania	LT	0.79	1.62	2.22	0.68	0.52	1.21	0.21	0.28	1.53
Luxembourg	LU	0.87	-0.92	0.18	0.72	-0.86	0.45	0.94	-0.89	-0.36
Hungary	HU	-0.21	1.55	-0.09	-0.66	1.22	-0.07	-0.06	1.63	0.82
Malta	MT	-1.08	-0.62	-1.01	-0.75	-0.38	-0.64	-0.82	-0.27	-0.77
Netherlands	NL	-0.93	-0.90	-1.37	-0.95	-0.82	-1.67	-1.00	-0.89	-1.15
Austria	AT	-0.18	-0.57	-0.10	-0.01	-0.65	-0.44	-0.18	-0.73	-0.30
Poland	PL	1.92	2.11	0.22	0.97	0.24	0.36	0.76	-0.09	0.82
Portugal	PT	1.20	0.07	0.79	0.65	-0.24	0.80	0.70	-0.05	0.89
Romania	RO	:	:	:	3.29	2.53	1.89	3.18	2.36	2.55
Slovenia	SI	-0.97	-0.39	-1.08	-0.72	-0.38	-0.86	-0.55	-0.43	-0.39
Slovakia	SK	-0.33	1.07	-0.30	-0.66	-0.12	-0.34	-0.73	-0.26	0.18
Finland	FI	-1.04	-0.78	-0.55	-1.33	-0.82	-1.41	-1.49	-0.94	-1.79
Sweden	SE	-0.25	-0.86	-0.85	-0.14	-0.85	0.04	-0.24	-1.01	-0.07
United Kingdom	UK	0.19	-0.64	1.60	-0.17	-0.61	0.49	0.03	-0.48	0.48

Source: own study based on the data compiled in Table 3.

In the next stage of the analysis (for the period considered, including for each of them separately) the following were carried out:

- firstly, measurements of Euclidean distance between the EU-28 Member States,
- secondly, grouping the EU-28 Member States in clusters, with a similar magnitude and level of poverty among the ‘working poor’⁹.

In order to distinguish groups of countries similar in terms of the value of previously distinguished and described indicators, cluster analysis was applied using the Ward agglomeration method. The results of the cluster analysis presented below in the form of a tree diagram, show the possibility of distinguishing several groups of countries characterized by convergent values of diagnostic variables (see Figures 2-4).

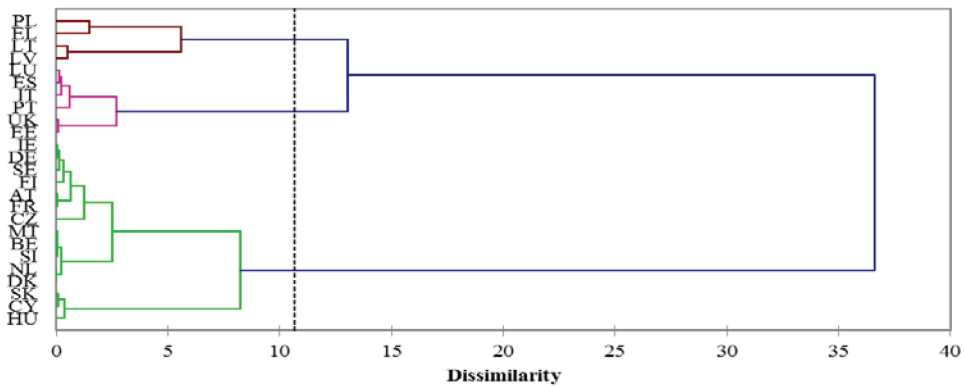


Fig. 2. Cluster analysis – bonds tree diagram Ward method (Euclidean distance) for the EU-28, 2005-2008

Source: own study based on the data compiled in Table 3.

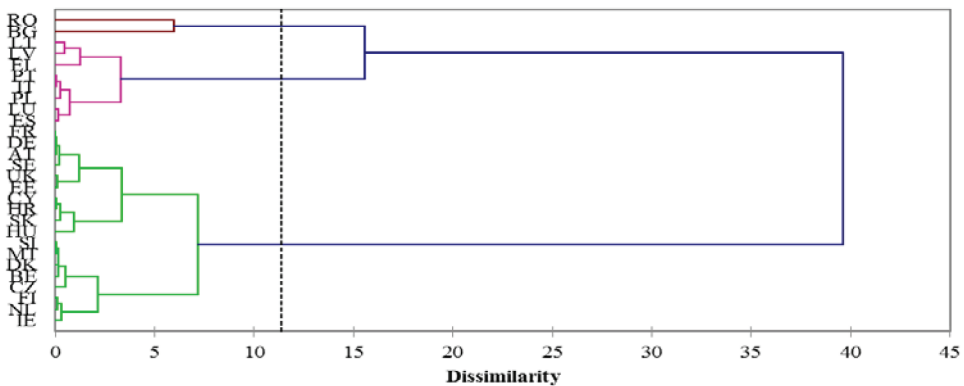


Fig. 3. Cluster analysis – bonds tree diagram Ward method (Euclidean distance) for the EU-28, 2009-2012

Source: own study based on the data compiled in Table 3.

⁹ A variant based on the split made automatically by XLSTAT was used.

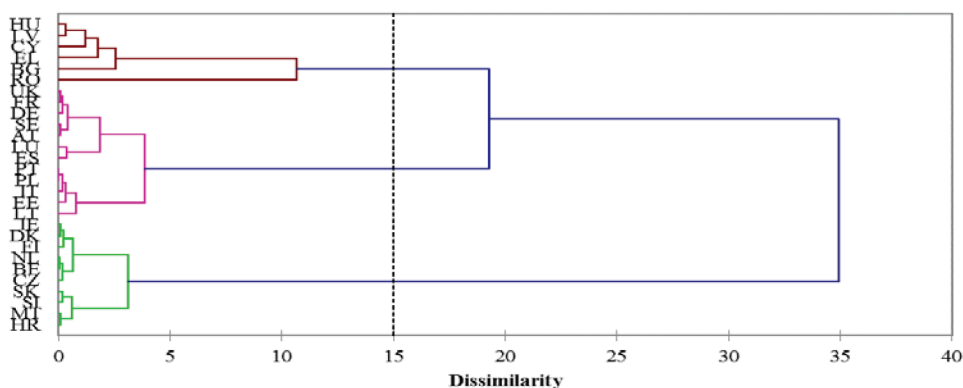


Fig. 4. Cluster analysis – bonds tree diagram Ward method (Euclidean distance) for the EU-28, 2013-2016

Source: own study based on the data compiled in Table 3.

Based on the above analysis, it can be concluded that as a result of the grouping made for the period:

- 2005-2008, three clusters have been identified:
 1. the first group included 15 countries that created a cluster of medium-strength with the level of dissimilarity closest to the break-even point (Belgium, Czech Republic, Denmark, Germany, Ireland, France, Cyprus, Hungary, Malta, the Netherlands, Austria, Slovenia, Slovakia, Finland and Sweden),
 2. the second group included 6 countries with the highest level of similarity that created a strong cluster with the level of diversity of the furthest point of division (Estonia, Spain, Italy, Luxembourg, Portugal and the United Kingdom),
 3. the third group included 4 countries forming a weak cluster with the lowest level of internal similarity (Greece, Latvia, Lithuania and Poland).
- 2009-2012, three clusters have been identified:
 1. the first group included 18 countries (15 from the previous period joined by Estonia, Croatia and the United Kingdom) creating a cluster of medium strength with the level of dissimilarity closest to the division point,
 2. the second group consisted of two countries that formed a weak cluster with the lowest level of internal similarity (Bulgaria and Romania),
 3. the third group included 8 countries which are characterized by the highest level of similarity – they created a strong cluster with the level of diversity of the furthest division point (Greece, Spain, Italy, Latvia, Lithuania, Luxembourg, Poland and Portugal).
- 2013-2016, three clusters have been identified:
 1. the first group included 10 countries (Belgium, the Czech Republic, Denmark, Ireland, Croatia, Malta, the Netherlands, Slovenia, Slovakia and Finland),

- which together constitute a group of countries with a high level of similarity with the level of diversity at the furthest point of division,
2. the second group included 6 countries (Bulgaria, Greece, Cyprus, Latvia, Hungary and Romania) that formed a weak cluster with the lowest level of internal similarity with the level of dissimilarity closest to the division point,
 3. the third group included 12 countries (Germany, Estonia, Spain, France, Italy, Lithuania, Luxembourg, Austria, Poland, Portugal, Sweden and the United Kingdom) creating a medium-strength cluster with the level of diversity at the furthest point of division (similar to the first group).

The obtained results of grouping of the European Union Member States, as well as the position of each of these countries within one of the three distinguished clusters (with the best, average and worst situation in terms of the analyzed criteria) in each analyzed period, were largely determined by the general level of social development of these countries. Of the 28 Member States of the EU, 13 of them are the so-called new Member States with a lower level of socio-economic development in comparison to the 15 countries of the so-called old EU. This development gap between the 'new' and 'old' Member States was directly translated into the distance between these countries in terms of the observed level of poverty risk among workers, in particular the level of material deprivation.

4. Conclusions

As has been shown, in the area of the labour market and employment policy, 'working poor' constitute a new category to which a little more attention should be devoted because although in general view 'work' was usually associated with wealth, not with poverty, in recent times it can be observed that it is more and more often identified with the latter category. That is why this report devotes attention to those who, despite having a job, face similar problems as those who are disadvantaged on the labour market.

Empirical research show that the 'working poor' has become a real challenge for European countries. This study has shed light into the incidence and main determinants of 'working poor' in the EU Member States in recent years. On the basis of the analysis and assessment of the situation of people included in the working poor group in Europe, including EU Member States (the EU-28), made using the methods of the source material analysis, statistical data analysis and taxonomic method, it can be concluded that there is a 'working poor' phenomenon among the employed and it affects more and more people. These conclusions certainly cannot fill us with optimism. If by every year there will be more people who, although they work, remain poor, it would mean that both national authorities in each country, as well as supranational authorities (e.g. EU institutions) responsible for employment policy, social affairs and social inclusion, face a serious challenge. Leaving the problem unresolved poses a real threat to the future of the European labour market, including

the policies, strategies and programs for employment and economic growth (for example the 'Europe 2020' Strategy).

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ZJAWISKO WORKING POOR W EUROPIE – ANALIZA TAKSONOMICZNA

Streszczenie: W artykule podjęto problem osób pracujących, ale borykających się z biedą/ubóstwem. Zjawisko *working poor* („biednych pracujących”) jest poddane analizie taksonomicznej, w której zakres podmiotowy ogranicza się do wybranych państw europejskich, a zakres czasowy do ostatnich piętnastu lat. Celem artykułu jest przedstawienie zależności między pracą a biedą i/lub ubóstwem na europejskich rynkach pracy, w tym dookreślenie poziomu i struktury „biednych pracujących”. Aby zrealizować tak postawiony cel badawczy, posłużono się wynikami badań *The European Union Statistics on Income and Living Conditions*, a dzięki informacjom pozyskanym z bazy danych Eurostat przeprowadzono porównywalne analizy statystyczne. Na podstawie uzyskanych wyników można stwierdzić, że w Europie istnieje zjawisko *working poor*, a w przyszłości może ono przybierać na sile i stanowić poważne wyzwanie dla europejskich rynków pracy.

Słowa kluczowe: „biedni pracujący”, rynek pracy, Polska, Unia Europejska.