

Chronic diseases and labour resources: “Old and new” European Union member states

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Abstract. Chronic diseases are the leading causes of death and disabilities in the EU with the large impact on productivity and labour markets. The purpose of this study is to evaluate the spatial diversification of chronic diseases and its consequences for national labour markets in the “old and new” EU countries. The study use indices that determine the number of the years of life lost (YLL) as a result of premature death and the estimated number of potential years of life lost to disability (YLD) to assess the scale of the burden on labour resources with the consequences of chronic diseases. Attention was paid to the identification of the reaction model of “new” EU member states which will allow one to define the convergence degree of the EU area in this scope. In 2016, the average value of the YLL index in the group of the EU-CEE states was 151.1 per 1 thousand of people aged 15-69. This gives a result that is higher than the average level observed in the EU-15 group by over 67 years. The study shows the urgent need to address the issue of poorer health outcomes of economically active populations of the “new member states” in relation to eliminating the productivity lost and negative labour market consequences.

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1. INTRODUCTION

Chronic diseases are the leading causes of deaths and disability in the European Union countries, however, we have identified many health gaps among different countries (and even between certain regions in those countries), notably between the so-called old and new member states. The situation is even more diverse if we take into consideration the health issues of new and “newer” member states (e.g., Romania, Bulgaria). According to the European Health Report 2018 (WHO 2018b) there are some positive trends as the “differences between Member States in the indicators related to social determinants of health – infant mortality, life expectancy, primary school enrolment and unemployment – have narrowed” (WHO, 2018b, p. 8). However, many health indicators remain more favourable (with some exceptions) in the so-called old EU countries. Life expectancy in Europe overall ranges between 68.1 to 71.6 years (WHO 2018b). In 2016, the OECD published, for the first time, the estimation of health expenditures by disease, age and gender. The study estimated that circulatory diseases account for more than 10% of the current health expenditures and that circulatory, digestive and muscular conditions together with cancer and mental health account for almost 60% of the spending on health (OECD, 2016). Many chronic conditions impact the health of the Europeans during their professional career, especially in the age group of 50+, thus bringing in many personal as well as societal consequences, including the loss of productivity and increased financial burden for both healthcare and social security systems as well as lower quality of life for the people living in the EU countries.

Poor health conditions currently constitute one of the main causes of professional deactivation of labour force resources. For this reason, the relations between the health of society and its productivity on the level of both individual companies and whole economies have become the subject of increasing research (WHO, 2001; Bloom et al., 2004; Abegunde & Stanciole, 2006, Goryakin & Suhrcke, 2017). The unfavourable effects on the labour market and the losses connected with these effects in the global production constitute an aggregation of several components. The costs incurred by sick persons due to lost incomes, the costs of the government budget resulting from limited employment and the costs incurred by companies as a result of an increased rotation of employees are of key importance here. Accumulation of risk factors that together determine the society’s morbidity rate in connection with chronic diseases is particularly evident in highly developed countries (Gavurova et al., 2020, Stefko et al., 2020). The deepening unfavourable relation of the increased lifespan in relation to the number of years lived in the so-called “health” is the key problem of prosperous economies (Jakubowska & Horváthová, 2016, p. 161-162; Rajjani, et al., 2018). In the case of developed countries, it should be accepted that it is not the absolute length of life but rather the number of years lived in health that constitutes the real determinant of the labour market potential.

The analysis presented herein is aimed at the assessment of the spatial diversification degree of the impact of chronic diseases on the potential of national labour markets within the European Union. The research methodology used here was adapted to the following accepted assumptions:

- chronic diseases and their long-term consequences currently constitute the key factor that determines the lost productivity level in labour resources in the EU;

- within the framework of the EU, there is a high diversification degree of the scale of burdens caused by chronic diseases on the level of the national economies of member states;
- in spite of the lasting process of social and territorial convergence, the EU member states in Central and East Europe with the traditions of the post-socialist economy are still to a higher extent exposed to the burden on labour resources with the consequences of chronic diseases as compared to economies with market traditions;
- as regards EU member states, the level of economic development is a stronger predictor of the lost productivity of human resources that follows from premature mortality rather than from disability as a result of chronic diseases.

The analysis was based on data from the WHO database concerning the number of the so-called years of life in health which were lost as a result of chronic diseases. Taking into consideration the accepted research objective and the scope of available data on the national level (NUTS 1), population aged 15-69 was covered by the research while accepting this age scope as potentially productive. Using statistical measures, the diversification scale of the parameters analysed was defined on the level of EU member states, and the tendencies that are occurring in the phenomenon examined were identified within the space of the last dozen or so years. The data obtained refers fundamentally to the years of 2000-2016.

2. LITERATURE REVIEW

2.1. Health and work

The assessment of the connection that occurs between health and work is a complicated issue, one which is difficult to examine by means of data analysis. Due to the multifaceted nature of the impact of the disease on economic effects and feedbacks that occur between social and economic factors and the social health level, it constitutes a great methodological challenge (Devaux & Sassi, 2015; Gavurova et al., 2017; Galama & Van Kippersluis, 2013). There are divergences between research results presented in the literature that are aimed at a valuation of potential production losses triggered off by chronic diseases due to both the accepted objective and methodology and the quality of data used. Cole and Neumayer (2006) argue that a key mechanism through which health affects growth is via total factor productivity (TFP) and their results suggest that poor health can indeed reduce aggregate productivity. However, attempts taken to define the benefits that follow from activities aimed at an improvement of the health of society confirm the existence of an added correlation between such parameters as expenses on health and access to medical care and those indexes that measure the economic growth level of an area (Suchecka & Antczak, 2016, p. 119; Taşkaya et al., 2016, Reeves et al., 2013; Zandi, et al., 2020). Nevertheless, impediments should be taken into consideration here that occur in comparisons of health condition between the populations of individual countries, regions, areas (towns, villages) or social stratification (the rich, the poor).

The proven path of connections between health and the social and economic status is the strong effect of the impact of health on the level of the human's professional activity, their employability on the labour market and, as a consequence, the possibility to achieve an appropriate material status (Pasternak-Malicka, 2019, Pasternak-Malicka, M. and Migala-Warchol, A., 2018, Taraniuk, et al., 2018, Dahl, Malmberg-Heimonen, 2010; Grossman, 2000). Analyses conducted in this area demonstrate explicitly that those who enjoy good health have greater opportunities both of lengthening their professional activity (Boulhol et al., 2012) and having a longer period of employment (OECD, 2015). An analysis of the income situation of people with health limitations in relation to the remaining part of the population confirms the scale of discrimination and points to a notable degree of the impact of disability on the possibility to achieve income from gainful employment (Marmot & Bobak 2000; Jakubowska, 2016). Through a limitation of work

productivity, chronic diseases determine in a fundamental manner employment prospects and the level of incomes which can be obtained by those who suffer from illnesses. Chronic diseases constitute the cause of frequent sick leaves including long-term absence from work, and they furthermore increase the probability of people leaving the labour market earlier. The negative consequences are additionally intensified by the occurring social inequalities because the level of education, as well as the social and economic status, appear to be a strong predictor of this phenomenon (Devaux & Sassi, 2015). Bosák and Másilková (2018) studied the cost of impairments of the motoric system and found that are the most frequent causes of temporary work inability in CZ. According to the authors, they are also the most frequent cause of invalidity. Annually, just these impairments cause work inability to more than 50 thousand people and invalidity pension is paid out to nearly 24 thousand people with all the subsequent individual and societal costs. The above-mentioned authors estimated the total cost in the field of motoric system impairments as € 269 803 572 in 2016.

As previous paragraphs show the complex relationship between the health and paid work the important relationship may be found also between health and unemployment. Among many others e. g. Louda et al. (2018) in their study about effects of mass layoffs on health insurance expenditure found significant difference between the annual costs of treatment of employed (€ 536.8 a year) and unemployed persons (€ 705.4 a year) in their research sample from one of the region of Czech Republic. The difference of € 168.6 means that the costs of treating the unemployed are 31% higher than those for treating the employed, being higher than the relative increase in the risk of disease.

2.2. Consequences of chronic diseases in highly developed economies

The escalation of the incidence of the so-called chronic diseases that have been observed from the end of 20th century has become a vital problem in highly developed and fast developing countries. This situation constitutes to a great extent the consequence of the social and economic transformations that are occurring in these countries including changes in the lifestyle and in the consumption model (Machenbach, 2008). It is assumed that the so-called “causes of causes”, i.e. the base determinants of chronic diseases, are the reflection of the main forces that drive social, economic and cultural changes. Above all, such processes are mentioned here as globalization, urbanization and the ageing of the population (Rudawska, 2012, pp. 30-32, WHO, 2005, pp. 48-50). For these economies, this means a labour resource potential that is smaller than it could be expected on the one hand; on the other hand, there are growing costs of treatment both of the rising number of seniors and an expanding participation of those people who are incapable of doing work in labour force resources. In the case of economies with the highest level of income, owing to the increase of (public and private) expenses on health protection and progress in the area of medical technologies, it was possible to reduce the scale of premature mortality triggered off by chronic diseases; yet, this did not result in any limitation of the number of years lost to disability. The estimates presented in this area by the World Health Organization pointed out that in the case of the richest countries, chronic diseases are responsible for over 80% of years of life lost prematurely as a result of diseases or injuries and over 87% years lost to disability. The index of the average number of the years of life lost as a result of premature death or disability caused by a chronic disease that was assessed in accordance with the WHO methodology for the year 2016, was 240 years of life per 1 thousand of the population in the case of highly developed states, out of which 42% of the number of lost years resulted from the statistical disability period. Taking into account four categories of states distinguished according to the classification of the World Bank in relation to the level of income achieved, this was the worst result. For the individual groups of states, the index of the number of the years of life lost as a result of premature death or disability caused chronic diseases per 1 thousand of people which assessed for the year 2016 was as follows: countries with a low

level of income – 168, countries with a lower middle level of income – 206, countries with an upper middle level of income – 222, countries with a high level of income – 240 respectively (WHO, 2018a).

3. METHODOLOGY

The study uses indexes that determine the number of the years of life lost (YLL) as a result of premature death and the estimated number of potential years of life lost to disability (YLD) to assess the scale of the burden on labour resources with the consequences of chronic diseases.

The selection of the variables analysed was made on the basis of a review of proposals presented in the literature and related the assessment methodology of the phenomenon examined (Murray, Lopez, 2013). Source data came from Global Health Estimates 2016: Disease burden 2000-2016 of the World Health Organization.

Considering the adopted research goal, the variables studied were aggregated for the population aged 15–69, assuming this age range as potentially productive. This allowed determining the value of indicators of the number of years lost due to premature death (YLL) and the number of years lost due to disability (YLD) as a result of chronic diseases per 1000 people aged 15-69 for EU-28 countries. Comparability of data between EU member states was achieved by using intensity indexes that linked the number of incidences observed to a specific population size.

Using statistical measures, the diversification scale of the parameters analysed was defined on the level of EU member states. Their spatial distribution in the EU-28 area was determined. Attention was paid to the identification of the reaction model of “new” EU member states, which will allow one to define the convergence degree of the EU area in this scope. Two groups of states: (1) EU-15, i.e. those states that had acceded the EU by the year 2004 and that represent highly developed economies with market traditions, and (2) EU-CEE, i.e. the countries accepted in the EU structure after the year 2004 that represent the economies of the Central and East Europe with the experiences of political transformations, were distinguished for the needs of the foreseen research into the convergence degree of the “old” and “new” EU in the area of the occurring relations between the economy development level and the scale of the burden on labour resources with the consequences of chronic diseases. Due to the substantive criterion accepted, Cyprus and Malta were removed from the group of states accepted after the year 2004. To assess the tendencies that are occurring in the phenomenon examined, measurements were made in two points in time: the years 2000 and 2016.

4. EMPIRICAL RESULTS AND DISCUSSION

Among the EU member states, a substantial diversification is to be observed of the weight of chronic diseases which is determined by differences in the frequency of the occurrence of individual diseases as well as in the level of their mortality (Harbers, Achterberg, 2012, p. 9). This has an influence on differences in life expectancy in health for the residents of the individual states and, as a consequence, it determines in a fundamental way the observed effects on the labour market. An analysis of the diversification level of the selected parameters that describe the scale of the burden on the labour resources of EU economies with the consequences of chronic diseases confirmed the initially accepted assumption that a high level of diversification is particularly evident in the case of the years of life lost (YLL) index of people in potentially economically productive ages (15-69 years). In the year 2016, in the group of member states examined, this index accepted the average values on the level of 109,1 years per 1 thousand of people aged of 15-69. It is to be noted that within the span of the years of 2000-2016, there was an improvement in this area: the average level of the YLL index per 1 thousand people aged 15-69 fell by more than 20 years in the period examined (from the level of 130.6 to the level of 109.1). However, the high diversification level of the YLL

index in the group of the EU states constitutes an essential problem for the European economies. The number of the years of life lost prematurely as a result of chronic diseases per 1 thousand of people in productive age assessed for the year 2016 fluctuated in the range from 64.8 (Luxembourg) to 195,7 (Bulgaria) with the variability coefficient of 36.7%. Within the span of the years examined, the diversification level of this parameter in the group of EU member states was not significantly reduced (Table 1).

Table 1

Selected statistics for the EU Member States (in 2000 and 2016)

		Average	Interval	Max.	Min.	Standard deviation	Coefficient of variation	N
YLL	2000	130.6	147.4	224.9 (Hungary)	77.4 (Cyprus)	44.6	34.1%	28
	2016	109.1	130.9	195.7 (Bulgaria)	64.8 (Luxembourg)	40.1	36.7%	28
YLD	2000	92.3	34.2	99.2 (Luxembourg)	65.0 (Cyprus)	6.8	7.4%	28
	2016	95.1	32.1	101.8 (Netherlands)	69.7 (Cyprus)	6.0	6.3%	28

Source: Authors' results based on the data from Global Health Estimates 2016: Disease burden, 2000-2016. Geneva, World Health Organization; 2018, http://www.who.int/healthinfo/global_burden_disease/estimates/en/index2.html, Access: 25.05.2020.

The index of the years lost to disability caused by chronic diseases (YLD) was characterized by a slightly smaller range. In the year 2016, it accepted values from 69.7 (Cyprus) to 101.8 (Netherlands) of potential years lost to disability in relation to the analogical reference group of people aged 15-69. In the examined period of 2000-2016, this index demonstrated a small growth tendency: the average value of the index rose by 2.8 (from the level of 92.3 to the level of 95.1). This parameter was at the same time characterized by a low level of variability.

An analysis of the results of the spatial distribution of the indexes examined demonstrates that the problem of the high level of burden with the consequences of chronic diseases is a feature which is characteristic for the group of the EU member states in Central and East Europe. A high level of premature death risk for people in the so-called economically productive age is particularly evident here (Figure 1).

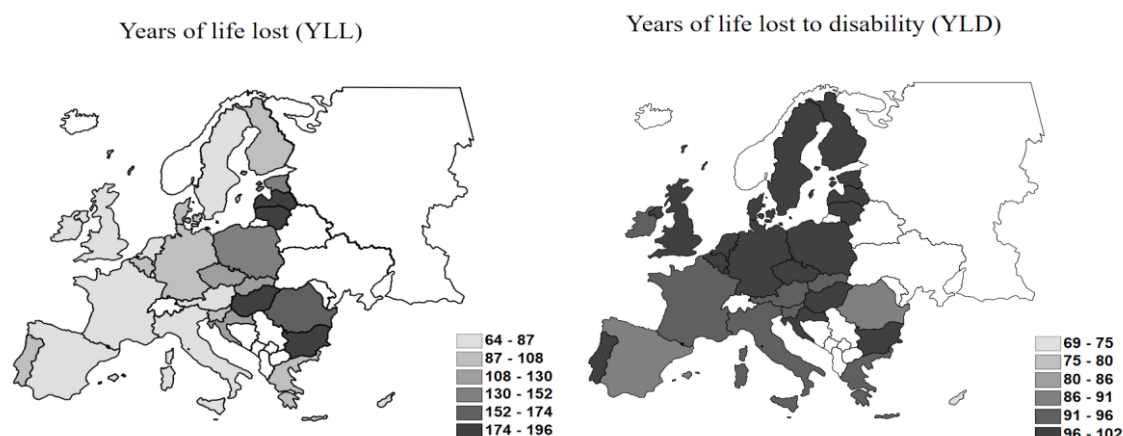


Figure 1. The spatial distribution of the indexes: years of life lost (YLL) and years of life lost to disability (YLD) as a result of chronic diseases per 1.000 population aged 15-69 (the EU Member States, in 2016)

Source: own evaluation

An analysis of the distribution of the indexes examined that determine the burden on labour resources with the consequences of chronic diseases in the groups of "old" and "new" European Union countries confirm the initial assumption adopted in the analysis suggesting that the problem of the high premature death risk level of those in economically productive age as a consequence of chronic diseases is a characteristic feature for the group of the Central and East European EU states. In the year 2016, the average value of the YLL index in the group of the EU-CEE states was 151.1 per 1 thousand of people aged 15-69. This gives a result that is higher than the average level observed in the EU-15 group by over 67 years. The reduction pace of this index that is lower than in the "old" EU states is additionally an unfavourable phenomenon. In the years 2000-2016, the index of the years of life lost as a result of a premature death in the group of the Central and East Europe states lowered on the average by 15% with a decrease observed in the EU-15 member states on the level of 19% (Figure 2).

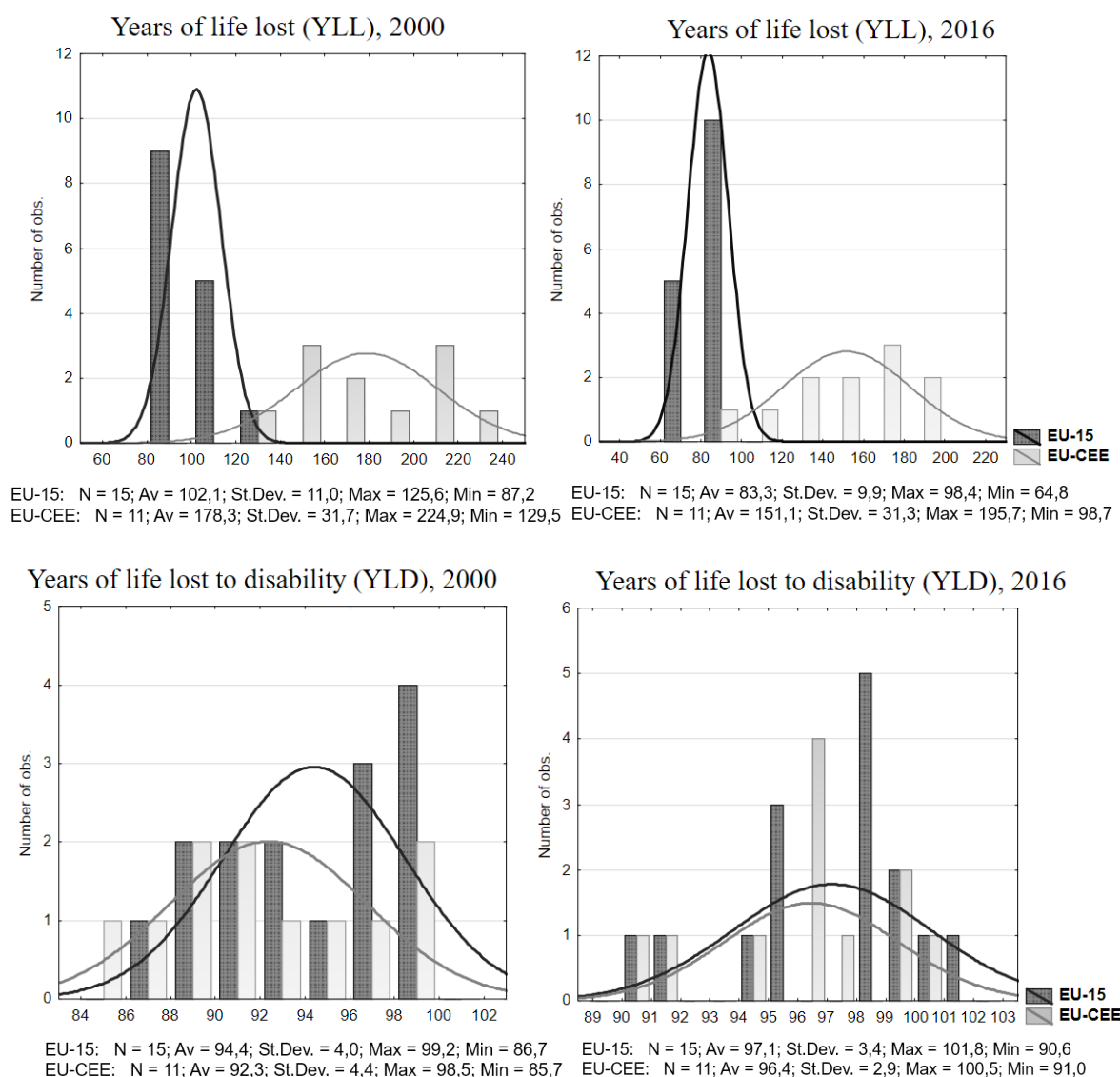


Figure 2. Histogram of the indexes: years of life lost (YLL) and years of life lost to disability (YLD) as a result of chronic diseases per 1.000 population aged 15-69 for two groups of EU states: EU-15 and EU-CEE (in 2000 and 2016)

Source: own evaluation

The index of the load on potential labour resources with the risk of disability being the result of chronic diseases in the individual groups of states was not so diversified. It did not change considerably within the span of the years examined of 2000-2016, even though in the case of all the reference groups a small increase of the values examined was noted (cf. Figure 2). As regards the EU-CEE group, the average level of this index rose by 4.4% (from 92.3 to 96.4), whereas in the EU-15 group it rose by 2.9% (from 94.4 to 97.1). A synthetic statement of the results for both groups of the member states is found in Figure 3, which constitutes at the same time the path of “catching up” with the highly developed western economies by the Central and East European countries.

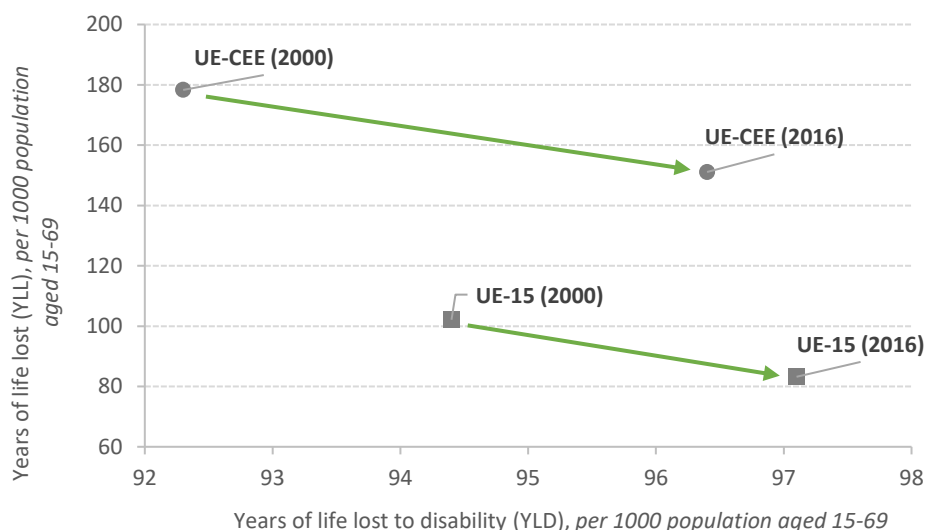


Figure 3. The correspondence between the number of the years of life lost (YLL) and the estimated number of potential years of life lost to disability (YLD) as a result of chronic diseases for two groups of EU states: EU-15 and EU-CEE (in 2000 and 2016)

Source: own evaluation

The research results presented point to similar patterns of reactions in the individual groups of member states. Within the span of the past dozen or so years, in the case of both groups examined, a significant reduction of the levels of the premature mortality of those in economically productive age could be observed with a simultaneous small growth tendency of the number of the years of life lost to disability as a result of chronic diseases. In the map presented that shows relations occurring between the number of the years of life lost as a result of premature death or disability, the “initial” level of the individual groups constitutes a fundamental difference between the “old” and “new” EU member states. States with a higher level of development (EU-15) and, as a consequence, with better developed systems of health care and prevention of chronic diseases, managed to achieve a lower level of the loss of the potential of human resources caused both by premature death and disability.

5. CONCLUSION

The results confirmed that the Central and East European states still remain a group which is strongly endangered by the economic consequences of chronic diseases, and the differences observed occurring between the member states in this area are of a permanent nature. The mortality level of those in economically productive age caused by chronic diseases remains a problem for economies with the experiences of political transformations. The country tailored health policy actions are needed to tackle this

phenomenon and improve the health and wealth of "new member states" populations and narrow the existing gap to "old member states".

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