

Original Article

Impact of government sport – related spending on staying healthy and being physically active

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Abstract:

The aim of this article is to investigate the relationship between government spending on sports and recreation and the health and physical activity of the population in the countries of European Union in 2017. Firstly, the value of a synthetic measure related to staying healthy and sustaining a consistent level of physical activity was estimated. The estimated measure was then grouped with the use of a three means comparison method. It was established that the "Old Union" countries, especially the Scandinavian countries and some of the EU's island states, i.e. Ireland, Great Britain, and Malta, were clearly ahead of the rest in this comparison. Among the countries of the "Old Fifteen" only Belgium and Italy were classified as part of a group with poor results, and the other countries belonged to either of the first two groups – with exceptionally good or good results. The countries from the eastern part of Europe, which had not yet joined the Union before 2004, were discovered to be in a noticeably worse position. After a synthetic measure had been constructed, it was used to estimate the Pearson's linear correlation coefficient. The second variable used in this calculation was government expenditure on sports and recreation per person (in Euro). Based on the results of the correlation study, it can be concluded that higher government spending is often aligned with a higher value of the constructed synthetic measure. It can also be established that the correlation is moderate, and the dependence is significant.

Key Words: government expenditures, sport, health

Introduction

Health is undoubtedly a particularly important aspect of human life. It affects both a person's well-being as well as any activities they might undertake. This thesis has even more underlying significance when we consider the ongoing process of the aging of societies. Putting these two arguments together, it is viable to conclude that we should strive for the health of people all over the world. Therefore, the following article presents an analysis of the health condition of citizens of the European Union member states and presents collected data on their physical activity. Next, we discuss the ways in which the state might influence the health and physical activity of its citizens, similarly to other areas of life. Thus, it is essential to consider the extent of the correlation between the money invested and the intended effect.

The aim of the article is to investigate the relation between government spending on sports and recreation and the populace staying healthy and being physically active. The subjective scope of the article covered the Member States of the European Union (excluding Luxembourg), in the time span of the year 2017. In order to analyse the health condition and physical activity of citizens, a synthetic variable was constructed. All data was obtained from the Eurostat database.

According to the definition proposed by the World Health Organization (WHO), health is: "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1946). This definition puts a significant emphasis on the fact that a healthy person is not simply one who does not suffer from disease or disability, but someone whose general well-being is assured. One of the factors that influence our health is physical activity, the lack of which may even lead to death. In 2004, nearly 5.5% of deaths worldwide were caused by a lack of physical activity (*Global health risks...*, 2009). It is often claimed that one of the more serious issues today is overweight, which is caused by an inadequate diet and lack of physical activity. It is worth to add that WHO defines physical activity as "any bodily movement produced by skeletal muscles that results in energy expenditure above resting level" (Caspersen et. al., 1985). Physical activity, consisting of regular sports and physical stimulation, allows you to maintain both physical and mental fitness. In addition, it has been proven to affect the improvement of interpersonal relations. Therefore, it can be concluded that physical activity has a positive effect on the health of citizens of a given country (*Council Recommendation on promoting health-enhancing physical activity across sectors*, 2013).

2932-----

Lera-López, Wicker and Downward referred to the importance of appropriate adaptation of state policies in their research. They analysed the impact of government spending on individual decisions related to undertaking physical activity. A total of 25,243 people was examined, and the group of respondents included citizens of 27 European Union countries. It is worth emphasizing that the study was conducted at the level of individuals. Based on the analyses, it was found that spending on health increases the likelihood of practicing sports and physical activity in a statistically significant manner. However, the authors do draw attention to the fact that expenditure on education also increases this probability in a statistically significant manner, even more than expenditure on health. Therefore, it is recommended to increase expenditure on education, and treat health expenditure as a supplementary means (Lera-López et al., 2016).

B. Humphreys and J. Ruseski analysed the physical activity of US citizens. This study was conducted in the period of 1998-2000. One of the factors increasing the physical activity of citizens was spending on parks and recreation. The authors pointed out however that an increase in this type of expenditure may only increase physical activity in certain groups. Namely, a different increase will occur among older people, and slightly different among young people (Humphreys, Ruseski, 2007).

The cited research shows that the proper adaptation of state policies may have an impact on practicing sport by the citizens. Thus, it is reasonable to analyse the relation between government spending on sports and recreation and staying healthy and being physically active.

Under the World Health Organization's Constitution, governments are responsible for the health of their citizens. Therefore, the state must allocate adequate funds to health and physical activity of its inhabitants (WHO, 1946). In 2017, all European Union countries spent a total of EUR 51 billion on sport and recreation (Szczepaniak, 2020). The largest amount of money per capita was spent in Sweden (Chart 1). The average amount invested for this purpose per one Swede is EUR 255.95. A little less was spent in Finland (€ 215.87). Expenditure of nearly EUR 200 per capita was also allocated in the Netherlands and Denmark. As you can see, the Scandinavian countries allocate the most resources for this purpose. On the other hand, the lowest expenditure on sports and recreation in 2017 was recorded in Bulgaria (EUR 15.62), Slovakia (EUR 23.35) and Romania (EUR 24.95).

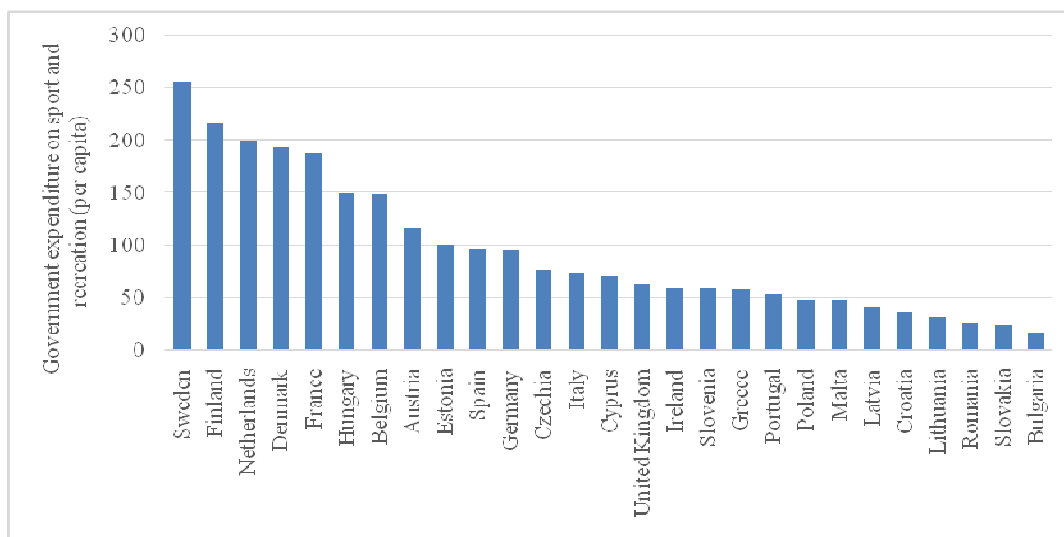


Chart 1. Government expenditures on sport and recreation in EU countries in 2017

Source: own preparation on the basis of Eurostat data.

The expenditure on sports and recreation includes:

- “provision of sporting and recreational services
- administration of sporting and recreational affairs
- supervision and regulation of sporting facilities
- operation or support of facilities for active sporting pursuits or events (playing fields, tennis courts, squash courts, running tracks, golf courses, boxing rings, skating rinks, gymnasias, etc.)
- operation or support of facilities for passive sporting pursuits or events (chiefly specially equipped venues for playing cards, board games, etc.)
- operation or support of facilities for recreational pursuits (parks, beaches, camping grounds and associated lodging places furnished on a non-commercial basis, swimming pools, public baths for washing, etc.)
- grants, loans, or subsidies to support teams or individual competitors or players” (*Manual on sources and methods for the compilation of COFOG statistics*, 2019).

Material & methods

In order to deepen the analysis related to the health and physical activity of the population in individual European Union countries, a non-standard synthetic measure was developed. The first step was selecting the variables for analysis. It should be emphasized at this stage that the availability of data on sport is rather limited and quite a significant portion of available data is incomplete. As already mentioned, all data came from the Eurostat database and covered the year 2017. After their completeness was confirmed, a set of potential diagnostic variables was determined (Table 1.), which were then verified in terms of variability and correlation. It was assumed that the threshold value of the coefficient of variation is 0.1. At this stage, variable X_{11} was rejected. It was assumed that if the correlation coefficient took values of up to 0.5, then a given variable was left in the set of diagnostic variables, and if this value was higher, it was eliminated from the set. At the stage of examining the relation between the variables, the variables X_2 and X_6 were excluded.

Table 1. Set of potential diagnostic variables

| Symbol | Variable | |
|--------------------------------|--|----------------|
| X_1 | Self-perceived health as good and very good [in %] | (S) |
| X_2 | Healthy life expectancy [in year] | (S) |
| X_3 | Fertility indicators (S) | |
| X_4 | General government expenditure on health [as % of GDP] | (S) |
| X_5 | Infant mortality rates [in %] | (D) |
| X_6 | Hospital beds [per 100 000 inhabitants] | (S) |
| X_7 | Graduates sport studies (Bachelor and Master Degrees) [as % of total graduates] | (S) |
| X_8 | Employment in sport [as % of total employment] | (S) |
| X_9 | Import of sporting goods [as % of total import] | (S) |
| X_{10} | Persons performing physical activity (one hour and more) outside working time [in %] | (S) |
| X_{11} | Accidents at work in sport area [in % of total accidents at work] | (D) |

Source: own preparation.

The constructed set of statistical variables became the basis for the transition to stimulation and normalization of the variables. This stage will allow the variables to be compared with each other. The first step was to replace the destimulants with stimulants using the formula (Topolewski, 2019; Kukula, 2000):

$$x_{ij}^S = 1 - x_{ij}^D, (i=1, 2, \dots, n; j=1, 2, \dots, m)$$

where:

x_{ij}^S - value of the variable transformed into a stimulant,

x_{ij}^D - value of the transformed destimulant.

The next step was to normalize the variables. For this purpose, the quotient conversion was used, using the formula (Walesiak, 2011):

$$x'_{ij} = \frac{x_{ij}}{\max_i x_{ij}}, (i=1, 2, \dots, k; j=1, 2, \dots, p)$$

where:

x'_{ij} - value in the i - object of the normalized j - variable;

x_{ij} - actual value in the i - object of the j - variable;

$\max_i x_{ij}$ - maximum value of the j - variable.

After the stimulation and normalization of the variables had been completed, the next step was the construction of a synthetic measure. The structure of the measure was based on a simple, model - free formula for aggregating diagnostic variables, using the formula (Binderman Z. et al., 2018, Krakowiak-Bal, 2005, Becker, 2011):

$$z_i = \frac{1}{p} \sum_{j=1}^p x'_{ij}$$

z_i - value of the synthetic measure for the i - country;

p - number of variables;

x'_{ij} - value in the i - object of the normalized j - variable.

Results

After all the transformations and estimation of the above formula had been carried out, the obtained results of the synthetic measure assumed values ranging from 0 to 1. The higher the value of a given country, the higher its position in the ranking. Accordingly, countries with scores close to 0 occupy lower positions in the ranking.

The ranking of countries based on the calculations is presented in Table 2. The analysis of the ranking shows that the value of the synthetic measure ranges from 0.408 to 0.644, which may indicate a relatively low differentiation of the European Union countries in terms of health and physical activity. Nevertheless, it is also clear that Finland, Sweden and Ireland stand out as the best. The situation is slightly worse in Great Britain and Malta. Latvia, Poland, and Bulgaria occupy the lowest position. However, the situation in Hungary and Lithuania is not significantly better.

Table 2. The value of the synthetic measure for individual EU countries in 2017

| L.p. | Country | Value of synthetic measure | L.p. | Country | Value of synthetic measure |
|------|----------------|----------------------------|------|-----------|----------------------------|
| 1 | Finland | 0,6443 | 15 | Czechia | 0,5562 |
| 2 | Sweden | 0,6419 | 16 | Slovakia | 0,5523 |
| 3 | Ireland | 0,6103 | 17 | Estonia | 0,5515 |
| 4 | United Kingdom | 0,5986 | 18 | Germany | 0,5454 |
| 5 | Malta | 0,5960 | 19 | Belgium | 0,5066 |
| 6 | Spain | 0,5915 | 20 | Italy | 0,4914 |
| 7 | Denmark | 0,5864 | 21 | Romania | 0,4896 |
| 8 | France | 0,5753 | 22 | Croatia | 0,4789 |
| 9 | Slovenia | 0,5745 | 23 | Lithuania | 0,4447 |
| 10 | Netherlands | 0,5739 | 24 | Hungary | 0,4406 |
| 11 | Portugal | 0,5735 | 25 | Bulgaria | 0,4308 |
| 12 | Austria | 0,5628 | 26 | Poland | 0,4305 |
| 13 | Cyprus | 0,5595 | 27 | Latvia | 0,4081 |
| 14 | Greece | 0,5587 | | | |

Source: own preparation on the basis of Eurostat data.

In order to determine the health and physical activity of the population in individual EU countries, they were grouped according to the value of the synthetic measure with the use of a three means comparison method. The calculation began with the estimation of the arithmetic mean value. Then, the objects were grouped into two separate populations - above and below the obtained average value. Next, the procedure was repeated in each population, dividing them further into two smaller groups. Ultimately, four separate groups were obtained each year (Kaczmarczyk, 2017). Following these guidelines, the numerical ranges included in Table 3 were obtained.

Table 3. Numerical ranges for grouping with the use of the three means comparison method

| Group IV | Group III | Group II | Group I |
|--|-----------------|------------------|------------|
| <0-0,4579> | (0,4579-0,5398> | (0,5398- 0,5807> | (0,5807-1> |
| Group I – very good; Group II – good; Group III – difficult; Group IV – very difficult | | | |

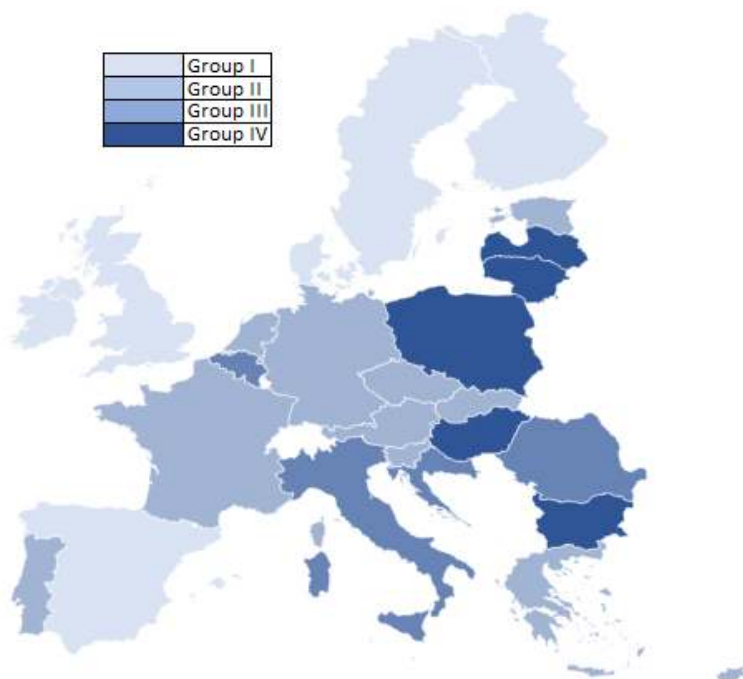
Source: own preparation.

The results of the grouping are presented on Map 1. As presented, seven countries were classified into the first group (with the best conditions/occupying top positions in the ranking). All the Scandinavian members of the EU (Finland, Sweden, and Denmark) belong here. The next three members of the Union are countries located on islands (Ireland, Great Britain, and Malta). The last member of this set is Spain.

The largest group is the second one, which includes eleven out of twenty-seven European Union countries. As you can see, mainly countries located in the Central and Eastern Europe, including Germany, Austria, Slovakia, Slovenia, the Czech Republic, and Estonia are found here.

At this stage, it is worth noting that out of the fifteen "Old Union" states, as many as thirteen were places in the first and the second groups. Only Belgium and Italy found themselves in the next one - the third group. A total of four countries were classified in it, including Romania and Croatia, i.e. countries located in Eastern Europe.

The last group - the worst in terms of citizens staying healthy and being physically active – consists of five countries, including Poland. All these countries represent the eastern part of Europe and entered the Union not earlier than in 2004.



Map 1. Staying healthy and physically active in EU countries in 2017 - results of grouping by means of the three means comparison method
Source: own preparation.

Estimates of the synthetic measure and the grouping revealed the condition of the population of individual European Union members in terms of staying healthy and being physically active. Next, the relation between the synthetic measure and government expenditure on sports and recreation should be considered. On Chart 2. the scatter plot is presented. The abscissa axis presents the value of the synthetic measure, while the ordinate axis shows government expenditure on sports and recreation in EUR/person. As presented, the higher value of government spending on sport and recreation is often matched by the higher value of the synthetic measure. Pearson's linear correlation coefficient was 0.50, which means that the correlation between the measures tested might be considered moderate and the dependence is significant. Therefore, it should be concluded that the conscious shaping of state spending on sports and recreation has a significant impact on people's health and physical activity.

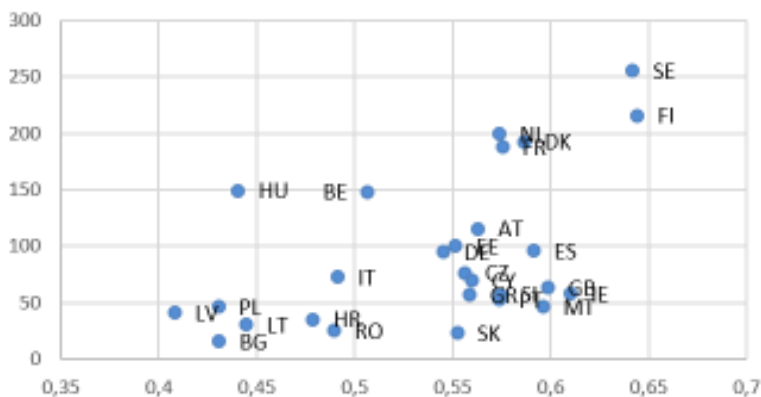


Chart 2. Value of the synthetic measure (horizontal axis) and government expenditure on sports and recreation (vertical axis, Euro per capita)
Source: own preparation on the basis of Eurostat data.

Discussion

Taking care of health, ensuring proper levels of physical fitness and general well-being are now deemed integral to a balanced lifestyle. This aspect is even more important if we consider the problem of aging societies (Osińska, 2020). One of the concepts in health transition is the Compression of Morbidity Theory. According to this theory, two points on the life expectancy line are particularly important. The first one relates to the moment when a person becomes sick or disabled, while the second point shows the time of death of the individual. According to the presented concept, the time between these points should be shortened. This should allow the elderly to be more active. This concerns both physical and professional activity, which may directly translate to an improvement in the quality of life of this group of people. This theory is now recognized as the aging healthy paradigm (Swartz, 2008).

Taking care of health and physical fitness is equally important for young people. Conscious decisions related to nutrition and physical activity from an early age may contribute to reducing the risk of incidence of non-communicable diseases (such as heart disease, obesity, hypertension, cancer or diabetes) later in life (Moreno et al., 2008).

It might be claimed that the obtained results do not differ significantly from the analyses of other authors, cited above. Therefore, it can be assumed that state policy is an effective tool for stimulation of the physical activity of its citizens. Improving physical activity can contribute to general improvement of the health of a country's inhabitants. According to the data presented in the report issued by the European Commission, nearly half of the Europeans (46%) did not engage in sport or any physical activity in 2017. The fact that this percentage increased by 4% compared to 2013 is even more worrying. It is also worth mentioning that physical activity decreases with age. According to the survey, 38% of people aged 15-24 do not engage in sport or other physical activity or do it relatively seldom. For comparison, this percentage equals 54% for people aged 25-39 and 61% for people aged 40-54. Moreover, in the age group over 55, as many as seven out of ten people do not engage in any physical activity. Taking into account the quoted data describing involvement in physical activity and sports, a policy should be put in place to support these activities. On the one hand, Europeans are an aging society, and on the other hand, they are also less and less physically active, which could cause serious health problems for the Union citizens in the future (Special Eurobarometer, 2018).

Conclusions

This article addresses the relation between government spending on sport and recreation and the health and fitness of the population. Performed estimation of the synthetic variable gave grounds to a claim that the Scandinavian countries and some of the island states of the Union, namely: Ireland, Great Britain and Malta, stand out as places where the citizens seem to be in the best condition in terms of health and physical activity among the states of the European Union. Latvia, Poland, and Bulgaria occupy the lowest position in the ranking.

The estimated synthetic measure became the basis for grouping with the use of the three means comparison method. It showed that as many as eleven out of twenty-seven surveyed countries were included in the second group. Moreover, it was noted that as many as thirteen "Old Union" countries were in the group with an exceptionally good and good situations in terms of keeping the population healthy and physically active. Only Belgium and Italy were placed in a lower position, in the ranking.

The performed estimation of the synthetic measure made it possible to examine the relation between state spending on sports and recreation and the health and physical activity of the population of individual EU countries. By means of the Pearson's linear correlation coefficient, it was determined that such a relation was present. Based on the results, it can be concluded that the correlation is moderate, and the dependence is significant. Therefore, it might be claimed that rational and conscious adaptation of state spending on sports and recreation has a significant impact on people's health and physical activity.

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