



Healthcare Financing Models and the Expenditure Growth

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Abstract: *The present study includes the countries of the European Union, aiming to test the hypothesis that the funding models can be related to the size and growth of health expenditure, as a phenomenon from the second half of the 20th and the beginning of the 21st century. The criterion for grouping the national health systems is the dominant public source of financing from the two with the largest weight in the aggregate expenditure – health insurers' payments and payments on account of the state budget. Data from the health accounts of the countries of the EU for a period of the last 10 years are used. The observed indicator is the weight of total health expenditure of the current GDP, which allows international comparisons to be made. The methods of analysis used include descriptive statistics, verification of hypotheses for the type of empirical distributions, equality of means and variances, and graphical presentation of the detected dependencies. The results show that there is a significant variation in health expenditure between the individual countries in the EU. Within the formed two groups of countries - one with a dominant government budget and the other with a dominant health insurance financing, no statistically significant difference in the size of the health expenditure can be found. Such a dependence is found when grouping using other indicators related to geographical location and living standards.*

1. INTRODUCTION

Healthcare stands out as a specific socio-economic sphere in which the market has a limited place and role. Pure market phenomena are limited for several reasons, well known and described in the scientific literature. They can be summarized as follows (Arrow, 1963, p. 948-954; Stiglitz & Rosengard, 2015, p.368-371):

- the individual's demand for health services is not steady in origin as, for other goods, but irregular and unpredictable - it is a fact only in the time of illness;
- risky nature of the final medical treatment and its quality, which can subject the consumer properties of the produced services to a considerable degree of uncertainty;
- the individual course of the disease and influence of the applied treatment, which can predetermine the unique nature of the final result depending on the particular case;
- monopoly role of the physicians in the healthcare market which favours vertical integration prescribed demand, limits competition;
- the presence of specific monopolistic factors preventing the entry of new providers of medical care;
- the presence of stated preferences that limit the free consumer choice;
- relatively more pronounced asymmetry of information;
- an absence of profit motive since for-profit and not-for-profit organizations compete within the system at the same time;

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- availability of goods with significant positive externalities, which limits their market pricing;
- health is a basic human need with significant social importance, which implies ensuring financial affordability through the participation of the government.

As a result of these, the state makes efforts to ensure not only control by placing requirements on the activities of health care providers, but also to raise and distribute funds to ensure equity in access to the system (Culyer & Newhouse, 2000, p. 1805). Public funds are collected by two main methods – taxation and compulsory insurance payments. On this basis, two main models for the financial organization of healthcare systems are distinguished, named after their founders – the so-called Bismarck and Beveridge models.

The model of Bismarck was introduced in Germany in 1883 and first, it was based on social insurance for workers (Lisac et al., 2008, p. 184). Later, the insurance coverage was extended to other categories of employed, as well as some self-employed people (Busse, 2002, p. 17). This system allows more market elements mainly a high degree of economic and financial independence of the healthcare providers and competition among them. An advantage of the Bismarck system is the shorter waiting time to access the system. But the price of these benefits is a relatively higher current health care expenditure.

Beveridge's model differs significantly from Bismarck's because health fundraising is done through taxation. In this sense, all members of society participate in this process, and the government bears the total or a large part of all health expenditures. Within the revenue system, there are no special instruments intended to finance the current health costs. Similar systems, financed as a priority or entirely at the expense of the state budget, are to a greater extent centralized and integrated. In turn, they are relatively "more economical". However, the main disadvantage is the presence of larger queues of patients, i.e. ceteris paribus, slower time access to health goods. This model was introduced after the Second World War and was influenced by the British economist William Beveridge in 1948. Such kind an organization of the system was argued through the sentence that health is a basic human right and the whole society should be contributed to the system, which is realized by taxation. This system has free universal access to health care (Koen, 2000, p. 4; Rodrigues, E., et al., 1999, p. 164).

Both models allow for a certain level of private spending. As the latter finds expression mainly through private insurance products and through the so-called direct patient payments. In both models, private sources have significantly less weight than public ones.

2. AIM OF THE STUDY

The present study includes the countries of the European region, aiming to test the hypothesis that the funding models can be related to the size and growth of health expenditure, as a phenomenon from the second half of the 20th and the beginning of the 21st century. This study tries to solve the following scientific tasks:

- to select a measure of health expenditure that allows providing a comparison among economies with different wealth, income, and living standards.
- to define sets of national health systems from the EU region with their health expenditure according to the type of financial model.

- to provide evidence for the distribution, central tendencies, dispersion, and homogeneity of collected data.
- to confirm or reject the hypothesis for the relationship between the models of healthcare financing with the size of expenditure.

3. DATA AND METHODOLOGY

International data about health indicators, including economical ones, can be found in several publicly accessed sources. In this regard can be mentioned the regional Eurostat Database, global World Bank and International Monetary Fund Data Bases, and some specialized sources like the European Health for All database of the World Health Organization. According to the aim and the tasks of the study, it was chosen Eurostat Database which provides opportunities for the extraction of different measures of expenditure, and for international comparisons to be made.

It was chosen the per cent share from the current GDP of total current health care expenditure (TCHE) or its specific element by a source of financing as a reliable unit of measure which allows international comparisons to be made.

The following quantitative methods were used – descriptive statistics, tests for normality, homogeneity of variances and non-parametric tests for equality of group medians. All graphs and tests were performed with the SPSS 23 software product at a significance level of 0.05.

4. RESULTS AND DISCUSSION

After reviewing queries in the database “Health care expenditure by financing scheme”³ from a total of 33 observed countries (27 - members of the EU and 6 outside it), two subgroups were formed. In the first subgroup, we included 13 countries with the lowest share of Social health insurance schemes below 1.5 % of the current GDP. This is the group of countries that come as close as possible to the Beveridge model. The other 20 countries, whose financing is based mainly on social health insurance and compulsory contributory health insurance, were included in the second group, presenting the Bismarck model group.

In addition, publications available on popular scientific Internet platforms⁴ representing health systems from the last ten years were studied to be assigned to the appropriate group, according to a funding model (Lo Scalzo et al., 2009, p. 49; Theodorou, 2012, p. 42; Economou, 2010, p. 49; Barros et al., 2011, p. 58; Dimova et al., 2018, p. 63).

Total health expenditure as the sum of all funding sources for the total population of 33 countries and both samples follow a frequency distribution close to normal (Sharpio-Wilk test Sig. > 0.05). The same is confirmed for both groups of countries whose distribution of health expenditure as a per cent of current GDP is close to normal. According to the significance levels of the tests, it can be concluded that the distribution in the Bismarck model group is closer to rejecting the hypothesis of a normal distribution of the data. This is due to the fact that there is a definite number of countries with relatively small weights of TCHE from the national income. The histograms of the two samples can be seen in Fig. 1.

³ The queries were performed on 06.02.2022 for the last available data for 2019.

⁴ www.academia.edu, www.researchgate.com, <https://scholar.google.com/>

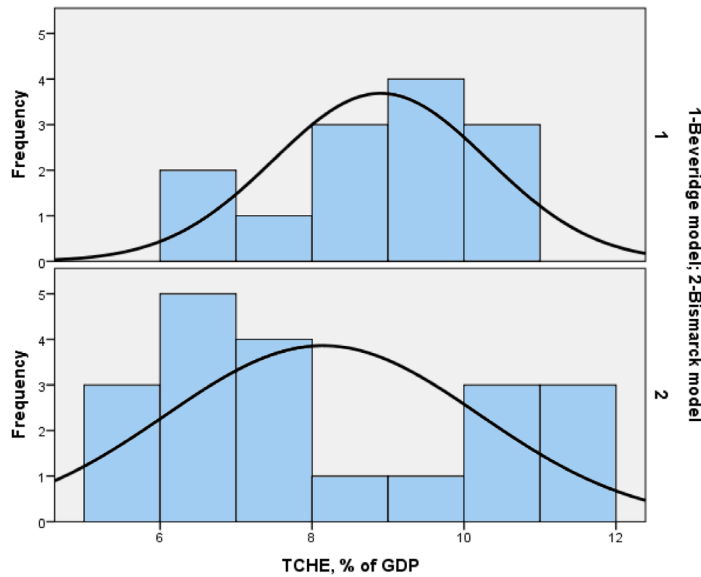


Figure 1. Frequency distribution of TCHE with normal curves in two samples.

There are 12 (60 %) countries in the group with insurance financing with a weight of health expenditure in GDP below 8 %. In the countries that adopted the Beveridge model with costs below the specified threshold, this number is only 3, with a cumulative share of 23.1 %. There is a well-marked difference in the means, medians, and dispersion of the data in the two samples (Fig. 2).

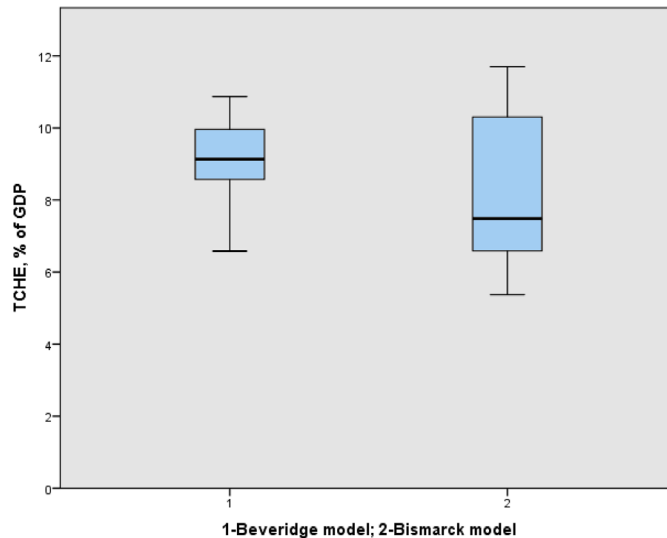


Figure 2. Group medians, maximum, minimum value, 1st and 3rd quartile of TCHE.

In the sample of countries that base their health systems on the Bismarck model, we encounter quite a pronounced dispersion (Range = 6.33 %; IQR = 3.84 %). This sample contains countries whose data are relatively heterogeneous in terms of spending as a share of GDP. The hypothesis of homogeneity of variances in the two groups is rejected (Levene’s test Sig. < 0.05).

The difference in group medians is visible in Fig. 2 (Median₁ = 9.13 %; Median₂ = 7.48 %), but whether it is large enough to be considered statistically significant as well? The non-parametric test for independent samples shows that the hypothesis of equality of group medians cannot be accepted (Mann-Whitney U test Sig. > 0.05). Average measures of health care expenditure, presented as a percentage of current GDP, do not differ statistically significantly in the two groups of financing models.

This result may be due to the large variance in the Bismarck group. If we pay more attention to this group, we will find that the majority of countries with low expenditure weights are not those that have long and traditionally used the social insurance model of financing. These are the countries that have returned to this practice after years of centralized command-administrative management of the system. To understand more about the financing models and the health expenditure they generate, a new third group of countries can be created, including those from Central and Eastern Europe (CEE). From the group of countries with the Beveridge model, there is only one country from the specified region, which was also assigned to the third group (Latvia). Thus, the third group contains 13 countries (Median = 6.98 %; IQR = 1.32 %). The median values and the variation of the data in the three groups can be presented in Fig. 3.

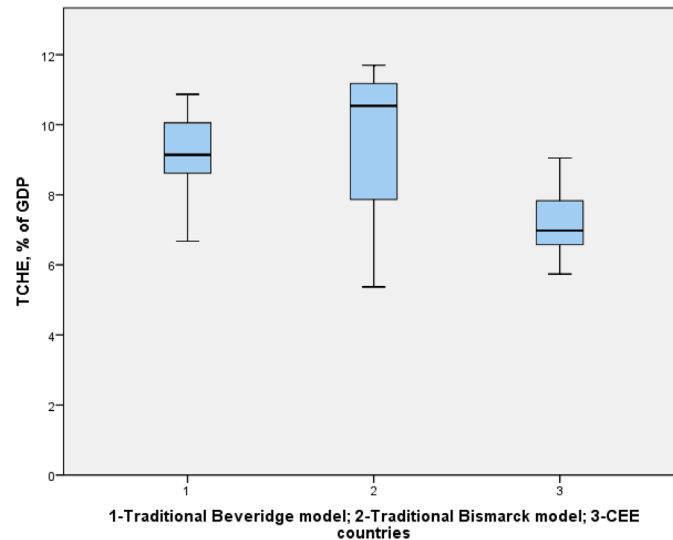


Figure 3. Medians, maximum, minimum value, 1st and 3rd quartile of TCHE in the three groups of countries.

The results of the non-parametric test in this case confirm the hypothesis of a significant difference in the group medians (Kruskal-Wallis Test Sig. < 0.05). There is at least one pair of group medians that are significantly different from each other. This fact is due to the significantly lower levels of health expenditure in the CEE countries, not so much to the visible difference between the two groups of countries with traditions in the analyzed financing models.

5. FUTURE RESEARCH DIRECTIONS

The search for more convincing predictors of health expenditure in the European region, other than financing models, could be directed towards the use of living standards indicators, the parity purchasing power of income, or similar ones.

6. CONCLUSION

Although visually there is not a small difference in the mean values and the medians of the two groups of countries with Beveridge (n=13) and with Bismarck (n=20) models, the hypothesis that the paradigm of the financing model can be related to the significant changes in the size of the total expenditure of health care cannot be confirmed. This study also supports the hypothesis that belonging to a given geographic region may also be associated with significant differences in healthcare expenditure.

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