

## HEALTH CARE FINANCING IN THE EUROPEAN UNION COUNTRIES – STRUCTURE AND CHANGES

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### ABSTRACT

The aim of the paper was to present health care systems and assess the recent trend in health care expenditure in the European Union countries. The data source was the World Bank and European Statistical Office (Eurostat). The adopted research period covered the years 2000–2016, due to data availability. The methodology of the study was based on an analysis of data indicator series related to health care expenditure, which evaluate the national health care system performance. The research results were presented using primarily Japanese candlestick charting. The study showed that health care expenditure represented an ever-increasing burden for all the EU economies, both in absolute values and in relation to GDP. However, substantial differentiations in the amount and structure of health care expenditure were observed at the country level, having roots in the level of a country's economic development and diverse post-war economic and political evolution. The analysis of health care expenditure structure confirmed that all three types of health care systems (Beveridge, Bismarck and mixed one) were observed in the EU, but the last one had a marginal importance. The form of system did not determine its effectiveness. On average, more than three-fourths of health care expenses were financed by general government expenditure. Out-of-pocket spending varied widely among the analysed EU member states.

**Key words:** health care system, health expenditure, general government expenditure, out-of-pocket expenditure, Japanese candlestick charting

**JEL codes:** H51, I18, I10, I13, E62

### INTRODUCTION

Health is a special economic good that has significant value for man, resulting from both its direct and indirect impact on his level of satisfaction, and thus on the value of his utility function [McGuire et al. 1988]. It is vital for all countries to appropriately invest in their health care sector. Evidence shows that investing in health significantly benefits the economy [Rahman et al. 2018]. Health should be treated as an integral part of sustainable development and economic growth which ensures nation economic security and betters human life [Sen 1999, Karim 2016, Rahman et al. 2018]. The

idea of health as a form of human capital has a long history and became popular in economic literature in the 1960s [Schultz 1961, Mushkin 1962].

Various models of health care financing can be seen in the world. Countries finance their health care through a combination of taxes, social insurance contributions, private insurance programs and out-of-pocket payments [van Doorslaer et al. 1999]. Health care system classifications have been broadly described in the literature [Burau and Blank 2006, Freeman and Frisina 2010, Wendt 2014]. The way health care systems are created, managed and financed is pivotal and affects people's lives [WHO 2000]. In the European Union

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three different health care systems are observed according to service financing, delivery, and economic policies, namely [Gaeta et al. 2017]:

- Beveridge model – financially granted by public taxes and directly operated by the state;
- Bismarck model – financially granted through employer and employee compulsory social security contributions;
- mixed system – being a hybrid of Beveridge and Bismarck models in which private funding from voluntary insurance schemes or upfront payments is significant.

Due to the complexity and specificity of health care, the effectiveness of the system is heterogeneously understood and depends on many different factors [Smith et al. 2009, Joumard et al. 2010, Lighter 2011].

Health care systems in the EU have experienced major changes in recent decades [Wendt 2014]. Substantial differences between Western and Eastern EU member states are a reflection of a diverse economic and political evolution after World War II [Tambor 2015]. The effectiveness of the systems varies.

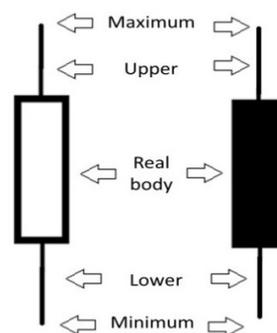
Health spending measures the final consumption of health care goods and services, as defined in the System of Health Accounts [OECD et al. 2017]. Total government spending, as a share of GDP, can be different according to the country's priorities, which depend on capacity to pay and fiscal constraints [Zaman et al. 2017]. Health government expenditure is an important indicator of a government's commitment to the health of its citizens, and is important for the sustainability of national health programs [Lu et al. 2010]. In most countries, both developed and developing, the level of health care expenses is increasing over time [Wolfe 2008], largely due to their allotment of a higher proportion of national government financing. What is even more important, the growth in health expenditure is outpacing inflation [Grima et al. 2018]. In developed economies, countries charge patients for some part of health services, most commonly for prescription drugs [Gemmill et al. 2008].

The aim of the paper was to briefly present health care systems and assess the recent trends in health care expenditures in EU countries. Our contribution was that using Japanese candlestick charting, we analysed data indicators related to health expenditure, which evaluate national health care system performance in

all EU member states from 2000 to 2016. The research should be considered as comparative and treated as a challenge for future research. The sections in the paper are structured as follows: The next section describes the data and research methods used. The following section presents empirical findings and discusses them. The final section draws conclusions of the study.

## MATERIAL AND METHODS

The methodology of the study is based on an analysis of data indicator series related to health care expenditure in all 28 EU countries. The following indicators are used: current health expenditure to GDP ratio, current health expenditure per capita, structure of health care system, general government health expenditure, private health expenditure, and out-of-pocket health care expenditure. The above-mentioned indicators form the basis of the evaluation of national health care system performance. Indicators related to health expenditure reflect performance of health care systems. The data come from the World Bank and European Statistical Office (Eurostat). Due to data availability, the adopted research period covers the years 2000–2016. The research results are presented using primarily Japanese candlestick charting (Fig. 1), and secondarily by selected statistical and graphic methods.



**Fig. 1.** Composition of Japanese candlestick  
Source: Authors' own elaboration based on Gdakowicz [2011].

Candlestick charting has a long history [Nison 1991] and is a type of technical analysis charting. Knowledge about the open, closed, high and low values for the time period to be described is needed for candlestick chart construction. The analysed time interval can be freely modified. Candlestick is composed

of the real body which represents the area between the opening and closing periods (Fig. 1). The white real body means that the closing period represent a higher value than the opening one. The black body reflects the opposite situation, i.e. the closing value is lower than the open value [Gdakowicz 2014]. The use of Japanese candlestick charting helps in providing clarity when comparing the analysed countries and across time.

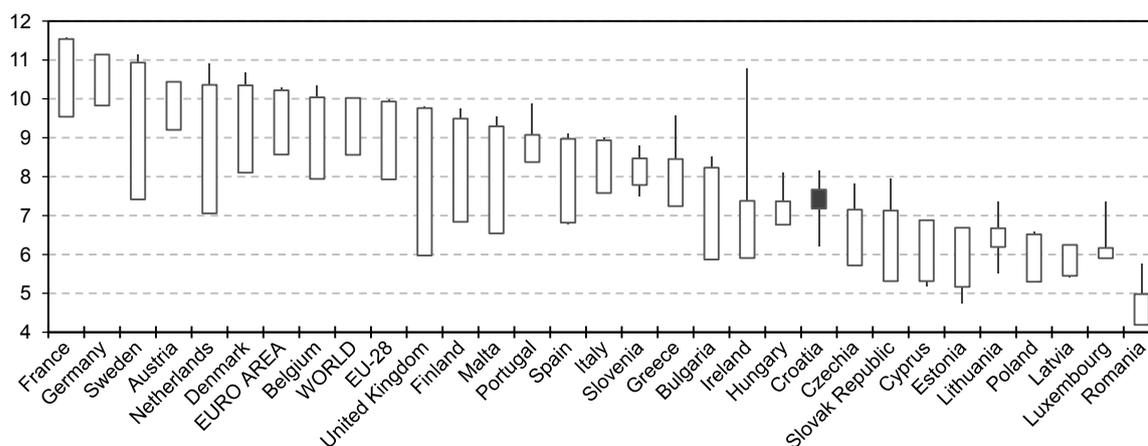
## RESULTS AND DISCUSSION

The study showed that health expenditure represented an increasing burden for the EU economies in relation to GDP from 2000 to 2016 (Fig. 2). On average, the analysed health care indicator increased 25% (from about 8% up to 10% of GDP) in the EU in the analysed period and almost equalled the average global relative health spending. While the largest level of health expenses were observed in Western EU countries (among others, more than 11% of GDP in France and Germany in 2016), the lowest expenditure on health in relation to GDP was noted in Central Eastern EU member states (less than 7% of GDP in Romania, Latvia, Poland, Lithuania, and Estonia in the entire analysed period). The explanation for that observation is that the substantial difference in the relative level of health spending between Western and Eastern EU countries has roots in diverse post-war economic and political evolutions [Tambor 2015]. The only exception was Luxembourg, where the proportion of health expenses to GDP was stable but relatively low (about 6%).

The largest increases among the EU countries in the 2000–2016 period were recorded in the United Kingdom (70%), Sweden and the Netherlands (close to 50%). The only EU country that has experienced a decline (about 7%) in health expenditure in relation to GDP in the analysed period was Croatia. Our results are in common with Wolfe [2008].

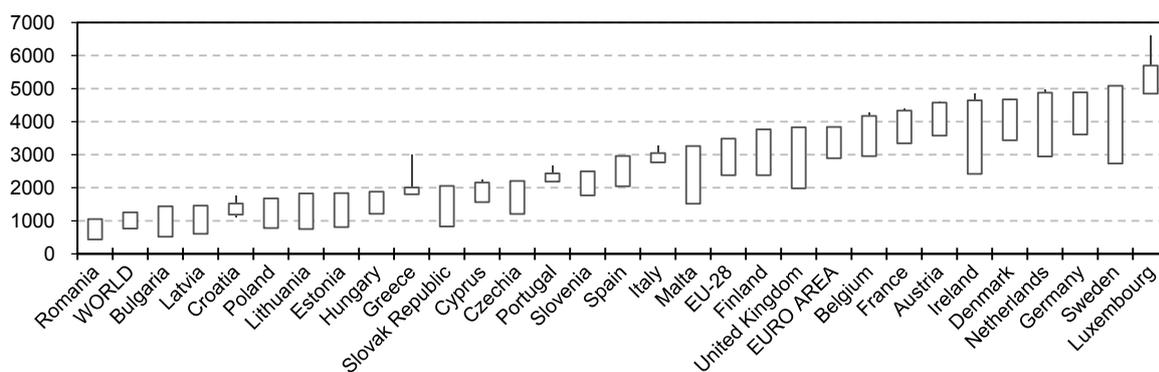
For a better understanding of the different dynamics, health expenditure in relation to GDP ratio should be considered in hand with health spending per capita. While higher income EU member states tend to allocate more of their income to health care, some countries representing relatively high spending on health per capita could have relatively low health expenditure to GDP, and vice versa [OECD 2018].

Figure 3 shows that the amount of health spending per capita is strictly connected to the level of national income per capita. On average in EU countries, financing of health per capita in PPP 2011 USD increased by 46% from 2000 to 2016, but less than two-thirds of this increase was the product of rising GDP. In comparison to the world average, the EU member states spent about three times more on health care per capita. At the country level, relatively the largest increases were noticeable in post-communist countries, primarily in Bulgaria (178%), Slovakia Republic (148%), Lithuania (143%) and Romania (139%). It is worth mentioning that due to the economic crisis, Greek spending on health decreased by 46% from 2008 to 2015. In many other EU member states, as a consequence of the above-mentioned economic downturn,



**Fig. 2.** Changes of current health expenditure in European Union countries, 2000–2016 (% of GDP)

Source: Authors' own elaboration and calculation based on World Bank data.



**Fig. 3.** Changes of current health expenditure per capita (Purchasing Power Parity in constant 2011 USD) in European Union countries in 2000–2016

Source: authors' own elaboration and calculation based on World Bank data.

health spending per capita has become more aligned to economic growth [Morgan and Astolfi 2014].

Despite the growing EU integration and convergence of health care systems [Leiter and Theurl 2012] there are differences in the way health care is financed in the EU countries. Three types of health care systems, i.e. Beveridge, Bismarck and Mixed, were observed in the EU (Table 1). The Beveridge model, also referred to as National Health System (NHS), established in the United Kingdom (UK) in 1942 [Gaeta et al. 2017], apart from the UK was present in all Southern and Scandinavian EU member states. The Bismarck model, based on compulsory social security contributions by employers and employees, was the most popular health care system in the EU. It was present in the EU funders states and was adopted by post-communist EU countries, including Poland. The mixed system, in which private funding from voluntary insurance schemes or upfront payments is crucial, was the least popular. Although Busse et al. [2007] Gaeta et al. [2017] classified adoption of the mixed system by four the EU member states, the role of voluntary insurance in these countries was marginal.

Table 2 presents 2018 ranking of health care system effectiveness in EU countries according to consumer opinion (*Euro Health Consumer Index 2018*), developed by Health Consumer Powerhouse in 2019. It should be noted that the selection of a given form of health care system is not the most important factor, because it does not directly determine the effectiveness of the system. The report on Euro Health Consumer Index points to the superiority of the Bismarck model over the Beveridge system, where the Netherlands is the undisputed leader among EU member states. Nevertheless, the results show that in the case of Nordic countries (Denmark, Finland and Sweden) the Beveridge system works smoothly, while in post-communist EU countries (e.g. Romania, Hungary, Poland) the Bismarck model is not effective.

Figure 4 presents the structure picture of health care system financing in the EU countries in 2016 and confirms significant differences in the composition of their financial sources. In the case of Denmark, Sweden, the United Kingdom and Italy the health care system was more than 75% funded by government

**Table 1.** Typology of health care systems in the European Union countries

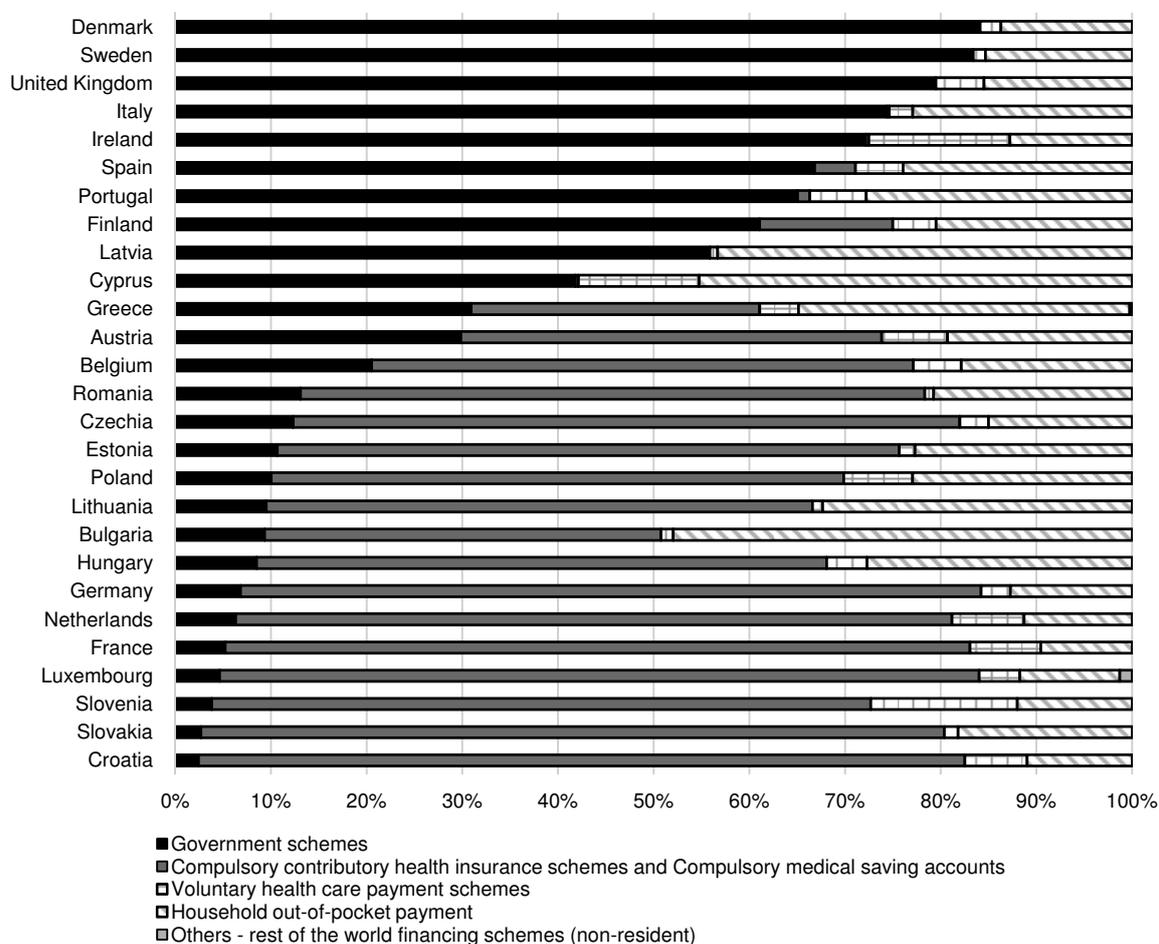
Beveridge system (National Health System – NHS)	Bismarck model (Social Health Insurance System – SHIS)	Mixed model (Private Health Insurance System – PHIS)
Cyprus, Denmark, Finland, Ireland, Italy, Latvia, Malta, Portugal, Spain, Sweden, the United Kingdom	Belgium, Estonia, France, Germany, Lithuania, Luxembourg, the Netherlands, Poland, the Czech Republic, Romania, Slovakia, Slovenia, Hungary	Austria, Bulgaria, Greece, Croatia

Source: Authors' own elaboration based on Gaeta et al. [2017].

**Table 2.** Typology of health care systems in the European Union countries

Country	Rank	Score	Country	Rank	Score	Country	Rank	Score
Netherlands	1	883	Czechia	11	731	Malta	21	631
Denmark	2	855	Estonia	12	729	Lithuania	22	622
Belgium	3	849	The UK	13	728	Greece	23	615
Finland	4	839	Slovakia	14	722	Latvia	24	605
Luxembourg	5	809	Spain	15	698	Bulgaria	25	591
Sweden	6	800	Italy	16	687	Poland	26	585
Austria	7	799	Slovenia	17	678	Hungary	27	565
France	8	796	Ireland	18	669	Romania	28	549
Germany	9	785	Croatia	19	644	–	–	-
Portugal	10	754	Cyprus	20	635	–	–	-

Source: Authors' own elaboration based on Gaeta et al. [2017].



**Fig. 4.** Structure of health care expenditure in the European Union countries in 2016

Source: Authors' own elaboration based on Eurostat data.

schemes which were based on taxes. There was no funding from compulsory contributory health insurance schemes or compulsory medical saving accounts in the above-mentioned countries.

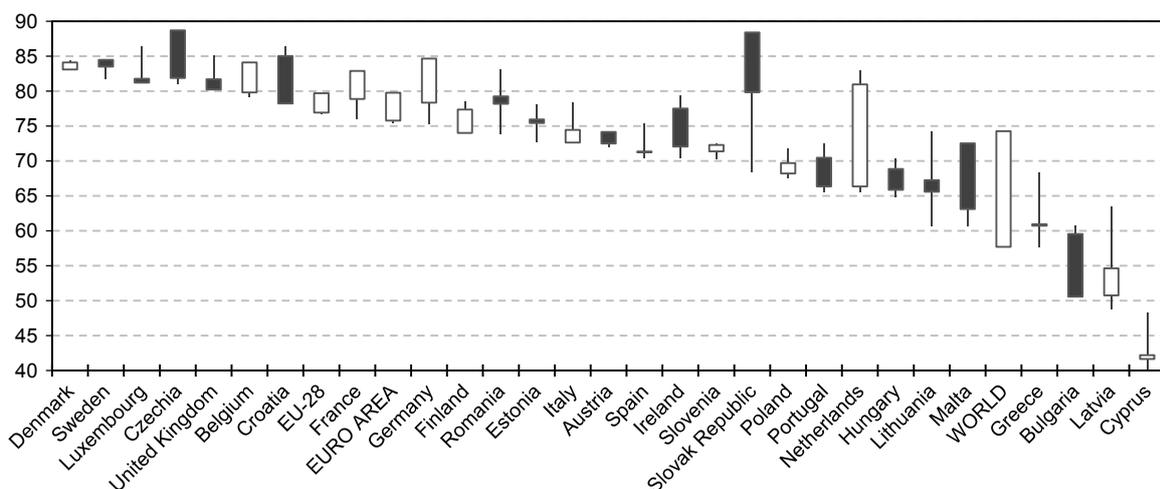
The health care system was funded in a totally different way in post-communist countries and the Inner Six, i.e. mostly on compulsory social security contributions by employers and employees. In Slovenia, Slovakia and Croatia, government funding did not exceed 4% of total health spending. Household out-of-pocket payments as a component of total expenditure on health varied widely among the EU countries in 2016, from very low levels in France, Cyprus and Latvia up to 48% in Bulgaria. The most marginal part of health care system financing were the voluntary payment schemes, which represented more than 10% in only three EU member states, namely Slovenia, Ireland and Cyprus.

Figure 5 shows that on average, budgetary funding of the health care system increased slightly (3.5%) from 2000 to 2016, while the world average growth equalled 30% in the same period. Government expenses represented the major financial pillar of health care systems in the EU member states, in other words budgetary resources funded almost 80% of total health care. At the country level, the study confirmed that changes of general government engagement in

financing health care in the EU countries from 2000 to 2016 were visible but presented different trends.

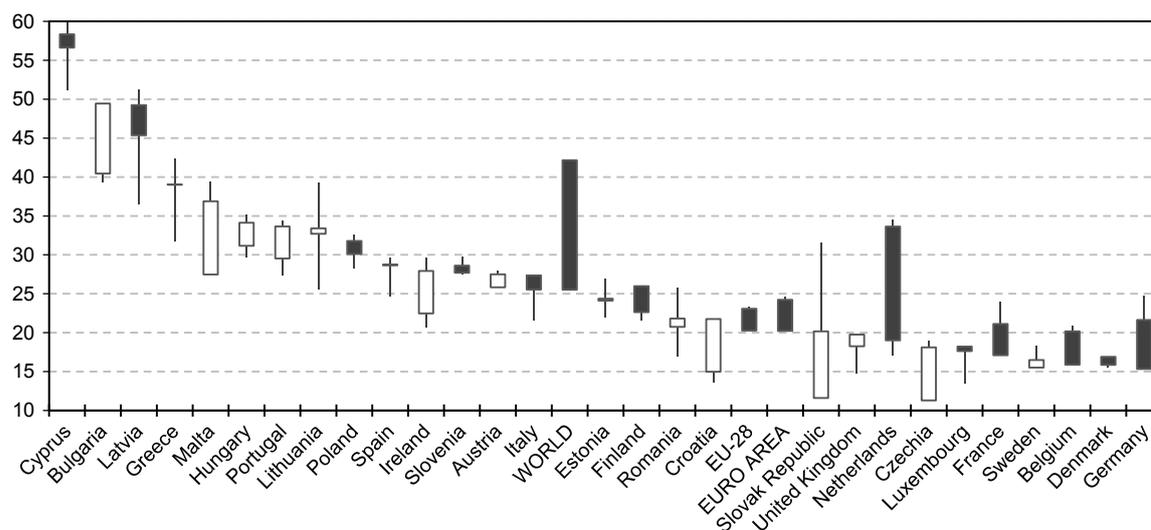
While a decrease in government health expenditure (as a percentage of total health spending) was observed for 16 countries, 12 countries experienced a growth in government spending. The largest increase of budgetary engagement in health care was recorded in the Netherlands (22%), while in the case of Bulgaria, Malta, and the Slovak Republic financing of health care from government funds decreased more than 10% in the analysed period.

Figure 6 confirms that the amount of private health expenditure was negatively correlated with government spending on health and constituted the second most important health care system funding in the EU countries over the period 2000–2016. The largest share of private health spending in relation to total health expenditure in the EU was observed in Cyprus (almost 60%). In comparison, the share of private health expenditure in the 10–20% range was observed in several of the EU countries in the analysed period. The 12% decrease in private health expenditure in the EU should be considered small compared to the average global decrease of 40%. The largest decrease (more than 20%) in private expenditure was observed in the Netherlands, Germany, Belgium and France. By comparison, the highest growth of private health spending



**Fig. 5.** Changes of general government health expenditure in the European Union countries, 2000–2016 (% of current health expenditure)

Source: Authors' own elaboration and calculation based on World Bank data.



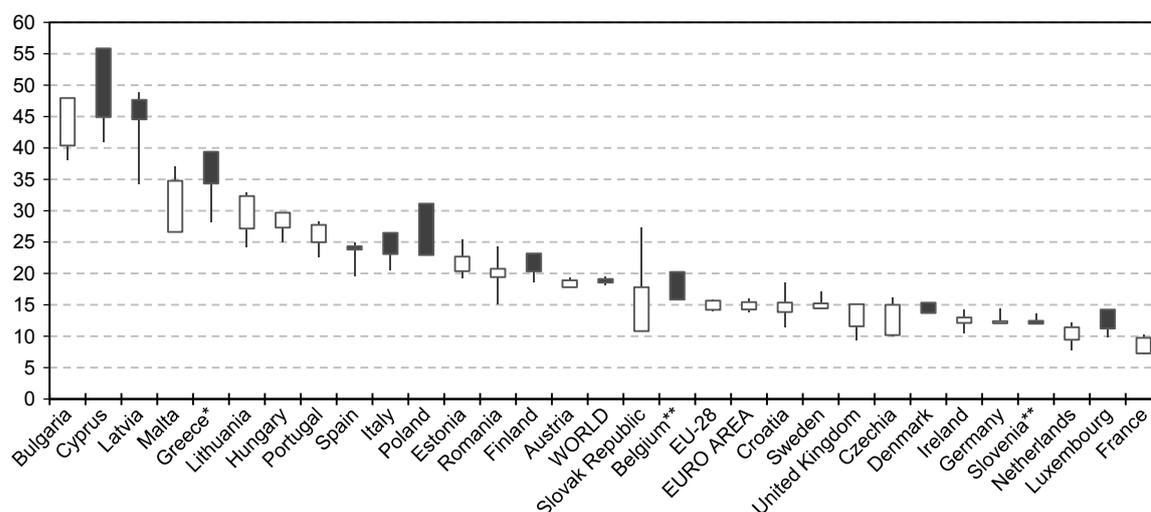
**Fig. 6.** Changes of private health expenditure in the European Union countries in 2000–2016 (% of current health expenditure)

Source: Authors’ own elaboration and calculation based on World Bank data.

in comparison to total health expenditure was observed in the Slovak Republic, the Czech Republic and Croatia, 74%, 60% and 45%, respectively.

Some form of cost sharing from individuals via copayments, coinsurance, and deductibles were required in all EU countries. However, the amount

(percent of current health expenditure) of out-of-pocket payments for health services in the EU member states varied widely and did not follow a consistent trend in the analysed period (Fig. 7). Increasing cost sharing was observed in 16 countries (e.g. the Slovak Republic, the Czech Republic, France, Malta,



\*data for Greece are available from 2008; \*\*data for Belgium and Slovenia are available from 2003

**Fig. 7.** Changes in out-of-pocket health care expenditure in the European Union countries in 2000–2016 (% of current health expenditure)

Source: Authors’ own elaboration and calculation based on World Bank data.

the UK, and the Netherlands), while a decrease was visible in 12 EU member states (e.g. Poland, Belgium, Luxembourg, Cyprus, Greece, and Italy). The amount of the EU average out-of-pocket expenditure was 25% lower than the world average. It is worth mentioning that out-of-pocket expenses are limited to direct expenditure for services not included in the benefits package and to cost-sharing requirements. Although the World Bank [Busse et al. 2007] states that contrary to low- and medium-income countries, informal payments rarely present a problem in high-income economies, the problem of out-of-pocket informal spending is worth considering in the EU, especially in Eastern and Southern EU countries. In Greece, Souliotis et al. [2016] estimates that under-the-table payments hover at about one-third of public hospital admissions and visits to private practitioners and dentists.

## CONCLUSIONS

The paper confirmed substantial changes of health care systems in the analysed period in EU countries. The study showed that health expenditure represented an increasing burden for all the EU economies, both in absolute values and in relation to GDP, on average 46% and 25% respectively. Substantial differentiations in the amount and structure of health expenditure among analysed countries were observed at the country level, having roots in the level of a country's economic development and diverse post-war economic and political evolution. The analysis of health expenditure structure confirmed the existence of Beveridge, Bismarck and mixed models but the importance of the last one should be considered marginal. On average, 79% of health expenses were financed by general government expenditure in 2016 in the EU.

The research confirmed that budget funds were the basic financial pillar of health care systems in EU countries. The study showed the reduced involvement of private health expenditure by about 12%. The largest decrease in private expenditure was observed in the Netherlands, Germany and Belgium, respectively. The EU average out-of-pocket expenditure was 25% lower than the world average. Out-of-pocket spend-

ing varied widely among the EU member states. The most increased cost-sharing was observed in the Slovak Republic and the Czech Republic, while the most decreasing trend was visible in Poland and Belgium. In the paper we showed that Japanese candlestick charting improves clarity in the research of indicators related to health expenditure. Explaining the drivers and mechanisms of health expenses in the EU member states is a challenge for future research.

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## **FINANSOWANIE OPIEKI ZDROWOTNEJ W KRAJACH UNII EUROPEJSKIEJ – STRUKTURA I ZMIANY**

### **STRESZCZENIE**

Celem artykułu było przedstawienie systemów opieki zdrowotnej i ocena zmian w wydatkach na opiekę zdrowotną w krajach Unii Europejskiej. Dane pochodziły z baz danych Banku Światowego i Europejskiego Urzędu Statystycznego (Eurostat). Ze względu na dostępność danych przyjęty okres badawczy obejmował lata 2000–2016. Metodologia badania została oparta na analizie wskaźników związanych z wydatkami na ochronę zdrowia, stanowiących podstawę oceny krajowego systemu opieki zdrowotnej. Wyniki badań przedstawiono za pomocą metody świec japońskich. Badanie wykazało, że wydatki na opiekę zdrowotną są coraz większym obciążeniem dla wszystkich gospodarek unijnych, zarówno w wartościach bezwzględnych, jak i w stosunku do PKB. Zaobserwowano jednak znaczne zróżnicowanie w wielkości oraz strukturze wydatków na opiekę zdrowotną między analizowanymi krajami, spowodowane poziomem rozwoju gospodarczego oraz zróżnicowaną powojenną ewolucją gospodarczą i polityczną. Analiza struktury wydatków na opiekę zdrowotną potwierdziła, że wszystkie trzy rodzaje systemów opieki zdrowotnej (Beveridge, Bismarcka i mieszany) były obserwowane w UE, jednakże ostatni z nich miał marginalne znaczenie. Rodzaj systemu opieki zdrowotnej nie determinował jednak jego skuteczności. Przeciętnie ponad trzy czwarte wydatków na opiekę zdrowotną zostało sfinansowanych z wydatków sektora instytucji rządowych i samorządowych. Wydatki typu *out-of-pocket* różniły się znacznie między państwami członkowskimi UE.

**Słowa kluczowe:** system opieki zdrowotnej, wydatki na opiekę zdrowotną, wydatki sektora instytucji rządowych i samorządowych, wydatki typu *out-of-pocket*, metoda świec japońskich