Is There a Relationship between Financial Performance and Health Services Performance? Evidence from Selected Countries

(Research Article)

Finansal Performans ile Sağlık Hizmetleri Performansı Arasında Bir İlişki Var Mıdır? Seçilmiş Ülkelerden Kanıtlar

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ABSTRACT

Keywords:
Financial Performance, Health Services Performance, EDAS Method, Correlation

Received:
02.08.2023

Accepted:
20.01.2024

Utilising resources wisely and effectively is crucial because they are limited in the field of health. Effective health expenditures have a reducing effect on possible health problems that may be encountered in the future. For this reason, the performance evaluation of health services obtained as a result of health expenditures has gained importance. In addition, measuring financial performance, which is another performance evaluation tool for health institutions, is strategically extremely important. In this direction, the relationship between the health service performance and financial performance of Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, Norway, Slovenia, and Sweden in the 2018–2022 period was analysed with the EDAS method. According to the findings, a positive relationship was observed between financial performance and health service performance. It has been determined that the health services performance of the countries with high financial performance is also high.

ÖZET

Anahtar Kelimeler:
Finansal Performans, Sağlık Hizmetleri Performansı, EDAS Yöntemi, Korelasyon

Sağlık alanında sınırlı olan kaynakların etkin ve verimli şekilde kullanılması son derece önemlidir. Etkin biçimde gerçekleştirilen sağlık harcamaları, gelecekte karşılaşılabilecek olası sağlık sorunlarında azaltıcı etkiye sahiptir. Bu nedenle sağlık harcamaları sonucu elde edilen sağlık hizmetlerinin performans değerlendirmesi önem kazanmıştır. Ayrıca sağlık kurumları için bir diğer performans değerlendirme aracı olan finansal performansın da ölçülmesi stratejik açıdan son derece önemlidir. Bu doğrultuda çalışmada 2018-2022 döneminde Belçika, Danimarka, Finlandiya, Yunanistan, İrlanda, Lüksemburg, Norveç, Slovenya ve İsveç ülkelerinin sağlık hizmetleri performansı ile finansal performansı arasındaki ilişki EDAS yöntemiyle analiz edilmiştir. Bulgulara göre finansal performans ile sağlık hizmetleri performansı arasında pozitif ilişki görülmüştür. Finansal açıdan yüksek performans gösteren ülkelerin sağlık hizmetleri performansının da yüksek olduğu elde edilmiştir.

1. INTRODUCTION

The right decision should be made about where, how much, and how the resources should be directed in order for the limited resources in the field of health to be used in the most effective and efficient way (Çevik, 2013). Reasons such as the labour-intensive nature of health, when, where, and how much health will be needed, and the need for technological products in the presentation of health increase public health expenditures (İnam & Murat, 2023).

Today, in the conditions of increasing competition and high costs, the performance of health services, which is formed by health expenditures, and the financial performance of countries have become important (Çakmak, Öktem & Ömürgönülşen, 2009). Pekkaya & Dökmen (2019) stated that public health expenditures may not always provide high health service performance, and it is important to use health expenditures effectively. Similarly, there are many studies in the literature examining the performance of public health expenditures and health services (Filmer & Pritchett, 1999; Roberts, Chang & Rubin, 2004; Afonso & Aubyn, 2005; Spinks & Hollingsworth, 2005; Temür, 2008; Adam, Delis & Kammas, 2010; Kocaman, Mutlu, Bayraktar & Araz, 2012; Çevik, 2013; Asandului, Roman & Fatulescu, 2014; Daştan & Çetinkaya, 2015; Yılmaz & Yentürk, 2015; Medeiros & Schwierz, 2015; Frogner, Frech & Parente, 2015; Stefko, Gavurova & Kocisova, 2018; Pekkaya & Dökmen, 2019; Şantaş, Şantaş & Demirgil, 2021; İnam & Murat, 2023).

While evaluating the performance of health services, financial performance is as important as public health expenditures. The determination of financial performance facilitates the decision-making processes of health institutions and organisations for the future and enables them to see their future. Therefore, it is important in terms of increasing the reputation of the institution (Kaufman, 1994; Gider, 2011). In this direction, it is aimed to analyse and evaluate both the health services performance and the financial performance of OECD countries in the 2018–2022 period with the EDAS method. Although it was intended to include all OECD countries in the analysis, since all country data could not be fully accessed, Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, Norway, Slovenia, and Sweden, which do not cause linear dependence in the standard decision matrix in the EDAS method, were included in the analysis. Since there is no study in which countries health services and financial performances are evaluated together, this study is a first and contributes to the literature.

The study consists of four parts. In the first part, general information about health expenditures and health services performance is given, while in the second part, studies examining the performance of health institutions are examined, and a conceptual framework is formed in terms of health services performance and financial performance. In the third part, the health services performance and financial performance of Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, Norway, Slovenia, and Sweden in the period of 2018–2022 were evaluated with the EDAS method, and the relationship between the performances was examined. Finally, in the fourth part, the findings are interpreted and suggestions are made for future studies.

2. LITERATURE

In the literature, it is seen that studies examining the performance of health institutions examine either the health services performance (Retzlaff-Roberts et al., 2004; Afonso & Aubyn, 2005; Spinks & Hollingsworth, 2005; Adam et al., 2010; Kocaman et al., 2012; Asandului et al., 2014; Medeiros & Schwierz, 2015; Frogner et al., 2015; Stefko et al., 2018; Pekkaya & Dökmen, 2019; Demirci, Konca & İlgün, 2020; Karaman, Ürek, Bilgin, Uğurluoğlu & Işık, 2020; Dirik & Şahin, 2020; Şantaş et al., 2021; Kaçak, 2022; Pehlivan & Yiğit, 2022; Çeçen & Akbulut, 2023) or the financial performance (Ayanoğlu, Atan & Beylik, 2010; Palamutçu, 2013; Karadeniz, 2016; Taşar, Demir & Diğer, 2019; Kar, Özer & Avcı, 2019; Tasi et al., 2019; Yiğit & Bayrakcıoğlu, 2020; Ekinci & Bakır, 2021; Koçyiğit, Bıyık & Ertaş, 2022; Tutar, 2022; Kefe, 2023; Yazıcı, 2023).

Studies examining the effectiveness of the performance of health services include education and research hospitals (Pakdil, Akgül, Doruk & Keçeci, 2010; Beylik & Pekcan, 2012; Bal & Bilge, 2013; Yiğit, 2019); health centres (Çakmak et al., 2009; Özata & Sevinç, 2010; Uyar & Şahin, 2015); and public health (Kaçak, 2022). Health care performance measurement criteria are generally per capita health expenditure, number of patients, number of beds, number of doctors, nurses, total medical devices, life expectancy in performance evaluation, infant mortality rate, maternal and infant mortality rate, life expectancy at birth. The common opinion reached in the studies examined is that it is not important to make high health expenditures, and the important point is that effective and efficient health expenditures should be made. Accordingly, a summary of some studies is given below.

As a result of the study of Çevik (2013), in which he investigated the effect of public health expenditures of countries on health outcomes by classifying and comparing countries according to their income levels, the effect of public health expenditures on improving health indicators was investigated, and it was found that public health expenditures improved child mortality rates. Considering the change in this situation in countries, countries are classified according to income groups, and it has been found that public health expenditures have a better effect on health outcomes in low-income countries compared to high-income countries.

Asandului et al. (2014) revealed in a study in which 30 European countries evaluated the efficiency of their health systems using some 2010 health indicators that the countries were mostly ineffective.

Daştan and Çetinkaya (2015) compared the health systems of OECD countries and Turkey and examined the health expenditures of the countries with the concepts of life expectancy at birth, infant mortality rates, access to health services, and equity. It has been concluded that countries have different health systems, and their health expenditures are indirectly related to each other.

Kaçak (2022), in his study covering the years 2010–2018, evaluated the impact of public health services in 27 OECD countries on the performance of health systems. It has been found that there are 11 countries with effective public health systems, 18 countries with effective hospital service systems, and 9 countries that are effective in calculating the average efficiency scores of countries.

İnam and Murat (2023) tried to evaluate the performance of public health expenditures in 29 OECD countries according to nine variables that are thought to affect health expenditures. They stated that countries with high per capita income have a higher share of public health expenditures and that the expenditures made should be used more efficiently and effectively than their size. In line with the studies examined, it can be said that public health expenditures are important, but it is important to distribute the expenditures in a balanced way and to use them efficiently.

Financial performance analysis in health institutions was carried out using ratio analysis (Gider, 2011; Palamutçu, 2013; Avcı & Çınaroğlu, 2015; Çam, 2016; Songur et al., 2016; Yiğit & Bayrakcıoğlu, 2020; Bozdemir & Güley, 2022), horizontal and vertical analysis (Songur, et al., 2016), trend analysis (Songur, Kar, Top, Gazi & Babacan, 2016; Koçyiğit et al., 2022), the Du Pont financial analysis method (Işıkçelik, Duru & Günaltay, 2021; Işıkçelik, Turgut Ağırbaş, 2022; Arı, 2023), and multi-criteria decision-making methods such as TOPSIS (Kar et al., 2019; Yiğit, 2020; Keleş, 2023), MOORA (Keleş, 2023), and Grey Relational Analysis (Pourmohammadi, Shojaei, Rahimi & Bastani, 2018; Işıkçelik & Ağırbaş, 2022).

Studies examining the financial performance of health institutions (Ateş, 2014; Avcı & Çınaroğlu, 2015; Taşar et al., 2019; Kar et al., 2019) and oral and dental health centres (Yiğit & Bayrakcıoğlu, 2020; Tutar, 2022) were examined in scope. In studies, the criteria for measuring the financial performance of health institutions were generally the current ratio, liquidity ratio, cash ratio, financial leverage ratio, ratio of short-term liabilities to total resources, inventory turnover, return on equity, net profit margin ratio, etc. were used (Yiğit, 2020; Ekinci & Bakır, 2021; Işıkçelik & Ağırbaş, 2022). According to the studies examined, it is extremely essential to evaluate the financial performance of institutions. It enables institutions to survive, ensure their continuity, and control costs. By comparing the past with the current situation, it makes it easier to have an idea of the decisions to be taken for the future and to make long-term plans. It encourages the effective and efficient use of resources (Gider, 2011).

It is an extremely important issue to examine the performance of health institutions in terms of both efficiency and finances. Since the need for health services is increasing day by day, institutions should evaluate health services and financial performance in order to provide more added value by using existing resources effectively and efficiently, to make plans for the future by ensuring financial sustainability, and to control costs. Having more resources, better health system designs, and technological advances contribute to increased efficiency. For this reason, improving the performance of institutions providing health services is an important issue. The results to be obtained as a result of the evaluation of these two performances together are extremely important for health institutions. As a result of these evaluations, it enables institutions to have an idea of how far they have progressed or regressed and to see their plus and minus sides. In this direction, in the next section, the health service performance and financial performance of Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, Norway, Slovenia, and Sweden in the 2018–2022 period were analysed with the EDAS method, and the relationship between them was examined.

3. METHODS AND FINDINGS

In cases where there are more than one alternative and criteria, frequently used multi-criteria decision-making methods are used. These methods are very diverse, and it is seen that COPRAS, ARAS, EDAS, AHP, TOPSIS, MOORA, and ELECTRE methods are often preferred. In this study, the Evaluation based on Distance from Average Solution (EDAS) method was used, which enables the determination of the relative efficiency of one option compared to the other decision option in cases where there are more than one alternative and criteria (Keshavarz, Zavadskas, Olfat, & Turskis, 2015; Karabasevic, Zavadskas, Stanujkic, Popovic & Brzakovic, 2018). The reason for choosing this method is that data deficiencies in the standard decision matrix, which do not cause linear dependence, do not prevent the model from working.

The study aimed to analyse and compare both the health performance and financial performance of OECD countries in the 2018–2022 period, but all data for all OECD countries could not be accessed. In this direction, the OECD countries were selected in such a way that the data deficiencies in the standard decision matrix created for

the examination of both performance types would not cause linear dependence in the EDAS method. These countries are Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, Norway, Slovenia, and Sweden. The criteria used in the measurement of the health service performance and financial performance of countries are given in Table 1.

Table 1. Criteria used in Performance Measurements

Financial Performance Criteria (Maastricht Criteria)		Healthcare Performance Criteria (OECD Health Indicators)	
Notation	Criteria	Notation	Criteria
F1	Foreign Capital	H1	Life Expectancy
F2	Growth Rate	H2	Health Expenditures in the GDP
F3	GDP	H3	Health Expenditures per capita
F4	Per Capita Income	H4	Health Expenditures within the scope of state and compulsory health insurance
F5	Export	H5	Health Expenditure per capita within the framework of state and compulsory health insurance programmes
F6	Imports	H6	Number of Doctors per 1000 people
F7	Inflation	H7	Number of Beds per 1000 people
F8	Unemployment	H8	Medical Device Total (for 1.000.000 people)
F9	Population		

The health service performance and financial performance of public health expenditures of the nine countries included in the research between the years 2018-2022 were analysed using the EDAS method with the criteria given in Table 1, and the performance scores of the countries were determined. It was tried to determine whether the scores obtained were related to each other or not by correlation analysis. For this, first, EDAS analysis was performed 10 times in total. As an example, EDAS analysis and applications of the financial performance of 2018 are given below. In the first stage, the standard decision matrix in Table 2 was created with the data obtained from the OECD. The mean value of each criterion is given in the last line with the abbreviation AV.

Table 2. Standard Decision Matrix for Financial Performance Analysis (2018)

	F1 max	F2 max	F3 max	F4 max	F5 max	F6 max	F7 min	F8 min	F9 min
Belgium	1,758.5	1.8	46,0050.8	47,749.0	8.7	10.8	2.1	6.0	11,403,740.0
Denmark	1,156.2	2.0	2,253,316.0	52,089.0	7.4	10.6	0.8	5.2	5,789,957.0
Finland	1,233.7	1.1	233,462.0	45,298.0	11.5	11.4	1.1	7.4	5,515,525.0
Greece	-32.8	1.7	179,557.7	27,594.0	20.8	19.4	0.6	19.7	10,732,877.0
Ireland	-	8.5	327,441.4	80,790.0	19.7	15.2	0.5	5.8	4,857,015.0
Luxembourg	-	1.2	60,121.2	108,642.0	4.0	5.3	1.5	5.5	607,950.0
Norway	-	0.8	3,576,581.0	62,006.0	17.6	5.7	2.8	4.0	5,311,916.0
Slovenia	56.0	4.5	45,876.4	35,588.0	15.5	17.6	1.7	5.1	2,070,050.0
Sweden	2,426.1	2.0	4,828,306	50,473.0	8.3	10.3	2.0	6.5	10,175,215.0
AV	1,099.6	2.6	1,329,412.5	56,692.1	12.6	11.8	1.5	7.2	6,273,805.0

Source: *OECD (2023), https://stats.oecd.org/*
Note: *Data deficiencies that do not create linear dependencies do not prevent the EDAS method from working.*

As a next step, the $PDA = [PDA_{ij}]$ matrix of positive distance from the mean and the $NDA = [NDA_{ij}]$ matrix of negative distance from the mean were constructed. Equations (1) and (2) were used for this (Alinezhad & Khalili, 2019).

$$PDA_{ij} = \frac{\max[0, |x_{ij} - AV_j|]}{AV_j} \tag{1}$$

$$NDA_{ij} = \frac{\max[0, |AV_j - x_{ij}|]}{AV_j} \tag{2}$$

Positive distance and negative distance matrices from the mean are given in Table 3.

Table 3. Distance-to-Mean Matrices in Financial Performance Analysis (2018)

Positive Distance from Mean									
	F1	F2	F3	F4	F5	F6	F7	F8	F9
Belgium	0.599	0.000	0.000	0.000	0.000	0.000	0.443	0.000	0.818
Denmark	0.051	0.000	0.695	0.000	0.000	0.000	0.000	0.000	0.000
Finland	0.122	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.000
Greece	0.000	0.000	0.000	0.000	0.649	0.643	0.000	1.719	0.711
Ireland	0.000	2.242	0.000	0.425	0.562	0.287	0.000	0.000	0.000
Luxembourg	0.000	0.000	0.000	0.916	0.000	0.000	0.031	0.000	0.000
Norway	0.000	0.000	1.690	0.094	0.396	0.000	0.924	0.000	0.000
Slovenia	0.000	0.716	0.000	0.000	0.229	0.490	0.168	0.000	0.000
Sweden	1.206	0.000	2.632	0.000	0.000	0.000	0.374	0.000	0.622
Negative Distance from Mean									
	F1	F2	F3	F4	F5	F6	F7	F8	F9
Belgium	0.000	0.314	0.654	0.158	0.310	0.086	0.000	0.172	0.000
Denmark	0.000	0.237	0.000	0.081	0.413	0.103	0.450	0.282	0.077
Finland	0.000	0.581	0.824	0.201	0.088	0.035	0.244	0.000	0.121
Greece	1.030	0.352	0.865	0.513	0.000	0.000	0.588	0.000	0.000
Ireland	1.000	0.000	0.754	0.000	0.000	0.000	0.656	0.199	0.226
Luxembourg	1.000	0.542	0.955	0.000	0.683	0.551	0.000	0.241	0.903
Norway	1.000	0.695	0.000	0.000	0.000	0.517	0.000	0.448	0.153
Slovenia	0.949	0.000	0.965	0.372	0.000	0.000	0.000	0.296	0.670
Sweden	0.000	0.237	0.000	0.110	0.342	0.128	0.000	0.103	0.000

Either quantitative weighing techniques or equal weighting of the criteria are applied at the weighting stage of multi-criteria decision-making processes. Equal weight was assigned to the criteria in the study. Accordingly, the weighted positive distance matrix and the weighted negative distance matrix are given in Table 4.

Table 4. Weighted Distance Matrices for Financial Performance Analysis (2018)

Weighted Positive Distance from Mean									
	F1	F2	F3	F4	F5	F6	F7	F8	F9
Belgium	0.067	0.000	0.000	0.000	0.000	0.000	0.049	0.000	0.091
Denmark	0.006	0.000	0.077	0.000	0.000	0.000	0.000	0.000	0.000
Finland	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
Greece	0.000	0.000	0.000	0.000	0.072	0.071	0.000	0.191	0.079
Ireland	0.000	0.249	0.000	0.047	0.062	0.032	0.000	0.000	0.000
Luxembourg	0.000	0.000	0.000	0.102	0.000	0.000	0.003	0.000	0.000
Norway	0.000	0.000	0.188	0.010	0.044	0.000	0.103	0.000	0.000
Slovenia	0.000	0.080	0.000	0.000	0.025	0.054	0.019	0.000	0.000
Sweden	0.134	0.000	0.292	0.000	0.000	0.000	0.042	0.000	0.069
Weighted Negative Distance from Mean									
	F1	F2	F3	F4	F5	F6	F7	F8	F9
Belgium	0.000	0.035	0.073	0.018	0.034	0.010	0.000	0.019	0.000
Denmark	0.000	0.026	0.000	0.009	0.046	0.011	0.050	0.031	0.009
Finland	0.000	0.065	0.092	0.022	0.010	0.004	0.027	0.000	0.013
Greece	0.114	0.039	0.096	0.057	0.000	0.000	0.065	0.000	0.000
Ireland	0.111	0.000	0.084	0.000	0.000	0.000	0.073	0.022	0.025
Luxembourg	0.111	0.060	0.106	0.000	0.076	0.061	0.000	0.027	0.100
Norway	0.111	0.077	0.000	0.000	0.000	0.057	0.000	0.050	0.017
Slovenia	0.105	0.000	0.107	0.041	0.000	0.000	0.000	0.033	0.074
Sweden	0.000	0.035	0.073	0.018	0.034	0.010	0.000	0.019	0.000

The weighted normalized total positive NSP_i and negative NSN_i values are calculated by Eq. (3) and (4) for each alternative in both the weighted positive distance and weighted negative distance matrices (Alinezhad & Khalili, 2019).

$$NSP_i = \frac{SP_i}{max_i(SP_i)} \tag{3}$$

$$NSN_i = 1 - \frac{SN_i}{max_i(SN_i)} \tag{4}$$

In the last step, the final rating is made by averaging the NSP_i and NSN_i values. The steps explained in the 2018 financial performance data until this stage were repeated ten times in total for the measurement of both financial performance and health services performance for the period 2018–2022. Accordingly, the health services performance and financial performance rankings for the 2018–2022 period are given in Table 5 as a whole.

Table 5. EDAS Analysis Results of Financial and Health Services Performance for 2018-2022

	2018		2019		2020		2021		2022	
	FPR	**HPR**	**FPR**	**HPR**	**FPR**	**HPR**	**FPR**	**HPR**	**FPR**	**HPR**
Belgium	5	4	3	4	2	4	3	4	5	4
Denmark	6	3	7	3	6	3	6	1	7	3
Finland	8	5	5	5	5	5	7	8	8	6
Greece	3	8	6	8	7	8	4	7	3	5
Ireland	2	6	4	7	9	7	5	6	4	8
Luxembourg	9	9	8	9	4	9	9	9	9	7
Norway	4	1	1	1	3	1	2	2	1	1
Slovenia	7	7	9	6	8	6	8	5	6	9
Sweden	1	2	2	2	1	2	1	3	2	2
Correlation	0.417		0.667		0.567		0.583		0.550	

Note: Financial performance rankings with FPR and health services performance rankings with HPR are shown.

According to the conclusions of the analysis in Table 5, Sweden, Norway, and Belgium have had the best financial success on average over the years. Norway, Sweden, and Denmark, on the other hand, have the best health-care performance. When the correlation values between the health services and financial performance rankings of the countries for the years 2018–2022 are examined, it is seen that they are 0.417 in 2018, 0.667 in 2019, 0.567 in 2020, 0.583 in 2021, and finally 0.550 in 2022. This is an indication that there is a positive relationship between the financial performance of countries in 2018–2022 and the performance of the services provided by their hospitals. In other words, it can be said that the health service performance of countries with high economic performance is also high.

4. CONCLUSION

Today, health institutions under high cost and heavy competition conditions should use their resources effectively and efficiently. For this reason, besides the evaluation of the financial performance of the countries, the performance evaluation of the health services provided by the health expenditures has also become important. In the literature, it has been stated that effective use of health expenditures is important for health service performance since public health expenditures may not always provide high health service performance (Mazgit, 2002; Çakmak et al., 2009; Pekkaya & Dökmen, 2019). This situation arouses curiosity about the existence of a relationship between the performance of health services and the financial performance of countries. However, when the literature is examined, although there are many studies examining the performance of public health expenditures and health services, no study examining the relationship with countries financial performance has been found. In this direction, in the study, both the health services performance of public health expenditures using OECD health indicators and the financial performance using Maastricht criteria of Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, Norway, Slovenia, and Sweden in the 2018–2022 period and the relationship between findings were examined.

According to the analysis findings, Sweden, Norway, and Belgium are the countries with the best financial performance in the 2018–2022 period, while the countries with the best health service performances are Norway, Sweden, and Denmark, respectively. When the correlation values between the health services and financial performance rankings of the countries for the years 2018–2022 are examined, it is seen that they are 0.417 in 2018,

0.667 in 2019, 0.567 in 2020, 0.583 in 2021, and finally 0.550 in 2022. This is an indication that there is a positive relationship between the financial performance of countries in 2018–2022 and their health care services. In other words, the health service performance of countries with high financial performance is also high. Although most healthcare institutions are non-profit, their financial performance must be high in order to maintain their existence. As a natural result of this, the health service performance of institutions with high financial performance is expected to increase. Therefore, the findings obtained as a result of the analysis meet expectations. However, in the study, only the existence of a relationship between financial performance and health service performance can be mentioned. In future studies, health policies can be produced by examining the reasons for the positive relationship between health service performance and financial performance and the transmission channels between them.

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