

ANALYZING THE RELATIONSHIP BETWEEN FINANCIAL PERFORMANCE RATIOS AND PROFITABILITY: A PANEL DATA STUDY ON BIST-LISTED HEALTHCARE COMPANIES

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ABSTRACT

The health sector is a critical public service area in terms of the quality of life of individuals and public health. States allocate resources to health services from their general budgets, but it is often not possible for these services to meet all health needs. Therefore, the presence of the private sector in the field of health and the necessity to provide sustainable financial resources gain importance. While private healthcare companies contribute to the healthcare system with innovative service models, financial profitability stands out as a determining factor for sustainability in the sector. In this context, the aim of the study is to determine the factors affecting the financial profitability of companies operating in the health sector traded in Borsa Istanbul (BIST). The data used in the study consist of quarterly balance sheets and income statements of 12 healthcare companies traded in Borsa Istanbul. The quarterly data used covers the period of 2019/4Q-2024/2Q. Within the framework of the objectives of the study, panel data analysis was conducted. Since there are the same number of time observations for each cross-sectional observation, the Balanced Panel Data method is used. According to the results of the analysis, equity turnover and asset turnover have a significant effect on return on assets ratio at 1% level; leverage ratio has a significant effect on return on assets ratio at 5% level; liquidity ratio and debt ratio have a significant effect on return on assets ratio at 10% level.

Keywords: health economics; health sector; financial performance; panel data analysis

1. INTRODUCTION

The rapid increase in the elderly population in many countries against the economic and technological changes in the world and the threat of epidemics to the world make the health sector more important than ever. In the health sector, the market structure is changing because of the rapid increase in medical specialisation, diversification of medical technology, differentiation of disease structures and types. For this reason, healthcare companies allocate more resources to research and development activities, including new areas (Ağırbaş, 2013: 9). In addition to health services, the field of health economy is expanding with the increase in medical device, pharmaceutical and medical technology investments. Companies

that come to the fore in the private sector rather than the public sector need sustainable financing sources to gain competitive advantage (Lim and Rokhim 2021: 982; Abdull Rahman et al 2022: 516; Li and Terdpaopong 2024: 45). This situation makes it obligatory for healthcare companies, which are not expected to focus on profitability, to focus on financial profitability like other companies (Gider, 2011: 87; Park and Guahk, 2017: 721; Creixans-Tenas and Arimany-Serrat, 2018: 172; Lim and Rokhim 2021: 982; Abdull Rahman et al 2022: 516). Healthcare companies that operate in competitive and volatile international markets and are listed on the stock exchange are more exposed to financial profitability pressure (Aydemir, 2018: 134; Linh and Huyền, 2023: 115). This makes it obligatory for companies to measure their performance and to carry out studies to improve this performance (Taysı, 2020: 16; Batrancea, 2021: 1).

Health financing is explained as providing the resources needed for health service production in the most appropriate way. The sustainability of these resources is important for companies to keep up with economic and sectoral changes and to continue their existence in the market (Ağırbaş, 2016). Financial analysis tools are used by managers to measure performance and to access accurate, reliable information completely and on time in their decisions (Bozdemir Güley, 2022: 341). The main purpose of performance measurement using financial indicators is to determine the status of companies, the targets they need to achieve and the most appropriate point they can reach (Aydemir, 2018: 135). Studies conducted by different researchers show that factors such as financial profitability, cash ratio, equity to total assets ratio, debt to equity ratio, interest coverage ratio, inventory turnover rate, asset turnover rate, average collection period of receivables, profitability-related net profit margin, return on total assets and return on equity ratio should be analysed in order to predict whether healthcare companies have a good financial position (Pink et al. 2007: 87-88; Gider, 2011: 89). At this point, it is important to analyse the factors affecting financial profitability.

The methodology applied in this study analyses the dynamics of financial performance in the Turkish healthcare sector using financial analysis ratios and provides information that supports the decision-making processes of investors and managers. The economic performance of the healthcare sector is meticulously monitored by both public and private sector actors on a global scale. Determining the factors affecting financial profitability is of strategic importance for the sustainability and competitiveness of healthcare companies. Particularly in developing countries such as Turkey, the performance of healthcare companies traded on BIST has a significant impact on economic growth and accessibility of healthcare services. When the companies traded on BIST are evaluated in terms of the healthcare sector, it is seen that healthcare service providers, hospitals, pharmaceuticals, medical equipment and medical device manufacturers are included in the list. In this study, the factors affecting the financial profitability of healthcare companies traded on BIST between 2019/4Q and 2024/2Q periods are analysed using panel data analysis method. Return on assets (ROA) is used as the dependent variable, while liquidity ratio, leverage ratio, debt ratio and other relevant financial variables are considered as independent variables. The findings

of this study aim to make significant contributions to understanding the financial dynamics of the healthcare sector and optimising management strategies and provide information that supports decision-making processes.

2. LITERATURE REVIEW

When the literature is examined, there are many studies using various statistical methods to determine the factors affecting the financial profitability of companies. In this section, in addition to the studies using panel data analysis to determine the factors affecting the profitability of healthcare companies, different methods used to determine financial profitability are also considered.

Agha (2014) analyses the effect of corporate capital on corporate profitability with the data collected from Glaxo Smith Kline pharmaceutical companies traded on the Pakistan Karachi Stock Exchange between 1996 and 2011. Variables such as return on assets ratio, receivables turnover ratio, payables turnover ratio, inventory turnover ratio and current ratio are used in the study. According to the results of the analyses, there is a significant relationship between the company's profitability and inventory turnover ratio, receivables turnover ratio and debt turnover ratio, but there is no significant result between the current ratio and company profitability.

Zubairu and Abubakar (2015) use multiple regression analysis to examine the relationship between cash conversion cycle and corporate profitability of 11 healthcare companies listed on the Nigerian Stock Exchange between 2009 and 2014. Variables such as net profit margin, return on assets, return on equity, inventory ratio, receivables ratio, debt ratio and current ratio are used in the study. As a result of the analysis, it is concluded that there is no significant relationship between cash conversion cycle and corporate profitability.

Bülünç, et al. (2017) use ratio analysis method to evaluate the financial performance of private hospitals traded on the Istanbul Stock Exchange between 2013-2016. In the study, variables such as liquidity ratios, financial structure ratios, activity ratios and profitability ratios are utilised. It is seen that profitability ratios have positive values over the years.

Qurashi (2017) uses panel data analysis to examine the profitability and capital structure of biotechnology and pharmaceutical companies traded on the UK Stock Exchange between 2009 and 2015. In the study, variables such as return on assets, stock conversion period, creditor collection period, creditor payment period, cash conversion cycle, liquidity ratio, leverage ratio and firm size are used. According to the results of the analyses, there is a negative relationship between profitability and creditor payment period, stock conversion period and leverage ratio, and a positive relationship with cash conversion cycle, firm size and liquidity ratio.

Bacha Simões (2020) analyses the factors affecting debt financing using financial data of private hospitals in the United States between 1995 and 2015 with panel data analysis. In the study, total debt ratio, short-term debt ratio and long-term debt ratio are used as dependent variables, while profitability of total assets, liquidity ratio, retained earnings ratio, efficiency of total assets, hospital scale and interest coverage ratios are used as independent variables. According to the results of the

analyses, there is a positive relationship between profitability ratio and short-term borrowing ratio.

Çankaya (2020) uses multiple linear regression analysis to investigate the effect of capital management on profitability of 6 healthcare companies traded in Borsa Istanbul between 2016-2019. While the return on assets ratio of the enterprises is used as the dependent variable, the average collection period of receivables, inventory holding (turnover) period, cash cycle, asset size, sales growth rate, average maturity of debts and leverage ratio are used as independent variables. As a result of the analysis, it is concluded that the main variable affecting the return on assets is the inventory holding period, followed by the leverage ratio, asset size and average maturity of debts respectively.

Olumuyiwa, et al. (2020) utilise panel data analysis method to examine the impact of capital structure and profitability on 10 healthcare companies listed on the Nigerian Stock Exchange between 2003 and 2012. The study uses variables such as leverage ratio, return on assets, return on equity, return on investment and earnings per share. According to the results of the analyses, it is seen that the profitability measure is mostly earnings per share, followed by return on assets and return on investment.

Lim and Rokhim (2021) use pooled least squares regression and fixed effects analysis to examine the factors affecting the profitability of 10 pharmaceutical companies listed on the Indonesian Stock Exchange between 2014 and 2018. The study uses variables such as total sales, asset turnover, current ratio market power, sales growth rate and sustainable growth rate. According to the results of the analyses, there is a significant relationship between profitability and sales growth and asset turnover ratio.

İslıcık and Çil Koçyiğit (2021) examine the relationship between working capital and profitability based on the 2016 accounting period of 105 hospitals in Ankara, Istanbul and Izmir provinces. Multiple linear regression analysis is used in the study, and return on assets, inventory turnover, receivables turnover, cash conversion period and net working capital ratio are used as variables. According to the results of the analysis, there is a positive linear relationship between return on assets, inventory turnover ratio and net working capital ratio.

Işıkçelik, et al. (2021) examines the financial performance of a hospital group traded on the Istanbul Stock Exchange between 2015 and 2018 using DuPont financial analysis technique. Variables such as net profit ratio, return on assets, return on equity, total assets, net sales, net profit or loss for the period, equity multiplier and equity are used in the study. According to the results of the analysis, the profitability ratios of hospitals are negative between 2015-2018 and positive in 2019.

Adellia and Pranyoto, et al. (2022) utilise panel data analysis to examine the impact of profitability ratio, productivity ratio and growth rate of 12 healthcare companies listed on the Indonesia Stock Exchange between 2015 and 2020. The variables used in the study are net profit margin, return on equity, return on assets, accounts receivable turnover, accounts payable turnover, fixed asset turnover, growth rate

and debt-equity ratio. According to the results of the analyses, there is a significant relationship between profitability ratio, growth rate and equity ratio.

Rahhman, et al. (2022) analyses the factors affecting the profitability performance of 4 healthcare companies listed on the Malaysian Stock Exchange between 2010 and 2020 using panel data analysis. Variables such as gross profit margin, asset turnover ratio, current ratio and leverage ratio are used in the study. According to the results of the analyses, there is a negative relationship between profitability and asset turnover rate and a positive relationship with the current ratio variable.

Küçükşahin (2023) examines the financial analysis of companies in the education, health, sports and other social services sectors traded in Borsa Istanbul between 2018 and 2022. The variables used in the study are current ratio, acid test ratio, cash ratio, financial leverage ratio, equity to total debt ratio, short-term debt to total debt ratio, receivable turnover rate, inventory turnover rate, asset turnover rate, gross profit margin, operating profit margin, period profit margin, return on equity ratio, growth rate in sales revenue, growth rate in period profit, asset growth rate, equity growth rate, price earnings ratio, earnings per share ratio and market value book value. It is observed that there is an increase in productivity with growth performance in the health sector and an increase in profitability after the pandemic period.

Yörübulut (2023) analyses the financial performance of 15 health insurance companies between 2017 and 2021 using panel data analysis method. Profitability ratio, number of non-life policies, insurance leverage ratio, market share, incurred loss ratio, net earned premiums, and net incurred losses are used as variables in the study. According to the results of the analyses, the increase in the number of policies and liquidity increases the profitability ratio.

Çil Koçyiğit, et al. (2024) examines the factors affecting the profitability of 22,865 firms in the field of health within the scope of Human Health and Social Services between 2009-2021 with the panel data analysis method. Return on equity, tangible fixed asset structure, intangible fixed asset structure, financial leverage, foreign sales ratio and domestic sales ratio variables are used in the study. According to the results of the analyses, tangible fixed asset investments and financial leverage level have a negative effect on return on equity.

3. RESEARCH METHODOLOGY

In this section, the purpose of the study will first be explained, followed by a description of the dataset and variables. Subsequently, the Analysis Method, Model Development, and Hypotheses will be presented.

3.1.PURPOSE OF THE STUDY, DATA SET AND VARIABLES

The aim of this study is to determine the factors affecting the financial profitability of companies operating in the health sector in the Public Disclosure Platform (KAP) traded in BIST. Based on this context, the population of the study consists of health companies operating in BIST.

The data used in the study consists of quarterly balance sheet and income statement data of health companies traded in Borsa Istanbul. It covers the 2019/4Q-2024/2Q period data of 12 healthcare companies whose data can be accessed regularly among the companies traded on BIST. The financial ratios of these companies were obtained from Fintables and BiStock databases on a quarterly basis. The data of 12 companies (N=12) covers a total of 19 periods (T=19), 2019/4Q-2024/2Q. Therefore, there are $N \times T = 228$ observations in the study. The companies considered within the scope of the study are shown in Table 1.

Table 1. Companies used in the study

Number	Stock exchange code	Companies
1	DEVA	Deva Holding Co.
2	ECILC	EİS Eczacıbaşı İlaç, Sınai ve Finansal Yatırımlar Sanayi ve Ticaret Co.
3	LKMNH	Lokman Hekim Engürüsağ Sağlık, Turizm, Eğitim Hizmetleri ve İnşaat Taahhüt Co.
4	RTALB	RTA Laboratuvarları Biyolojik Ürünler İlaç ve Makina Sanayi Ticaret Co.
5	SELEC	Selçuk Ecza Deposu Ticaret ve Sanayi Co.
6	SEYKM	Seyitler Kimya Sanayi Co.
7	MPARK	MLP Sağlık Hizmetleri Co.
8	TRILC	Türk İlaç ve Serum Sanayi Co.
9	MEDTR	Meditera Tıbbi Malzeme Sanayi ve Ticaret Co.
10	GENIL	Gen İlaç ve Sağlık Ürünleri Sanayi ve Ticaret Co.
11	EGEPO	Nasmed Özel Sağlık Hizmetleri Ticaret Co.
12	ANGEN	Anatolia Tanı ve Biyoteknoloji Ürünleri Trade.Co.

The study consists of dependent and independent variables. Return on assets ratio is the dependent variable, while liquidity ratio, cash ratio, leverage ratio, debt ratio, asset turnover ratio, equity turnover ratio and market capitalisation/book value are used as independent variables. Detailed information on the financial ratios used as dependent and independent variables in the study is shown in Table 2.

Table 2. Variables used in the model and their explanations

	Variables	Abbreviation	Formulas
Profitability ratios	Return on assets ratio	ROA	Net Income/Total Assets
Liquidity ratios	Liquidity ratio	LO	Current assets-Inventories/Current Liabilities
	Cash ratio	NO	Cash and Cash equivalents/Current Liabilities
Financial structure ratios	Leverage ratio	KO	Total liabilities/Total Assets
	Debt to equity ratio	BO	Total Liabilities /Equity
Asset utilisation ratios	Asset turnover ratio	ADH	Net Sales/Average Total Assets
	Equity turnover ratio	ODV	Net Sales/Average Total Equity
Stock market performance ratios	Market value/book value	PD/DD	Market Value/Book Value

Table 2 shows the variables included in the analysis. A total of 8 different financial ratios were used in the study. These ratios are divided into 5 categories: liquidity ratios, financial structure ratios, asset utilisation ratios, stock market performance ratio and profitability ratio.

Profitability Ratios: It is used to determine the extent to which the enterprise uses its assets, equity and foreign resources efficiently and whether its activities and sales are profitable. **Liquidity Ratios:** In general, it investigates the ability of the enterprise to pay its short-term debts and the adequacy of working capital. **Financial Structure Ratios:** It is used as ratios that measure the ability of the enterprise to meet its long-term debt obligations. **Asset Utilisation Ratios:** It is used to determine the extent to which managers use the assets of the enterprise effectively. **Stock Market Performance Ratios:** It is used to determine the market (stock market) performance of publicly traded enterprises (Karadeniz, 2016: 104).

3.2. METHOD OF ANALYSIS, MODEL FORMATION AND HYPOTHESES

Since the study has both time dimension and horizontal cross-section, panel data analysis was applied. Panel data is explained as data in which horizontal cross-sectional data of individuals, companies or countries are brought together in a certain time interval (Yerdelen Tatoğlu, 2016: 2).

Panel data analysis is used in many fields such as sociology, psychology, education, political science, health research, especially in economics. In this analysis, studies on microeconomics are used more frequently than studies on macroeconomics due to the high number of units (e.g. companies). Studies at the macroeconomic level are generally studies in which the activities of countries over time are analysed. In

health research, panel data analysis is used in studies on the behaviour of people and groups of people over time (Koç, Şenol and Çevik, 2018: 30).

Within the framework of the objectives of the study, panel data analysis was determined and applied due to the fact that the data considered within the framework of the study have both time dimension and horizontal cross-section. Panel data method was used by using the data for 19 quarters of 12 health companies in the BIST Health sector, whose data can be accessed regularly. Therefore, the sample was formed with 228 companies/year data. In panel data analysis, Balanced Panel Data method was used since there are the same number of time observations for each cross-sectional observation. In the study, the data were coded and analysed using Stata 14 programme in computer environment. Based on the asset profitability model established for the realisation of the study, 7 hypotheses are analysed, and it is determined whether the hypotheses will be accepted or not. The return on assets model established to test the validity of the 7 hypotheses in the study is shown below.

Model: ROA

$$i,t = \alpha_{i,t} + \beta_1 LO_{i,t} + \beta_2 NO_{i,t} + \beta_3 KO_{i,t} + \beta_4 BO_{i,t} + \beta_5 AKH_{i,t} + \beta_6 \ddot{O}DV_{i,t} + \beta_7 PD/DD_{i,t} + \varepsilon_{i,t}$$

In the model, α is the constant term, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and β_7 are the regression coefficients of the independent variables, ε is the error term, i is the unit dimension and t is the time dimension (Akıncı, Yüce and Yılmaz, 2014: 87).

In this direction, the hypotheses formed for the Return on Assets (ROA) model are shown in Table 3 in detail.

Table 3. Return on assets ratio hypotheses

Model (ROA): Hypotheses formulated for return on assets ratio	
H ₁	Liquidity ratio has no effect on the return on assets ratio of companies traded in the BIST Health sector in the 2019/4Q-2024/2Q period.
H ₂	Cash ratio has no effect on the return on assets ratio of companies traded in the BIST Health sector in the 2019/4Q-2024/2Q period.
H ₃	Leverage ratio has no effect on the return on assets ratio of companies traded in the BIST Health sector in the 2019/4Q-2024/2Q period.
H ₄	Debt ratio has no effect on the return on assets ratio of companies traded in the BIST Healthcare sector in the 2019/4Q-2024/2Q period.
H ₅	Asset turnover rate has no effect on the return on assets ratio of companies traded in the BIST Health sector in the 2019/4Q-2024/2Q period.
H ₆	Equity turnover rate has no effect on the return on assets ratio of companies traded in the BIST Health sector in the 2019/4Q-2024/2Q period.
H ₇	Market capitalisation/book value has no effect on the return on assets ratio of companies traded in the BIST Healthcare sector in the 2019/4Q-2024/2Q period.

4. FINDINGS

In the study, modelling has been made between the profitability ratio and some ratios selected as representative among the financial analysis ratios. These ratios are analysed and test results revealing the relationship between profitability ratio and financial analysis ratios are presented. In the study, descriptive statistics of the variables related to the model, correlation, and tests for the selection of the appropriate model were conducted.

4.1.DESRIPTIVE STATISTICS

Descriptive statistics data for the dependent and independent variables determined in the content of the study are shown in Table 4.

Table 4. Summary statistics

	Mean	Median	Std. Dev.	Min	Max	N
ROA	17.801	13.645	19.794	-25.74	136.48	228
LO	2.412	1.22	4.040	0	29.01	228
NO	1.405	.41	3.355	0	25.09	228
KO	37.573	34.275	24.724	0	93.91	228
BO	16.955	11.04	16.101	0	60	228
ADV	.919	.81	0.712	0	3.69	228
ODV	2.13	1	3.326	0	18.92	228
PD/DD	3.754	2.945	3.680	0	17.67	228

As seen in Table 4 above, the results for the mean, median, maximum, maximum, minimum, standard deviation and number of observations of 8 different variables are shown. In terms of the size of the sample, the number of observations is 228.

4.2.CORRELATION TESTS

The variables used in the study were analysed by correlation analysis to understand whether multicollinearity caused by high correlation between each other is a significant problem. A high correlation indicates that there is a multicollinearity problem (Reis, Kılıç and Buğan 2016: 30). It is expected to be less than the critical value of 0.80 suggested by Gujarati and Porter (2009). In this direction, it is seen in Table 5 that multicollinearity between variables is not a significant problem.

The correlation results for the model in which the return on assets ratio is measured are shown in detail in Table 5.

Table 5. Correlation results of ROA and other ratios

Variables	ROA	LO	NO	KO	BO	ADV	ODV	PD/DD
ROA	1.000							
LO	0.492*	1.000						
NO	0.441*	0.991*	1.000					
KO	-0.200*	-0.360*	-0.371*	1.000				
BO	-0.148*	-0.283*	-0.282*	0.762*	1.000			
ADV	0.165*	-0.136*	-0.180*	0.570*	0.082	1.000		
ODV	-0.147*	-0.160*	-0.168*	0.686*	0.472*	0.441*	1.000	
PD/DD	0.007	-0.028	-0.039	0.450*	0.387*	0.188*	0.475*	1.000
*** p<0.01, ** p<0.05, * p<0.1								

In Table 5, there is a significant and positive relationship between ROA and LO, NO and ADV at 10% level. There is a significant and negative relationship between ROA and KO, BO and ODV at 10% level. In addition, while there is a significant and positive relationship between LO and NO at 10% level, there is a significant and negative relationship between KO, BO, ADV and ODV at 10% level. There is a significant and negative relationship between NO and KO, BO, ADV and ODV at 10% level. There is a significant and positive relationship at the 10% level between KO and BO, ADV, ODV and PD/DD. There is a significant and positive relationship between BO and ODV and PD/DD at 10% level. Finally, there is a significant and positive relationship between ODV and PD/DD at 10% level.

4.3.MODEL SELECTION AND ESTIMATION RESULTS

F Test, Fixed Effects and Random Effects tests were applied for estimation in the model created to determine the effect on the financial profitability of companies operating in the health sector. These tests are used to determine which of the pooled, fixed or random effects models should be estimated. For the return on assets model, the F test was first applied to choose between the fixed effects model and the classical model. According to the F test result, the classical model is rejected since the probability value of the test statistic is less than 0.05. As a result, the fixed effects model was accepted as appropriate. Then, Breusch Pagan LM test was applied for random effects and classical model selection. According to the result of the Breusch Pagan LM test, the classical model is rejected since the probability value of the test statistic is less than 0.05. The test results of the F test and Breusch Pagan LM test for the fixed effects and random effects model selections against the classical model are shown in Table 6.

Hausman test statistic is used to choose between "Fixed Effects" and "Random Effects" models. In cases where the probability value of the Hausman test statistic

is greater than 0.05, the random effects model will be used, and in cases where the probability value is less than 0.05, the fixed effects model will be used in the panel data analysis. As a result, since the probability value is greater than 0.05, the random effects model is accepted as appropriate. Table 6 shows the related test results.

Table 6. Test results for model selection

Model	F Test		Breusch-Pagan LM Test		Hausman Test		Choice
	Probability Value	Chi-square Value	Probability Value	Chi-square Value	Probability Value	Chi-square Value	
ROA	0.0001	3.06	0.0000	23.62	0.1464	10.82	Random Effects

After the preliminary test for model selection is performed, the validity of the basic assumptions in the models established in order to make healthy interpretations in Panel regression analysis should be investigated. In the data set, these basic assumptions are the absence of heteroskedasticity, inter-unit correlation and autocorrelation problems. Among these assumptions, Leven, Brown and Forsythe's Test is used to investigate heteroskedasticity, Durbin-Watson Autocorrelation Test is used to test the presence of autocorrelation, and Pesaran CD Test is used to test the correlation between units (Tatoğlu, 2016: 210). The results of the basic assumption tests are shown in detail in Table 7.

Table 7. Leven, Brown and Forsythe's test, Durbin-Watson and Pesaran CD test results

Model	Leven, Brown and Forsythe's test		Durbin Watson and Baltagi Wu autocorrelation test		Pesaran CD test	
	Chi-square Value	Probability Value	Durbin-Watson	Baltagi-Wu LBI	Test Statistic	Probability Value
ROA	W0 = 8.2978075 W50 = 6.6843783 W10 = 8.0743983	0.0000 0.0000 0.0000	0.84117261	1.0043776	7.131	0.0000

Leven, Brown and Forsythe's hypothesis for the test is H_0 : "Variances of the units are equal". According to the hypothesis H_0 established in the output, when the probability values are less than 0.05, it is concluded that the variance of the model varies across units. Therefore, since the probability value is less than 0.05, the hypothesis H_0 is rejected.

The hypothesis for Durbin-Watson, Baltagi-Wu threshold tests is " H_0 : There is no autocorrelation." Although critical values are not given in the literature, it can be interpreted that there is autocorrelation if the values are less than 2 [32]. According to the results, since the values are less than 2, it can be interpreted that there is first

order autocorrelation in the random effects model. In other words, it is concluded that there is an autocorrelation problem among the error terms in the equations. In this case, the hypothesis H_0 is rejected.

The hypothesis for Pesaran CD test is " H_0 : There is no correlation between units." According to the hypothesis H_0 established in the output, when the probability value is less than 0.05, it is concluded that there is correlation between units. Therefore, since the probability value is less than 0.05, the hypothesis H_0 is rejected.

When one or more of the heteroskedasticity, autocorrelation and inter-unit correlation assumptions are violated, the variance-covariance matrix of the error terms loses its unit matrix property. Accordingly, an appropriate correction method should be selected. In this context, Driscoll-Kraay estimator, which is resistant to heteroscedasticity, autocorrelation and inter-unit correlation in our model, is used [32]. The test result values are shown in Table 8.

Table 8. Driscoll-Kraay resilient estimator results

	Return on Assets Ratio (ROA)			
Variables	Coefficient	Drisc/Kraay Std.Err.	t-statistic Value	Prob. Value
LO	9.396175	4.868189	1.93	0.070***
NO	-9.137807	5.941788	-1.54	0.141
KO	-.6106325	.2446598	-2.50	0.023**
BO	.5640569	.2755125	2.05	0.056***
ADH	21.18033	5.701831	3.71	0.002*
ODV	-.872619	.2783422	-3.14	0.006*
PD/DD	-.010572	.2732017	-0.04	0.970
Cons	3.79345	5.732465	0.66	0.517
R ²	0.4373			
F statistic P Value	0.0000			
F statistic	241.38			

Note: "*, ** and ***" denote statistical significance at 1%, 5% and 10% levels, respectively.

Standard errors are corrected by using Driscoll-Kraay Estimator. The results of the return on assets model were interpreted accordingly. According to the results, the calculated R² value of 0.4373 reveals that approximately 44% of the change that may occur in the dependent variable can be explained by the 7 independent variables shown in the return on assets model.

According to the results obtained in Table 8; equity turnover rate has a negative significant effect on return on assets ratio at 1% significance level. Asset turnover

rate is positively significant at 1% significance level on return on assets ratio. Leverage ratio was found to be negatively significant at the 5% significance level on the return on assets ratio. Positive significant result was obtained for debt ratio on return on assets ratio at 5% significance level. Liquidity ratio is positively significant at 10% significance level on return on assets ratio. On the other hand, it is concluded that PD/DD does not have a statistically significant effect on the return on assets ratio.

5. CONCLUSIONS

In this study, the panel data analysis method was used to determine the factors that may affect the financial profitability of the health companies operating in Turkey. In the study, health companies in the BIST health sector in the period covering the 2019/4Q-2023/2Q period were considered. One dependent variable was used in the study. Seven independent variables were used. As a result, a single model was created. When evaluated together with the results of both the F test, Breusch-Pagan LM tests and Hausman test performed on this model, it was concluded that the random effects model from panel data models is more appropriate in the analysis of the effect of financial ratios on firm profitability.

To make sound interpretations in the regression analysis, the validity of the basic assumptions in the return on assets model is investigated. To test the validity of these assumptions, heteroskedasticity, horizontal cross-section dependence and autocorrelation problems were examined in the estimated model. According to the results of the research, heteroskedasticity, horizontal cross-section dependence and autocorrelation problem were found. As a result, Driscoll-Kraay robust estimator was used. As a result of the analysis of the random unit effects of the model whose dependent variable is return on assets, the model is statistically significant. Equity turnover and asset turnover have a significant effect on return on assets at the 1% level. Leverage ratio and debt ratio have a significant effect on ROA at the 5% level. Liquidity ratio has a significant effect on return on assets ratio at 10% level. When the direction of the relationship between the dependent and independent variables is analysed, it is seen that the return on assets ratio has a negative relationship with the independent variables of equity turnover ratio and leverage ratio, and a positive relationship with the independent variables of asset turnover ratio, debt ratio and liquidity ratio.

The findings obtained because of panel data analysis management in the study are like the studies of Zubairu and Abubakar (2015), Qurashi (2017), Çankaya (2020), Lim and Rokhim (2021), Rahhman et al. (2022), Yörübulut (2023) for the asset profitability ratio model.

The healthcare sector plays a critical role in enhancing individuals' quality of life and supporting public health. However, due to the limitations of public resources, the private sector holds a significant share in healthcare services, making it essential to ensure the financial sustainability of these services (World Health Organization [WHO], 2020). Understanding the factors affecting the financial performance of private healthcare service providers can make a significant contribution to

improving the overall efficiency of the sector and ensuring the sustainability of service delivery.

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