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The Impact of Operational Performance on Financial Results in the Storage and Transportation Sector

Ahmet KARACA 

Pamukkale University, Department of International Trade and Logistics, Denizli, Turkey

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***Corresponding author:** Ahmet KARACA

Pamukkale University, Department of International Trade and Logistics, Denizli, Turkey

Abstract

This study explores how operational performance affects the financial results of transportation and warehousing companies. Data was gathered from 2012 to 2024 from the Public Disclosure Platform (KAP). Using panel data regression analysis, the research examined the relationship between operational performance indicators and financial outcomes. Operational performance was assessed using metrics such as receivables turnover, inventory turnover, payables turnover, cash conversion cycle, fixed asset turnover, return on equity (ROE), and return on assets (ROA). Financial performance was measured by earnings per share (EPS). The results show that, at a statistically significant level, a one-unit increase in ROE corresponds to a 0.8760 rise in EPS. Conversely, a one-unit increase in the cash conversion cycle (CCC) is linked to a decrease of 1.0106 in EPS, which is also statistically significant. Overall, the findings reveal a negative relationship between EPS and CCC, and a positive relationship between EPS and ROE, with both being statistically significant.

Keywords: Operational performance, Logistics, Panel data regression, Cash conversion cycle

1. Entrance

Numerous factors influence a company's profitability in both the short and long term. Comprehending these factors facilitates more effective management of a company's assets. Internal determinants encompass accounting policies, product quality, market responsiveness, successful product innovations, investments in human resources, expenditures on research and development, innovative customer service initiatives, cost reduction strategies,

efficient management practices, and market operations. External determinants include the business cycle, exchange rates, mergers, favorable global economic conditions, high Gross Domestic Product (GDP) growth, political and legal environments, social and demographic trends, the company's sector, suppliers, customers, competitors, the global environment, economic and technological factors, social and cultural aspects, shareholders, strategic

alliances, labor unions, and financial resources. Additionally, external factors comprise government regulations, banking institutions, purchasers, the local community, material resources, and financial assets (Parkitna & Sadowska, 2011).

Effective management of any business requires the careful use of both fixed and current assets. Managing working capital is especially vital because it directly affects profitability and liquidity. A study by Singh and Pandey (2008) examined the components of working capital and how its management impacts Hindalco's profitability, along with the relationships between liquidity, profitability, and Profit Before Tax (PBT). The researchers used secondary data from Hindalco's annual reports from 1990 to 2007. Their analysis included ratio analysis, percentage calculations, and correlation coefficients. They also used multiple regression analysis to identify key factors influencing Hindalco's profitability. Additionally, the study evaluated microeconomic profitability using indicators such as the current ratio, liquid ratio, receivables turnover ratio, and the ratio of working capital to total assets (Singh & Pandey, 2008). Factors that positively affected profitability included effective inventory management, optimal debt levels, financial leverage, and capital efficiency. These findings also point out areas where performance can be improved. Managing business operations effectively involves optimizing current assets, which make up most of the total assets. Increasing inventory and receivables turnover rates can boost efficiency and profits. Furthermore, strategic allocation of resources to finance operations without sacrificing financial independence is advisable. Increasing equity turnover can create more value and lead to higher profits. Finally, reducing operating expenses has been identified as having the greatest impact on profitability (Burja, 2011).

Profitability measures a company's financial success. To enhance economic performance, firms must efficiently execute their operational, investment, and financing activities. While research indicates that operational performance influences profitability in service operations, the primary emphasis has traditionally been on the relationship between productivity and profitability, or between service quality and profitability. Scholars in marketing have predominantly examined the link between quality and profitability, as evidenced by studies conducted by Nelson et al. (1992), Fornell (1992), Anderson et al. (1994), Rust et al. (1995), and Loveman (1998). Conversely, researchers in accounting and operations management have concentrated on the impact of productivity on profitability, as discussed by Schefczyk (1993) and Smith and Reece (1999), among others.

Our investigation examines the relationship between operational performance and the earnings per share ratio, aiming to identify the primary factors influencing these variables. The study underscores the significance of operational activities in maintaining the competitiveness of the transportation and warehousing industry and their influence on profitability. The central research inquiry is: Does operational performance genuinely impact profitability? Moreover, does enhancing operational performance result in increased profits? We employ objective metrics to quantify profitability and operational efficiency, evaluating how operational effectiveness influences the financial outcomes of companies within the BIST Transportation and Warehousing sector. To assess operational performance, we analyze indicators such as receivables conversion cycle, inventory conversion cycle, payables conversion cycle, cash conversion cycle, fixed asset turnover, return on assets,

and return on equity. Concurrently, we measure financial performance through the earnings per share ratio.

2. Operational Performance

Operational activities such as investment and financing necessitate comprehensive research to attain optimal financial outcomes. In assessing current asset investments in these domains, cash and cash equivalents are of paramount importance. Excessive investment in cash and cash equivalents can elevate costs and potentially result in failures (Ceylan & Korkmaz, 2015, p. 287). Cash management encompasses forecasting a company's cash requirements and surpluses during the planning period, determining appropriate cash levels, devising strategies to accelerate cash inflows and decelerate cash outflows, and making informed decisions regarding the allocation of available funds between liquid assets and securities (Akgüç, 1998, pp. 229-230).

Operational performance is assessed through key financial metrics like fixed asset turnover, return on assets, return on equity, and the cash conversion cycle. These metrics provide valuable insights into a company's overall performance. Asset utilization ratios indicate operational efficiency, with the fixed asset turnover ratio showing whether investments in property, plant, and equipment are generating enough returns. This is calculated by dividing net income by fixed asset value (Treadwell, 2015, p. 65). Return on equity measures shareholder returns by dividing net income by shareholders' equity, while return on assets evaluates profitability and asset efficiency by dividing net profit by total assets (Karaca, 2022, p. 105).

Operational performance is measured using well-established metrics based on research, such as fixed asset turnover, return on assets, return on equity, and cash conversion cycle. These metrics give a solid foundation for informed decision-making by assessing a company's performance from multiple angles. In essence, asset utilization ratios measure operational efficiency and offer valuable insights into how effectively businesses use their assets and resources. The fixed asset turnover ratio shows whether a company's investment in fixed assets, typically property, plant, and equipment, is paying off. It's calculated by dividing net income by the current value of fixed assets (Treadwell, 2015, p. 65). Return on equity is determined by dividing net income by shareholders' equity, reflecting the returns earned by shareholders from their investments and the after-tax net income generated. Return on assets is calculated by dividing net profit by total assets to assess a company's investment profitability and efficiency in using its assets (Karaca, 2022, p. 105). Cycle analysis involves examining the difference between the operating cycle and the debt payment cycle. The operating cycle measures how a company manages receivables and inventories, with companies having strong liquidity positions able to reduce financing costs, enhance profitability, and maintain a competitive advantage. The operating cycle involves steps like receiving raw materials, semi-finished goods, and parts into inventory; processing them through production; and converting them into finished products. Input prices are paid to suppliers on time, deducted from inventory upon sale, and product prices are collected from customers (Özkan et al., 2021, p. 28).

For a business, forecasting future cash flows involves estimating the cash it needs and managing existing cash by expediting inflows and decelerating outflows. Factors such as size, management approach, operational framework, and auditing procedures influence a company's cash holdings (Ercan & Ban, 2005, p. 288).

To fulfill its financial obligations, enhance operational efficiency, and augment its value, an organization must accurately evaluate its cash requirements and meticulously administer its cash to sustain a healthy balance.

Companies need to calculate their cash conversion cycle to manage liquidity effectively. This is done by subtracting days payable outstanding from the sum of inventory outstanding and days sales outstanding [CCC = (DIO + DSO) – DPO]. As the cash conversion cycle lengthens, an organization's funding needs increase (Ceylan & Korkmaz, 2015, p. 287). A positive cash conversion cycle means cash outflows happen before inflows, requiring more funding and driving up financing costs and reducing profit margins. On the other hand, a negative cycle means inflows come before outflows, allowing companies to boost profit margins by generating income from surplus funds each operational cycle (Özkan et al., 2021, p. 28).

3. Literature

Operational performance refers to the measurable aspects of an organization's output that influence key business metrics like market share and customer satisfaction (Voss et al., 1997, p. 3). Profitability measures a company's ability to generate profit, defined as the ratio of profit earned during a specific period to the invested capital (Şimşek & Çelik, 2023, p. 136). Profit is the amount remaining from revenue after subtracting expenses directly related to revenue generation, including manufacturing and operational costs. Although research has mainly examined the relationship between productivity and profitability or performance quality and profitability, the overall impact of operational performance on profitability has received limited attention (Tsikriktis, 2007). Performance measurement systems help achieve strategic objectives, set organizational goals, and provide control. They also serve as tools to assist management in forecasting a company's economic performance and developing strategies to adapt to future changes based on these forecasts (Nanni et al., 1990; Otley, 1999).

Choosing the right performance measures is one of the biggest challenges businesses face (Ittner & Larcker, 1998). Poorly selected measures can mislead managers, leading to poor decisions and negative outcomes (Ferguson & Leistikow, 1998). Operational performance can be evaluated using various ratios, such as receivables turnover, fixed asset turnover, inventory turnover, asset turnover, return on assets, and return on equity. These ratios offer different insights into how effectively a company uses its assets and resources, helping assess financial performance from multiple angles. The receivables turnover ratio is calculated by dividing net income by average accounts receivable and shows how often a company collects cash from credit sales. The inventory turnover ratio is determined by dividing the cost of sales by average inventory, indicating how quickly inventory is converted into cash. The fixed asset turnover ratio measures whether the company's spending on equipment and facilities—property, plant, and equipment creates value. It is calculated by dividing the company's net income by the current value of its fixed assets.

Yücel and Kurt (2002) explored the link between the cash conversion cycle, a key tool in working capital management, and measures of profitability, liquidity, and debt structure. They analyzed data from 167 companies listed on the Istanbul Stock Exchange (ISE) from 1995 to 2000. Their research compared the cash conversion cycle, profitability, liquidity, and debt structure

across different periods, sectors, and company sizes. The results showed a positive correlation between the cash conversion cycle and the current ratio, along with a negative correlation with profitability ratios.

Recently, scholars in operations management have begun exploring this area. Zhao and colleagues (2004) studied the relationship between service quality systems and business performance through case studies in China. According to Zeithaml and colleagues (1996), understanding the complex connection between service quality and profitability requires analyzing other factors at the same time, such as the link between productivity and profitability. The existing literature on the connection between productivity and profitability in services is limited. Schefczyk (1993) examined how productivity affects financial performance in the airline industry. Using data envelopment analysis, the study combined multiple outputs and inputs for 15 international airlines, finding that productivity is related to return on equity. Smith and Reece (1999) investigated the relationship among strategy, productivity, and financial performance through field research in a wholesale distribution service environment, discovering that productivity influences economic performance. A common theme across these studies is that they examined productivity's effect on profitability without considering the potential influence of quality. According to Schefczyk (1993), efficiency alone does not represent overall performance, especially when results are measured without accounting for operational factors important to customers, such as punctual flights and undamaged baggage, which do not truly reflect efficiency.

Shin and Soenen (1998) discovered a negative relationship between cash conversion cycles and profit margins in food businesses in Greece. Lyrودي and Lazaridu (2000) examined the link between cash conversion cycles and liquidity ratios. Their study found a positive relationship between liquidity ratios and cash conversion cycles (Sakarya, 2008, p. 229).

In operations management, practices like Total Quality Management or Just-in-Time Manufacturing are viewed as methods to improve operational and financial performance. The literature on operations management, including both theoretical and empirical studies, indicates a positive relationship between these practices and performance. However, findings from studies, even with a sample of 1,200 companies, generally do not show a clear positive link between operational practices and financial results such as growth and profitability (Duarte et al., 2011). In addition to financial metrics like sales, current ratio, debt-to-equity ratio, and net profit margin, factors such as human capital investment, past performance, and industry diversification also significantly influence profitability. The wider market sector in which a company operates is also a key factor in determining profitability (Azim et al., 2015, p. 66).

In their study, Gümüş et al. (2016) examined data from five food companies listed on the BIST 100 index between 2006 and 2015. The study found that these companies mainly produce and sell retail and fast-moving consumer goods, resulting in a negative cash conversion cycle and no funding issues related to their cash conversion cycle.

Tsikriktis (2007) studied how operational performance affects profitability in the US domestic airline industry and also investigated how focus influences profitability across different service types. He used quarterly data from all major carriers

available since the mandatory reporting of service indicators to the US Department of Transportation. The analysis showed that while "focused" airlines had a relationship between late arrivals and profitability, this link was not seen in full-service airlines. Additionally, capacity utilization was a more important factor for profitability in full-service airlines than for focused airlines. Furthermore, he discovered that focused airlines outperformed the rest of the industry in profitability.

Özkan et al. (2021) examined how cash conversion cycles influence the financial performance of cement companies listed on the BIST (Istanbul Stock Exchange) by analyzing their cash conversion cycles. The study found that the cash conversion cycle significantly affects financing costs.

4. Data and Method

4.1. Purpose and importance of the research

The research aims to examine how the cash conversion cycle, fixed asset turnover, and profitability ratios affect earnings per share for companies in the BIST Transportation and Warehousing sector and to understand the nature of their influence. An important goal for effective financial management is to reduce the receivables collection period and extend the payment period. Cash management generally depends on the cash conversion cycle, which is calculated by subtracting the trade payables payment period from the sum of the inventory conversion period and the receivables conversion period (Yücel & Kurt, 2002, p. 2). In a competitive environment, a company's ability to survive, grow, manage risks, and maintain strong relationships with financial markets relies on its capacity to meet debt obligations and its overall operational performance.

4.2. Original value of the research

This study examines the role of operations in competition within the transportation and warehousing industry and their impact on profitability. The aim is to analyze how operational performance affects the financial outcomes of firms in the BIST Transportation and Warehousing sector, using objective measures of profitability and efficiency. The literature reviews the connection between efficiency and profitability in service industries. In related research, Zhao et al. (2004) explored the relationship between service quality systems and operational performance through case studies in China. Zeithaml et al. (1996) studied the link between service quality and profitability. Schefczyk (1993) assessed how efficiency influences financial performance in the airline industry using data envelopment analysis. Shin and Soenen (1998) examined effective working capital management and operating profitability, introduced the concept of the net commercial conversion cycle as an alternative to the cash conversion cycle, and analyzed its relationship with profitability. Lyrouti and Lazaridu (2000) investigated the connection between the cash conversion cycle and liquidity indicators such as the current ratio and liquidity ratio in food industry companies. Duarte et al. (2011) researched the relationship between operational practices and financial performance, including growth and profitability. Gümüş et al. (2016) analyzed how the cash conversion cycle relates to a firm's economic structure and liquidity position. Tsikriktsis (2007) assessed the impact of operational performance on profitability within the U.S. domestic airline industry.

Unlike other studies, this research examined the relationship between companies' operational performance, cash conversion cycle, return on equity, return on assets, fixed asset turnover, and

earnings per share using panel regression analysis, focusing on the long-term effects from 2012 to 2024.

4.3. Scope and limitations of the research

Within the scope of the research, the operational performance of companies was assessed using the receivables turnover cycle, inventory turnover cycle, payables turnover cycle, cash conversion cycle, fixed asset turnover ratio, return on assets ratio, and return on equity ratio. Financial performance was evaluated with the earnings per share ratio. A limitation of the study was that long-term data were only available for seven companies in the BIST Transportation and Storage sector, and related studies were limited.

4.4. Research method

The study examined the relationship between operational performance and financial performance of enterprises using panel data analysis, with variables from Table 2 acting as dependent and independent variables.

Table 1

Dependent and Independent Variables

Dependent Variable	HBK	Earnings Per Share
Independent Variables	NDS	Cash Conversion Cycle
	DVDS	Fixed Asset Conversion Period
	ROE (Return on Equity)	Return on Equity
	ROA (Return on Assets)	Return on Assets

Earnings per Share (EPS) reflect a company's profitability. It indicates the portion of the company's profit allocated to each outstanding share of common stock. EPS was calculated using equation no. 1 (Azim et al, 2015, p. 69):

$$EPS = \frac{\text{Net Income}}{\text{Average Outstanding Common Share}} \quad (1)$$

The cash conversion cycle (CCC) measures management efficiency. It shows how well a company handles its receivables, inventory, and payables—usually, a shorter cash cycle results in better operations and higher profits. The CCC is calculated using equations 2, 3, 4, and 5 (Azim et al., 2015, p. 69; Lazol, 2014).

$$\text{Days Inventory Outstanding} = \frac{\text{Average Inventory}}{\text{Cost of Sales}/360} \quad (2)$$

$$\text{Days Sales Outstanding} = \frac{\text{Average Accounts Receivable}}{\text{Net Sales}/360} \quad (3)$$

$$\text{Days Payable Outstanding} = \frac{\text{Average Accounts Payable}}{\text{Cost of Sales}/360} \quad (4)$$

$$\text{Cash Conversion Cycle} = (\text{Days Inventory Outstanding} + \text{Days Sales Outstanding} - \text{Days Payable Outstanding}) \quad (5)$$

The Fixed Asset Turnover Ratio (FATR) is calculated using equation no. 6 as a measure of how efficiently a company's fixed assets (property, plant, and equipment) are used (Azim et al., 2015, p. 69):

$$FATR = \frac{\text{Revenue}}{\text{Property, Plant and Equipment}} \quad (6)$$

Return on Equity (ROE) shows a company's profitability by indicating how much profit it earns from shareholders' investments. ROE is calculated as shown in equation 7:

$$ROE = \frac{\text{Net Income}}{\text{Shareholders Equity}} \quad (7)$$

Return on Assets (ROA) indicates how effectively and efficiently a company's assets are being used, indicating how profitable the company is relative to its total assets. ROA is calculated as in Equation 8.

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}} \quad (8)$$

4.5. Research model and hypotheses

The relationship between operational performance and financial performance, which are variables in the research model, was examined using panel data regression.

The panel data regression model is shown in equation 9 (Gujarati, 2006, p. 219; Das, 2019, p. 43).

$$Y_{it} = \alpha_{it} + \beta_{kit}X_{kit} + \mu_{it} \quad (9)$$

In the equation, Y (dependent variable), X_{kit} (independent variables), α is the constant term, β_{kit} are the slope coefficients, and μ_{it} is the error term, with subscript i indicating units and t representing time (Altunışık et al., 2010; Tafari et al., 2009).

Consistent with the research purpose, the following hypotheses were developed:

H1. Fixed Asset Turnover, Return on Equity, and Return on Assets significantly influence Earnings Per Share.

H2. There is a negative correlation between Earnings Per Share and Cash Conversion Cycle.

4.6. Findings of the research

Included businesses operating within the BIST Transportation and Storage sector. The selection focused on companies with a sufficient period for panel data analysis.

Table 2

BIST Transportation and Storage Sector Companies

Order	Code	Company Name
1	WHITE	WHITE FLEET AUTO RENTAL INC.
2	CLEBI	CELEBI AVIATION SERVICES INC.
3	GSDDE	GSD SHIPPING REAL ESTATE CONSTRUCTION INDUSTRY AND TRADE INC.
4	PGSUS	PEGASUS AIR TRANSPORTATION INC.
5	RYSAS	REYSAŞ TRANSPORTATION AND LOGISTICS TRADE INC.
6	TLMAN	TRABZON PORT MANAGEMENT INC.
7	THYAO	TURKISH AIRLINES AO

This part of the study includes data calculated using ratios related to the financial and operational performance of companies in the BIST Transportation and Storage Sector.

Table 3

Earnings per Share Values of Companies in the BIST Transportation and Storage Sector

YEARS	WHITE	CLEBI	GSDDE	PGSUS	RYSAS	THYAO	TLMAN	MEAN
2012	0.02	0.86	0.04	1.68	0.00	0.96	-	0.51
2013	0.07	0.13	-0.19	0.90	0.25	0.49	-	0.24
2014	-0.23	2.25	-0.16	1.40	0.19	1.32	-	0.68
2015	1.17	3.42	-0.29	1.11	-0.27	2.17	-	1.04
2016	0.73	1.10	-0.54	-1.31	-0.28	-0.03	1.35	0.15
2017	0.31	3.51	-0.30	4.91	-0.13	0.46	1.51	1.47
2018	0.00	8.42	0.68	4.96	-0.61	2.93	1.81	2.60
2019	0.15	7.92	-0.11	13.03	0.05	3.29	2.48	3.83
2020	0.38	-6.96	-0.33	-19.21	-0.18	-4.05	2.79	-3.94
2021	0.38	21.95	0.93	-19.28	-0.23	5.95	2.94	1.81
2022	0.23	44.44	0.42	69.41	1.00	34.37	10.13	22.86
2023	0.78	68.63	-2.03	204.37	1.48	118.11	7.59	56.99
2024	-0.38	146.77	-0.23	26.57	0.70	82.14	5.58	37.31
AVERAGE	0.28	23.26	-0.16	22.20	0.15	19.09	2.78	9.66
MAXIMUM	1.17	146.77	0.93	204.37	1.48	118.11	10.13	69.00
MINIMUM	-0.38	-6.96	-2.03	-19.28	-0.61	-4.05	0.00	-4.76

Table 3 presents the companies' earnings per share statistics. CLEBI ranks first with an average EPS of 23.26, PGSUS ranks second with an average EPS of 22.20, and THYAO ranks third with an average EPS of 19.09. The companies' overall average EPS performance was the lowest in 2023 at 56.99, while in 2020 it was -3.94.

Figure 1

BIST Transportation and Storage Enterprises Earnings Per Share Trend

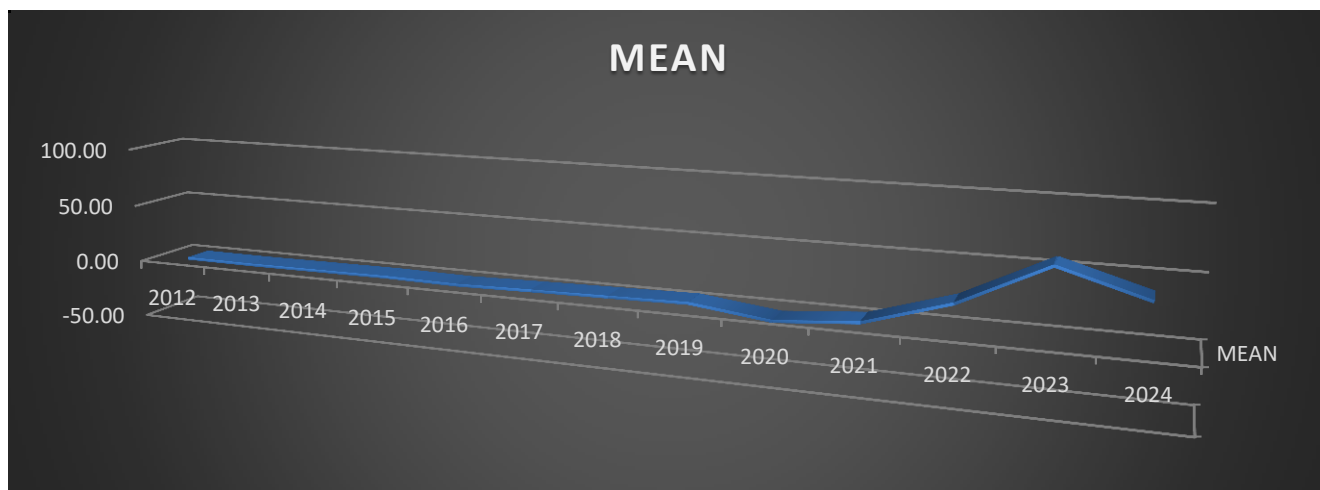


Figure 1 displays the average earnings per share of companies from 2012 to 2024.

Figure 2

BIST Earnings Per Share Trends for BIST Transportation and Storage Companies

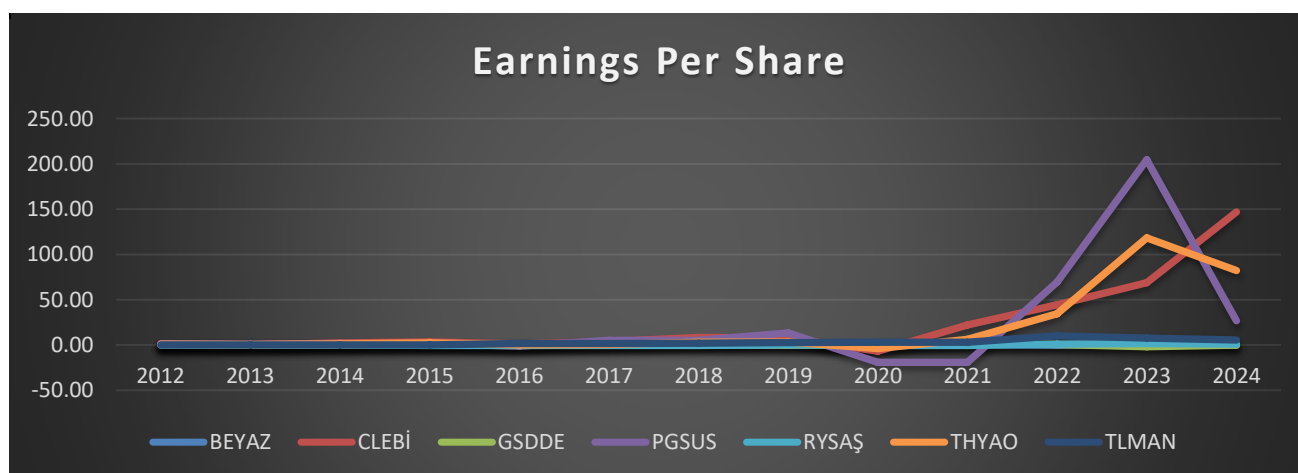


Figure 2 displays the trends in earnings per share for each company. Earnings per share reached a low in 2020-2021 and a high in 2023.

Table 4

Cash Conversion Cycles of BIST Transportation and Storage Enterprises

YEARS	WHITE	CLEBİ	GSDDE	PGSUS	RYSAŞ	THYAO	TLMAN	MEAN
2012	58.64	18.05	0.00	-20.77	33.79	-1.11	-	12.66
2013	57.02	14.75	0.00	-9.32	14.86	-2.30	-	10.72
2014	18.64	6.29	0.00	2.00	-8.82	-3.65	-	2.07
2015	3.00	3.94	0.00	3.66	-20.20	-5.75	-	-2.19
2016	12.58	10.56	38.30	-2.39	-30.50	-4.33	-25.94	-0.25
2017	39.21	9.05	21.65	-12.55	-27.83	-5.96	-43.60	-2.86
2018	49.04	9.28	15.37	-13.79	-11.21	-10.26	-40.14	-0.25
2019	48.55	10.23	25.13	-15.87	-11.21	-12.45	-44.49	-0.02
2020	46.16	9.72	30.07	-21.68	-11.80	-6.88	-48.36	-0.39
2021	32.74	0.96	8.61	-35.29	2.22	1.53	-16.94	-0.88
2022	28.75	-1.36	-1.89	-23.87	4.94	-0.99	-26.72	-3.02

2023	25.60	1.00	-8.91	-22.81	8.96	-4.08	-14.24	-2.07
2024	15.62	-1.39	-19.21	-17.88	-3.50	-2.64	-11.89	-5.84
AVERAGE	33.50	7.01	8.39	-14.66	-4.64	-4.53	-20.95	0.59
THE BIGGEST	58.64	18.05	38.30	3.66	33.79	1.53	0.00	22.00
SMALLEST	3.00	-1.39	-19.21	-35.29	-30.50	-12.45	-48.36	-20.60

When analyzing the data in Table 4, TLMAN has the shortest cash conversion cycle at -20.95. In other words, TLMAN quickly converts its receivables into cash while delaying debt payments, ensuring debts are paid later. PGSUS NDS ranks second, just behind TLMAN, with a -14.66 figure, while RYSAŞ ranks third at -4.64.

Figure 3

Cash Conversion Cycles of Businesses in the BIST Transportation and Storage Sector

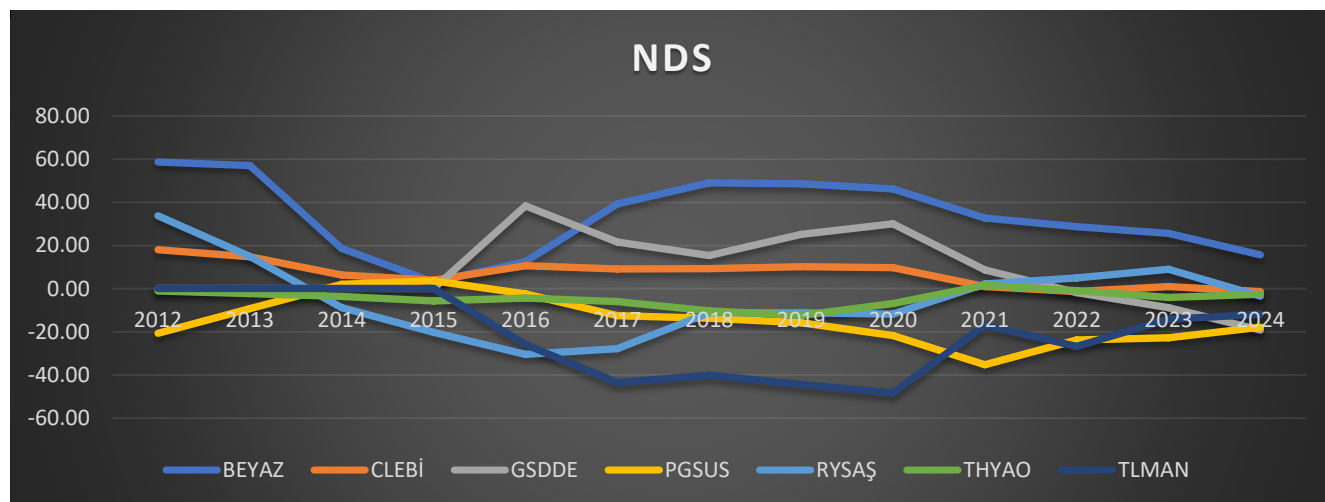


Figure 3 illustrates the NDS performance trends for each company individually. As shown in the chart, TLMAN, PGSUS, and RYSAŞ have lowered payment-related risks by maintaining negative cash conversion cycles. Companies with positive cycles have receivables and inventory turnover periods that surpass their payables turnover cycles, which increases liquidity risk.

Figure 4

Average Cash Conversion Cycles of BIST Transportation and Storage Enterprises by Year

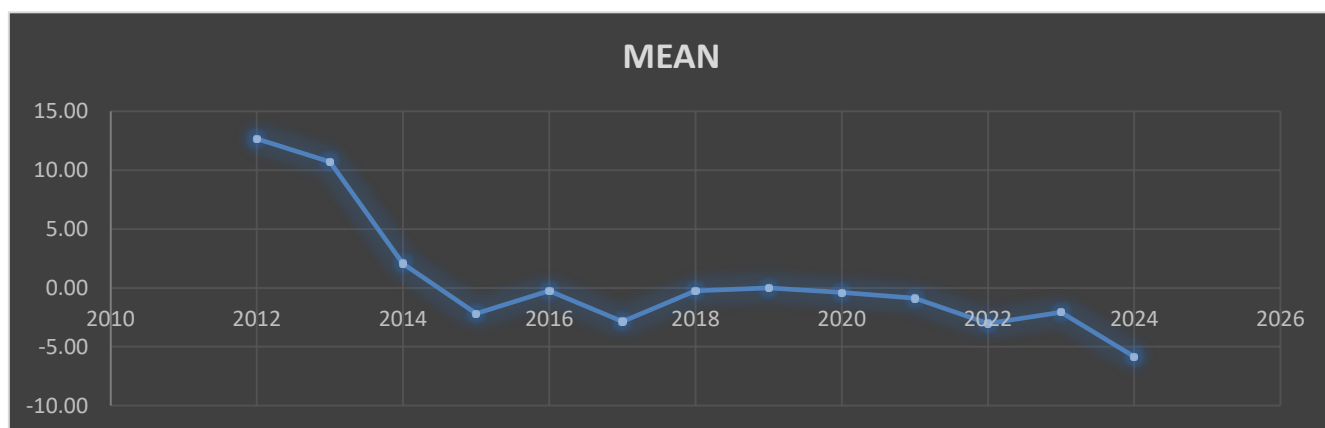


Figure 4 shows the average NDS values of businesses over the years. NDSs of companies peaked in 2012 and again in 2024. In other words, the graph indicates that the receivables and inventory turnover periods of businesses decreased relative to their payables turnover periods after 2014, thereby enhancing their ability to pay debts.

Table 5

Fixed Asset Turnover Periods of BIST Transportation and Storage Enterprises

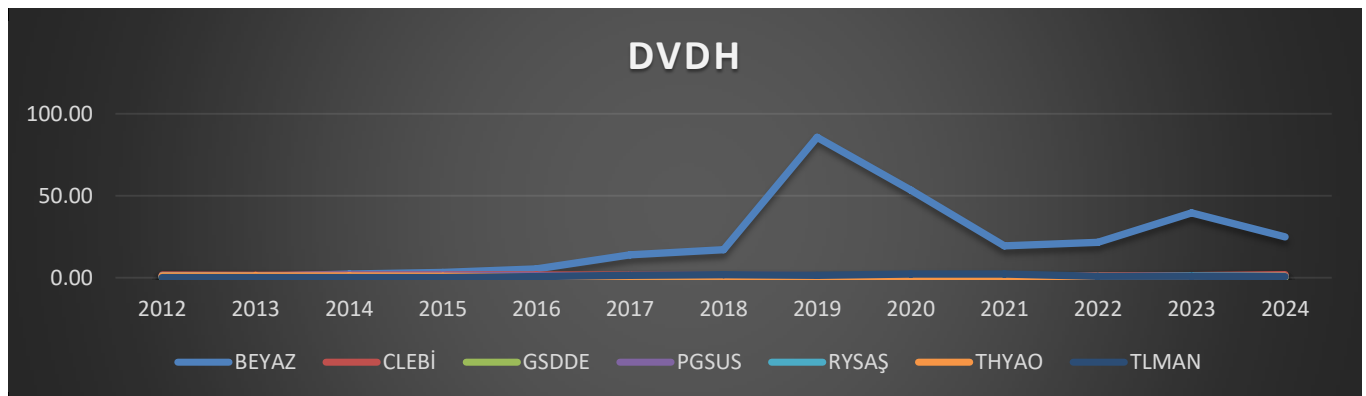
YEARS	WHITE	CLEBİ	GSDDE	PGSUS	RYSAŞ	THYAO	TLMAN	MEAN
2012	0.68	1.50	0.00	1.03	0.90	0.99	-	0.73
2013	0.71	1.45	0.00	1.04	0.77	0.90	-	0.70

2014	2.10	1.58	0.00	1.52	0.53	0.95	-	0.95
2015	3.08	1.75	0.00	1.54	0.43	0.75	-	1.08
2016	5.30	1.48	0.10	0.89	0.43	0.56	0.68	1.35
2017	13.99	1.66	0.17	1.07	0.43	0.72	1.47	2.79
2018	16.93	1.49	0.35	0.89	0.47	0.74	1.80	3.24
2019	85.53	1.18	0.17	0.74	0.55	0.63	1.43	12.89
2020	53.39	0.84	0.16	0.20	0.42	0.30	2.14	8.21
2021	19.36	0.72	0.33	0.27	0.37	0.34	2.25	3.38
2022	21.54	1.25	0.40	0.57	0.69	0.70	0.88	3.72
2023	39.41	1.19	0.16	0.46	0.99	0.63	0.86	6.24
2024	24.89	1.70	0.25	0.52	0.75	0.70	0.56	4.20
AVERAGE	22.07	1.37	0.16	0.83	0.59	0.69	0.93	3.80
THE BIGGEST	85.53	1.75	0.40	1.54	0.99	0.99	2.25	13.35
SMALLEST	0.68	0.72	0.00	0.20	0.37	0.30	0.00	0.32

Looking at the data in Table 5, BEYAZ has the highest fixed asset turnover rate, averaging 22.07. This indicates BEYAZ converts its fixed assets into cash 22 times a year. Meanwhile, GSDDE records the lowest rate, with an average of 0.16.

Figure 5

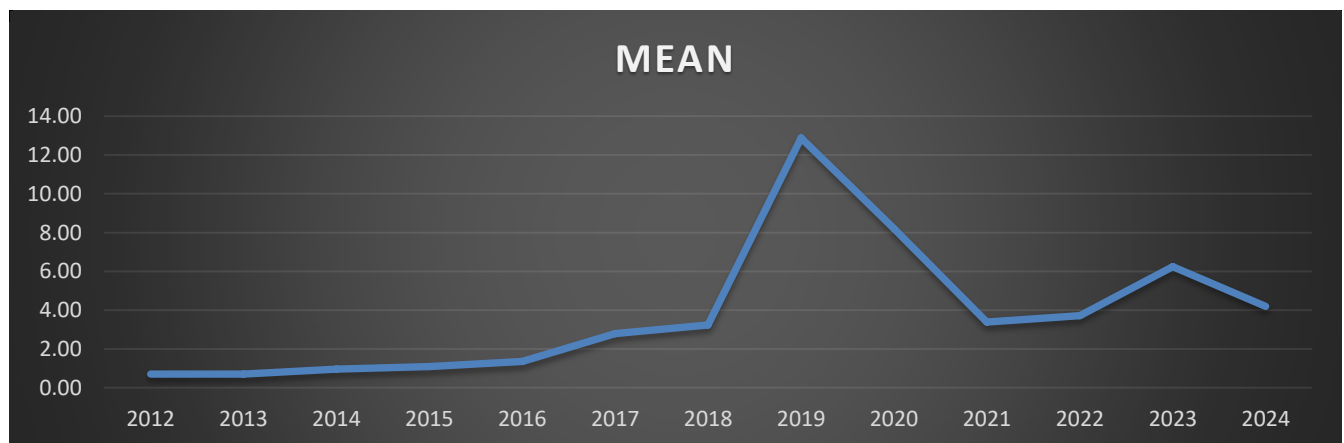
Average Fixed Asset Turnover Trends of BIST Transportation and Storage Enterprises



As shown in Figure 5, although WHITE has the highest DVDH, the other companies have similar values.

Figure 6

Average Fixed Asset Turnover Rate Trends of BIST Transportation and Storage Sector Enterprises by Year



When the DVDH of the enterprises is reviewed annually, it is observed that the highest values occurred in 2019, 2020, and 2023, while the lowest values were between 2012 and 2016.

Table 6

Return on Equity Ratios of Enterprises in the BIST Transportation and Storage Sector

YEARS	WHITE	CLEBI	GSDDE	PGSUS	RYSAŞ	THYAO	TLMAN	MEAN
2012	0.01	0.33	0.02	0.39	0.00	0.21	-	0.14
2013	0.11	0.07	-0.08	0.08	0.10	0.10	-	0.05
2014	-0.35	0.51	-0.09	0.12	0.07	0.20	-	0.07
2015	0.64	0.58	-0.15	0.08	-0.13	0.21	-	0.17
2016	0.29	0.26	-0.29	-0.09	-0.17	0.00	0.38	0.05
2017	0.13	0.51	-0.17	0.20	-0.09	0.03	0.48	0.16
2018	0.00	0.58	0.27	0.14	-1.25	0.13	0.50	0.05
2019	0.12	0.34	-0.04	0.25	0.10	0.11	0.56	0.21
2020	0.24	-0.38	-0.10	-0.36	-0.04	-0.14	0.43	-0.05
2021	0.19	0.32	0.23	-0.29	-0.05	0.09	0.44	0.13
2022	0.04	0.33	0.04	0.39	0.22	0.26	0.33	0.23
2023	0.11	0.32	-0.18	0.38	0.17	0.36	0.20	0.19
2024	-0.04	0.46	-0.02	0.18	0.14	0.17	0.09	0.14
AVERAGE	0.12	0.32	-0.04	0.11	-0.07	0.13	0.26	0.12
THE BIGGEST	0.64	0.58	0.27	0.39	0.22	0.36	0.56	0.43
SMALLEST	-0.35	-0.38	-0.29	-0.36	-1.25	-0.14	0.00	-0.40

When examining the values in Table 6, the company with the highest return on equity is CLEBİ, ranking first with an average of 0.32, followed by TLMAN in second place with an average of 0.26, and THYAO in third with an average of 0.13. In other words, CLEBİ delivers the highest return on the capital invested.

Figure 7

Average Return on Equity Trends of Enterprises in the BIST Transportation and Storage Sector

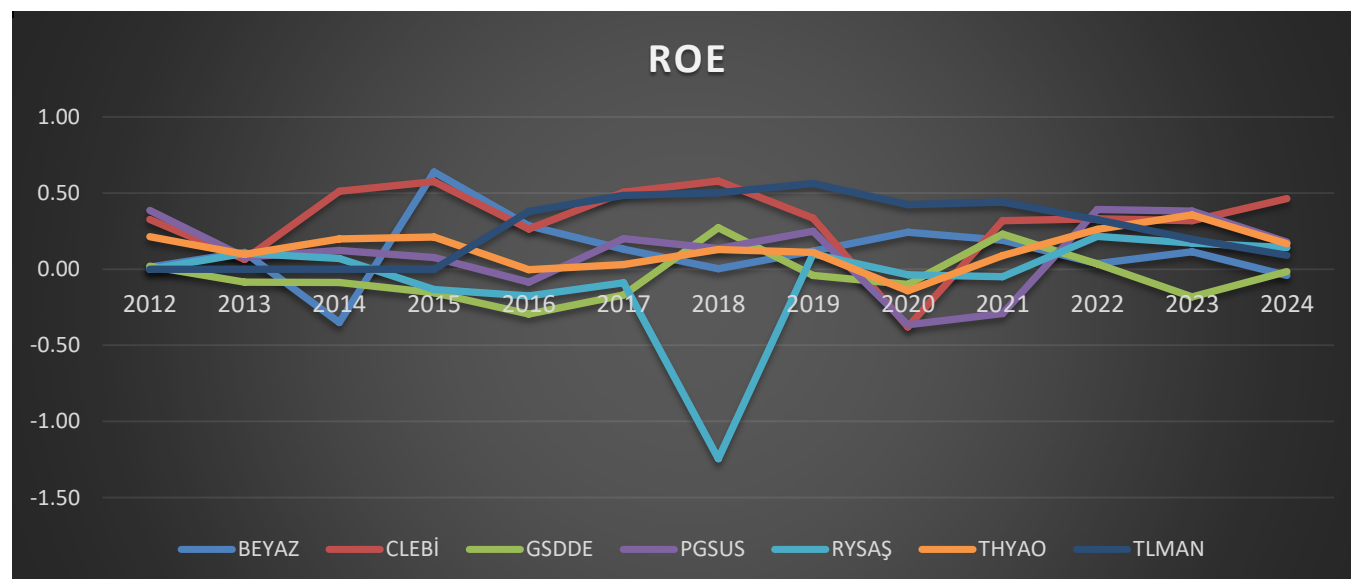
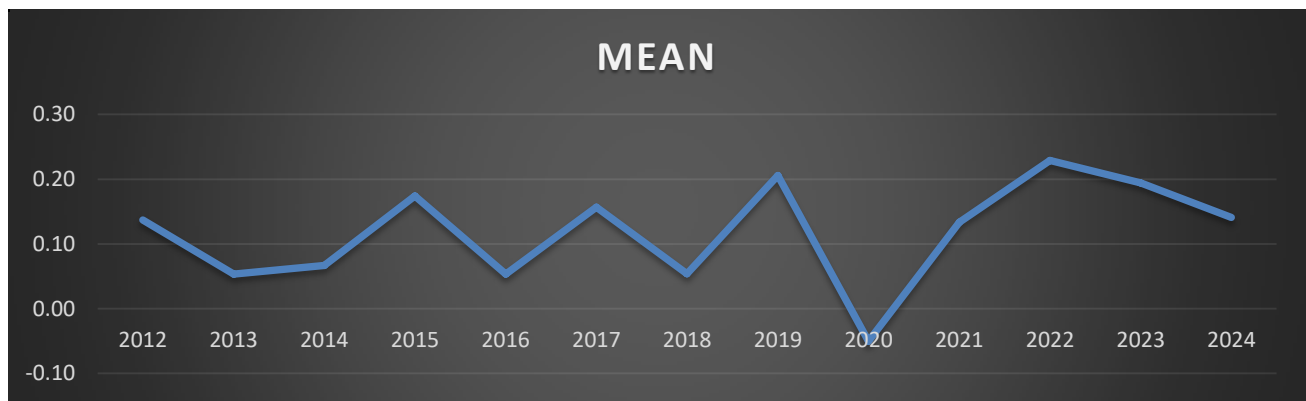


Figure 7 shows the return on equity trends for each company separately.

Figure 8

Annual Average Return on Equity Trends of Enterprises in the BIST Transportation and Storage Sector



When Figure 8 is examined, the average return on equity for the enterprises peaked in 2023 and 2019, and hit its lowest point in 2020.

Table 7

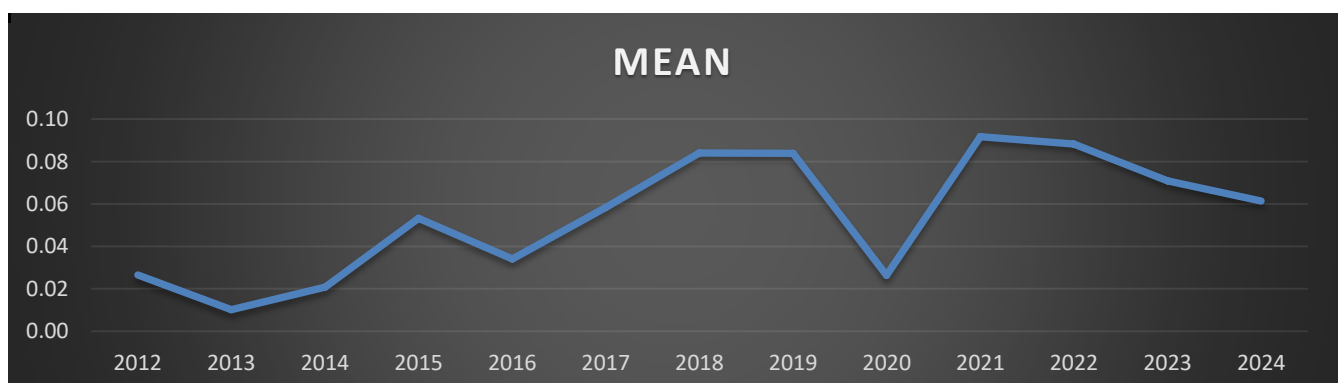
Asset Profitability Ratios of BIST Transportation and Storage Sector Enterprises

YEARS	WHITE	CLEBI	GSDDE	PGSUS	RYSAS	THYAO	TLMAN	MEAN
2012	0.00	0.04	0.02	0.06	0.00	0.06	-	0.03
2013	0.01	0.01	-0.05	0.03	0.05	0.03	-	0.01
2014	-0.04	0.10	-0.03	0.04	0.03	0.06	-	0.02
2015	0.24	0.12	-0.05	0.03	-0.03	0.06	-	0.05
2016	0.13	0.04	-0.08	-0.02	-0.03	0.00	0.20	0.03
2017	0.05	0.10	-0.04	0.06	-0.01	0.01	0.24	0.06
2018	0.00	0.13	0.12	0.04	-0.05	0.04	0.31	0.08
2019	0.05	0.09	-0.02	0.06	0.00	0.03	0.38	0.08
2020	0.09	-0.06	-0.06	-0.07	-0.01	-0.03	0.32	0.03
2021	0.09	0.10	0.16	-0.04	-0.02	0.02	0.33	0.09
2022	0.01	0.13	0.03	0.07	0.04	0.08	0.26	0.09
2023	0.04	0.11	-0.14	0.10	0.07	0.16	0.15	0.07
2024	-0.01	0.18	-0.01	0.05	0.07	0.08	0.08	0.06
AVERAGE	0.05	0.08	-0.01	0.03	0.01	0.05	0.17	0.05
THE BIGGEST	0.24	0.18	0.16	0.10	0.07	0.16	0.38	0.18
SMALLEST	-0.04	-0.06	-0.14	-0.07	-0.05	-0.03	0.00	-0.06

According to Table 7, TLMAN ranks first with the highest average return on assets of 0.17. CLEBI is second with an average of 0.08, and BEYAZ and THYAO are tied for third with an average of 0.05.

Figure 9

Annual Average Return on Assets Trends of Companies in the BIST Transportation and Storage Sector



Examining the graph in Figure 9, the highest annual return on assets ratios occurred in 2021 and 2022, while the lowest averages were seen in 2013 and 2020.

4.7. Analysis of research hypotheses using the panel data regression method

Since the research examined the relationship between the Cash Conversion Cycle, Fixed Asset Turnover Cycle, Return on Equity, and Return on Assets as operational performance indicators. The Earnings Per Share Ratio, as a financial performance indicator, hypotheses were developed based on the subject.

The hypotheses of the research are;

H₁ = There is a relationship between Fixed Asset Turnover Period, Return on Equity, Return on Assets, and Earnings Per Share.

H₂ = There is a negative relationship between Earnings Per Share and Cash Conversion Cycle.

The model of the study is expressed by equation (10). of the research;

$$\text{Model : } HBK = \beta_0 + \beta_{1NDS} + \beta_{2DVDH} + \beta_{3ROE} + \beta_{4ROA} + \mu_{it} \quad (10)$$

HBK : Earnings Per Share

β_0 : Constant coefficient

β_{1NDS} : Cash Conversion Period

β_{2DVDH} : Fixed Asset Turnover Period

β_{3ROE} : Return on Equity

β_{4ROA} : Return on Assets

μ_{it} : Error term

Table 8

Descriptive Statistics of Research Variables

Variables		Average	Std. Deviation	Minimum	Max	Number of Observations
HBK	general	10.1006	32.4393	-19.2813	204,375	N = 87
	intergroup		11.0874	-0.1627	23.2642	n = 7
	in-group		30.6994	-31.3765	192.2798	T bar = 12.4286
NDS	general	0.6170	22.1883	-48.3573	58.6445	N = 87
	intergroup		20.0448	-30.2585	33.5045	n = 7
	in-group		13.0496	-29.8907	39.0492	T bar = 12.4286
DVDH	general	3.9796	12.0046	0	85.5330	N = 87
	intergroup		8.0391	0.1606	22.0695	n = 7
	intragroup		9.2630	-17.4095	67.4432	T bar = 12.4286
ROE	general	0.1246	0.2725	-1.2452	0.6379	N = 87
	intergroup		0.1687	-0.0710	0.3793	n = 7
	in-group		0.2265	-1.0495	0.6471	T bar = 12.4286
ROA	general	0.0571	0.0955	-0.1399	0.3755	N = 87
	intergroup		0.0869	-0.0117	0.2501	n = 7
	in-group		0.0626	-0.1174	0.2474	T bar = 12.4286

Table 8 presents descriptive statistics for the variables included in the study. The overall mean of the HPC value was 10.1006, with a standard deviation of 32.4393; the overall mean of the NDS was 0.6170, with a standard deviation of 22.1883; the overall mean of the DVDH was 3.9796, with a standard deviation of 12.0046; the overall mean of the ROE was 0.1246, with a standard deviation of 0.2725; and the overall mean of the ROA was 0.0571, with a standard deviation of 0.0955. Detailed results for each variable are provided in the table.

Table 9*VIF Test*

Variables	VIF	1/VIF
ROA	2.97	0.336968
ROE	2.67	0.374700
NDS	1.58	0.631760
DVDH	1.31	0.761739
HPC	1.11	0.897673
Mean VIF	1.93	

Examining the test results in Table 9 shows that the VIF values are below 10, indicating no multicollinearity issues among the independent variables (Oğuz & Sökmen, 2020, p. 216).

Table 10*Cross-Section Dependency Test*

Method	Test Statistics	Probability (p)
Pesaran CD Test Statistics	1,647	0.0996
Friedman R	9,943	0.1271
Frees Q	0.829	
Critical values from Frees' Q distribution		
alpha = 0.10: 0.2828		
alpha = 0.05: 0.3826		
alpha = 0.01: 0.5811		
Note : H_0 : There is no dependence between the series, H_1 : There is dependence between the series.		

Table 10, which shows the cross-sectional dependency test results, indicates that there is no problem with cross-sectional dependency in the series, as the Pesaran CD test, Friedman R test, and Frees Q test results are $0.0996 > 0.05$ and $0.1271 > 0.05$, respectively.

Table 11*Heteroscedasticity and Autocorrelation Test*

Tests	Hypothesis	Test Statistics	Possibility
Modified Wald test	$H_0 : \sigma^2_i = \sigma^2$	2333.65*	0.0000
Modified Bhargava et al. Durbin-Watson		0.9059	
Baltagi-Wu LBI		1.34	

Note: * indicates 1% significance.

According to the Wald test results in Table 11, the H_0 hypothesis, which states that the variances of the units are equal, is rejected. In other words, our research model has a heteroskedasticity problem. The results of the Durbin-Watson and Baltagi Wu tests, along with the local invariance test developed by Bhargava et al., show that the test statistic value is less than 2, indicating an autocorrelation issue. This suggests an autocorrelation problem in the model and leads to the rejection of the H_0 hypothesis. Therefore, since the variance of the unit effect and the autocorrelation coefficient are not assumed to be zero, both the unit effect and autocorrelation problems are present. (Oğuz & Sökmen, 2020).

The models used for coefficient estimation in panel data analysis include the pooled least squares method (POLS), the fixed effects model, and the random effects model. The F test, the LM test, and the Hausman test are used to determine the best model among these three. The F test identifies which of the classical and fixed effects models provides the most accurate coefficient estimates. The LM test evaluates whether the classical or random effects model is more appropriate for analysis. The Hausman test compares the fixed effects and random effects models to identify the more suitable one.

Table 12*F, LM, and Hausman tests for the model.*

Tests	Test Statistics	Probability (P-Value)
F Test	1.95	0.0828

LM Test (Breusch-Pagan)	0.00	1,0000
Hausman Test Statistics	16.04	0.0030

Examining the data on the 12th, the F-test produces a p-value of 0.0828, which is above 0.05. This indicates that estimators from the pooled model generally offer more effective results than those from the fixed-effects model. The Breusch-Pagan LM test shows a p-value of 1.0000, also exceeding 0.05, suggesting that pooled model estimators are likely to yield more accurate coefficients than the random-effects model. Conversely, the Hausman test yields a p-value of 0.0030, below 0.05, indicating that the fixed-effects model estimates more precise coefficients than the random-effects model. Due to cross-sectional dependence among the units, we use the "Regression with Driscoll-Kraay standard errors" estimation method, which is robust.

Table 13

Estimated Results of the Relationship Between Operational Performance and Financial Performance

HBK	Coefficient	Std. Deviation	t-Statistics	Possibility
ROE	0.8760	0.2846	3.08**	0.0110
ROA	0.0086	0.1868	0.05	0.9640
NDS	-1.0106	0.2402	-4.21*	0.0010
DVDH	0.0940	0.1289	0.73	0.4810
cons	3.7446	0.7161	5.23*	0.0000
F (4.11)	32.80*	Number of obs.	29	
Prob.	0.0000	Number of groups	6	
R-squared	0.8455	Model	Pooled OLS	

Note : *, ** represent 1% and 5% significance levels, respectively.

When analyzing the results in Table 13, the F statistic's probability value of 0.0000 indicates that the model is significant, and the R2 of 0.7055 shows that the independent variables explain 70.55% of the variance in the dependent variable. It is observed that the values of ROE, ROA, NDS parameters, and the constant coefficient are statistically significant.

$$EPS = 3.7446 + 0.8760_{ROE} - 1.0106_{NDS} + + \epsilon_i$$

Suppose the variables in the model are explained by their values. In that case, a one-unit increase in return on equity (ROE) will lead to a 0.8760 increase in earnings per share (EPS), and this change is statistically significant. A one-unit increase in the cash conversion cycle (CCC) will result in a -1.0106 decrease in the EPS ratio, and this result is also statistically significant. Therefore, there is a negative relationship between earnings per share (EPS) and the cash conversion cycle (CCC). In contrast, a positive relationship exists between earnings per share (EPS) and return on equity, and these findings are statistically significant.

5. Conclusion

As a result, when the data was analyzed, CLEBI ranked first with an average HBK of 23.26, PGSUS ranked second with an average of 22.20, and THYAO ranked third with an average of 19.09. The year with the highest average HBK among the companies was 2023, at 56.99, while the year with the lowest was 2020, at -3.94.

When analyzing the cash conversion cycles (NCCs) of businesses, TLMAN had the shortest cycle at -20.95. In other words, TLMAN quickly converts receivables into cash while postponing debt payments for a longer period, ensuring debts are paid on time. PGSUS ranked second, gaining this same advantage immediately after TLMAN with an NDC of -14.66, while RYSAŞ ranked third at -4.64. The NDCs of these businesses were highest in 2012 and peaked in 2024. The chart shows that the receivables and inventory turnover cycles of these businesses decreased relative to their

payables turnover cycles after 2014, improving their ability to pay debts.

An analysis of the fixed asset turnover ratio (DVDH) among the companies shows that BEYAZ has the highest average ratio at 22.07, meaning it turns over its fixed assets into cash about 22 times annually. Meanwhile, GSDDE has the lowest ratio, averaging only 0.16. When looking at DVDH across different years, the highest values occurred in 2019, 2020, and 2023, while the lowest values were seen between 2012 and 2016.

In analyzing the companies' return on equity (ROE) ratios, CLEBI has the highest ROE, ranking first with an average of 0.32. TLMAN is second with an average of 0.26, while THYAO is third with an average of 0.13. Essentially, CLEBI provides the highest return on invested capital. The average return on equity for the companies peaked in 2023 and 2019 and was lowest in 2020.

Analyzing the return on assets (ROA) ratios of the companies shows that TLMAN ranks first with the highest average ROA of 0.17. CLEBI ranks second with an average of 0.08, while BEYAZ and THYAO tie for third with an average of 0.05. The highest annual ROA was reached in 2021 and 2022, while the lowest averages occurred in 2013 and 2020.

An analysis of the panel data results regarding the relationship between operational and financial performance indicators shows that a one-unit increase in return on equity (ROE) leads to a 0.8760 rise in earnings per share (EPS), and this is statistically significant. Similarly, a one-unit increase in the cash conversion cycle (CCC) results in a -1.0106 decrease in the EPS ratio, which is also statistically significant. Therefore, there is a negative relationship between earnings per share (EPS) and the cash conversion cycle (CCC), and a positive relationship between EPS and return on equity, both of which are statistically significant. In other words, the findings suggest that as the cash conversion cycle shortens, earnings per share increase; conversely, as it lengthens, earnings

per share decrease. Additionally, the analysis indicates that an increase in return on equity positively affects earnings per share.

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