EFFECTS OF WORKING CAPITAL MANAGEMENT ON FIRMS' PROFITABILITY: A SECTORAL ANALYSIS OF TÜRKİYE

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EFFECTS OF WORKING CAPITAL MANAGEMENT ON FIRMS' PROFITABILITY: A SECTORAL ANALYSIS OF TÜRKİYE

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ABSTRACT

This thesis investigates the effects of working capital management (WCM) on firms' profitability, focusing on the manufacturing, agriculture, transport and warehouse sectors in Türkiye. Utilizing a panel data methodology, the study analyzes financial data from 954 Turkish companies collected from EMIS between 2017 and 2021. Key metrics such as receivables turnover, inventory turnover, and the cash conversion cycle (CCC) are examined to assess their impact on profitability. The findings reveal a significant negative correlation between the CCC and firm profitability in the manufacturing sector, indicating that efficient WCM enhances profitability. The study employs both univariate and multivariate analyses, controlling for factors like firm size, debt ratio, and sales growth. Results emphasize the necessity of sector-specific WCM strategies to optimize profitability and create shareholder value. The study contributes to the existing literature by providing empirical evidence from Türkiye and underscores the importance of effective WCM practices across various sectors, advocating for further research to explore these dynamics in different economic environments.

Keywords**:** Working Capital Management; Cash Conversion Cycle; Profitability; Sectoral Analysis; Panel Data Methodology

ÖZ

Bu tez, Türkiye'deki imalat, tarım ve taşımacılık ile depo sektörlerine odaklanarak işletmelerin karlılığı üzerindeki işletme sermayesi yönetiminin (WCM) etkilerini araştırmaktadır. Panel veri metodolojisi kullanılarak, 2017-2021 yılları arasında EMIS'ten toplanan 954 Türk şirketine ait finansal veriler analiz edilmiştir. Alacak devir hızı, stok devir hızı ve nakit dönüşüm döngüsü (CCC) gibi anahtar metrikler, karlılık üzerindeki etkilerini değerlendirmek için incelenmiştir. Bulgular imalat sektöründe, CCC ile işletme karlılığı arasında önemli bir negatif korelasyon olduğunu, yani etkin WCM'nin karlılığı artırdığını ortaya koymaktadır. Çalışmada, firma büyüklüğü, borç oranı ve satış büyümesi gibi faktörler kontrol edilerek hem tek değişkenli hem de çok değişkenli analizler kullanılmaktadır. Sonuçlar, sektöre özgü WCM stratejilerinin karlılığı optimize etmek ve hissedar değeri yaratmak için gerekli olduğunu vurgulamaktadır. Çalışma, Türkiye'den ampirik kanıtlar sunarak mevcut literatüre katkıda bulunmakta ve çeşitli sektörlerde etkin WCM uygulamalarının önemini vurgulamakta, farklı ekonomik ortamlarda bu dinamikleri keşfetmek için daha fazla araştırma yapılmasını önermektedir.

Anahtar Kelimeler: İşletme Sermayesi Yönetimi; Nakit Döküm Döngüsü; Karlılık; Sektörel Analiz; Panel Veri Metodolojisi

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

AMADEUS:	Analyse Major Databases from European Sources
AP:	Accounts Payable (Number of Days Payable)
BSE:	Bombay Stock Exchange
BSE 500:	Bombay Stock Exchange 500 Index
CCC:	Cash Conversion Cycle
CMIE:	Centre for Monitoring Indian Economy
DEBT:	Debt Ratio
DPO:	Days Payable Outstanding
EMIS:	Emerging Markets Information Systems
ETLA:	Research Institute of the Finnish Economy
FEM:	Fixed Effects Model
GDP:	Gross Domestic Product
GDPGR:	GDP Growth Rate
H:	Hypothesis
INV:	Inventory Turnover (Number of Days Inventory Turnover)
NASDAQ OMX:	Nasdaq OMX Helsinki Stock Exchange
OBS:	Observations
OLS:	Ordinary Least Squares
REC:	Receivables (Number of Days Accounts Receivable)
REM:	Random Effects Model
ROA:	Return on Assets
ROE:	Return on Equity
SABI:	Iberian Balance Sheet Analysis System
SGROWTH:	Sales Growth
STD. DEV:	Standard Deviation
SIZE:	Firm Size

SME:	Small and Medium-sized Enterprises
SUR:	Seemingly Unrelated Regression
WCM:	Working Capital Management

INTRODUCTION

Corporate finance investment decisions are taken into two categories: long-term investments and short-term investment decisions. The areas of focus for long-term investment decisions are capital budgeting and structural decisions. On the other hand, the focus of short-term investments is on managing working capital. (Al-Mawsheki, 2022).

The difference between a company's current assets and current liabilities constitutes its working capital. Short-term accounts like cash accounts, short-term investments, accounts receivable, inventory, payables, accrued expenses, and prepaid expenses make up the working capital (Sagner, 2014). The goal of effective working capital management is to minimize overinvestment in current assets while ensuring the company maintains an optimal balance between profitability and liquidity. As a result, an efficient working capital management system is crucial for maximizing profitability and gaining a competitive edge (Bris, Yousaf, 2021).

Three components measure the effectiveness of working capital: the receivables turnover, the inventory turnover, and the suppliers' turnover (e.g. Aktaş, Croci, Petmezas, 2015; Garcia-Teruel, Solano, 2006; Deloof, 2003). The cash conversion cycle (CCC), a composite measure, is fundamentally connected to a business's financial inflows and outflows (Pham, C., Nguyen, Q., Nguyen, 2020). For company managers, finding the optimal balance of the cash conversion cycle is essential. For example, to improve cash flow, a company may apply rigorous collection terms and strict sales credits to customers. However, these rigorous policies could result in a loss in sales and therefore a negative impact on profitability (Ganesan, 2007). Increasing inventory levels might eliminate the possible interruptions that might occur during production and eliminate undesired stock-out emergencies. However, investing so much into inventory makes those resources unavailable for other investments while they remain in the stock and it will lead to a negative effect on profitability (Deloof, 2003; Garcia-Teruel, Solano, 2006; Kroes, Manikas, 2014). Increasing suppliers' turnover would delay the immediate cash outflow

and it spreads over time, therefore, there will be much more available cash for possible investments. However, following a strict supplier turnover policy could impact the company negatively because a company that applies a strict payment policy may not benefit from the possible discounts from the suppliers for the advance payments (Deloof, 2003; Garcia-Teruel, Solano, 2006; Özkaya, Yaşar 2023). Consequently, for a manager aiming to enhance the company's value and boost its profitability, managing working capital is vital.

This research has tested the effect of working capital management on firms' profitability with the model that was introduced and tested for Spanish SMEs by Garcia-Teruel and Solano (2006). Therefore, the research provided empirical evidence related to the impact of working capital management on firms' profitability utilizing a panel data methodology based on financial data that consisted of 954 companies from Türkiye during the period from 2017 to 2021. This research provides several significant contributions to existing literature. First, the study was conducted by Garcia-Teruel and Solano (2006) examining only SMEs, this limitation has been lifted in this study. Then we explore whether the model and findings presented by Garcia-Teruel and Solano (2006) hold for Türkiye's data. Furthermore, as far as we are aware, no prior studies have specifically investigated the influence of working capital on the profitability of companies in various sectors in Türkiye, such as agriculture, manufacturing, transport, and warehousing.

This study continues with a literature review in section 1 then in section 2 the data and sample have been presented. In section 3, variables of the study have been demonstrated. Then the research methodology is provided in section 4. In section 5, univariate and multivariate analysis results of the manufacturing sector have been provided. In section 6, the analysis results of agriculture have been demonstrated. In section 7, it has been presented the test results of the transport and warehouse sector. Lastly, in sections 8 and 9, the evaluation of results and the conclusion part have been presented.

LITERATURE REVIEW

Past literature about the effects of working capital is rich and the results show divergence. In the literature review, we have included different types of results from past studies.

Deloof (2003) conducted a study on the impact of working capital management on the profitability of Belgian firms. The study's sample was collected from a database maintained by the National Bank of Belgium, comprising financial statements from the top 2000 Belgian firms. The initial sample included 1637 firms with complete financial statements for each year between 1991 and 1996. After eliminating firms with incomplete data and outliers, a balanced panel set of 5045 firm-year observations was achieved, covering observations of 1009 firms from 1992 to 1996. In terms of dependent variables, Deloof considered net operating income and gross profit income. The chosen independent variables were the number of days inventory, the number of days accounts receivable, the number of days accounts payable, and the cash conversion cycle. Control variables in the study included financial debt ratio, sales growth, firm size, and fixed asset ratio. By employing correlation and regression techniques, he found a significant negative correlation between gross operating income and several variables: the length of accounts receivable collection, average inventory days, and accounts payable of these Belgian firms. By reducing the number of days receivable and inventory, managers can drive an increase in the profitability of the company.

Garcia-Teruel and Martinez-Solano (2007) carried out comprehensive research on the impact of working capital management on the profitability of SMEs. The study utilizes data from the AMADEUS database. The study involved a sample of 38,464 small and medium-sized Spanish firms, spanning the years from 1996 to 2002. Return on assets was chosen as the dependent variable, while the number of days receivable, number of days inventory, cash conversion cycle, and number of days accounts payable were identified as independent variables. As for the control variables firm size, sales growth, debt ratio, and GDP growth rate were selected. By employing a panel data approach, they uncovered a substantial negative correlation between the profitability of SMEs and the number of

days receivable and inventory. However, the research did not find a significant relationship between the number of days accounts payable and the return on assets. Their findings indicate that by managing working capital efficiently, SMEs have the potential to generate value.

Shrivastava, N., Kumar, and P., Kumar (2017) conducted a Bayesian analysis of working capital management on corporate profitability of Indian firms. The research uses data from non-government and non-financial public limited companies, collected from their annual reports and balance sheets as provided by the Reserve Bank of India. The data covers the period from 2003 to 2012. The final data consisted of 1172 firms. The dependent variable in the study was selected as the gross operating profitability. The independent variables chosen were the leverage ratio cash conversion cycle, the ratio of current assets to total assets, the ratio of current liabilities to total assets, and the liquidity ratio. Finally, firm size has been used as a control variable. The application of both classical Bayesian techniques and panel analysis led to the discovery that an increased cash conversion period negatively influences the profitability of Indian firms. A suitable level of working capital is strongly evidenced across all measures.

Viswanathan, Palanisamy, and Mahesh (2016) examined the working capital status of selected Indian Pharmaceutical Companies. The research utilizes secondary data gathered from the Centre for Monitoring Indian Economy (CMIE) spanning the years 2003 to 2013. The study focuses on 10 listed pharmaceutical companies, with data selected based on a convenience sampling method. The results of the ratio analysis show that selected Indian pharmaceutical companies have good liquidity but poor solvency. Long conversion periods of working capital components affect profitability. To improve, they should control costs and reduce cash conversion cycles.

Enqvist, Graham, and Nikkinen (2013) conducted a study on the impact of working capital management on firm profitability during different business cycles in Finnish companies. The research uses firm-level data, including income statements and balance sheets, from all companies listed on the Nasdaq OMX Helsinki stock exchange from 1990 to 2008. The data was gathered from the Research Institute of the Finnish Economy. The final sample consisted of 1136 observations. The study identified gross operating income

and return on assets as dependent variables. Cash conversion cycle, supplier turnover, inventory turnover, and number of days receivable were included as independent variables. The current ratio, sales, and debt ratio were demonstrated as control variables in the analysis. Through regression analysis, they discovered a negative correlation between the profitability and cash conversion cycle, suggesting that effective inventory management, reduced accounts receivable collection period, and shorter accounts payable cycles boost profitability. The research also uncovers that the relationship between working capital and profitability is significantly affected by economic conditions, with profitability generally suffering in low economic states. The impact of efficient working capital management on profitability increases during economic recessions.

Vishnani, and Shah (2007) examined the impact of working capital management on corporate performance. The data for the study was gathered from the CMIE database and it covers the period of 1994 to 2005. The sample consisted of 23 companies. Return on capital employed was included as the dependent variable. The study identified the raw materials inventory holding period, current ratio, finished goods inventory holding period, average collection period, average payment period, and net working capital as the independent variables. Upon conducting regression analysis, correlation analysis, and statistical tests, it was found that although there is no confirmed relationship between liquidity and profitability across the entire industry, the policies and practices of working capital management significantly influence a company's profit performance.

Akbas, Karaduman, Ozsozgun, and Durer (2010) conducted a study on the impact of working capital management on profitability. Data from the Istanbul Stock Exchange, collected between 2005 and 2008 and covering 140 companies, was used in the study. In the study, the dependent variable was identified as the return on assets. The number of days of accounts receivable, accounts payable, inventory, and the cash conversion cycle were included as independent variables in the study. Leverage, firm size, and GDP growth rate were demonstrated as control variables. The results of the study, conducted using a panel data approach, indicate that the duration of accounts receivable, the length of accounts payable, the inventory days, and the cash conversion cycle have a detrimental effect on a company's profitability.

Öner (2016) investigated how working capital management impacts the profitability of firms in Türkiye. The data was acquired from Borsa Istanbul and Public Disclosure Platform Blomberg. The data, ranging from 2005 to 2014, was structured in a balanced panel data model, including a final sample of 110 firms with a cumulative total of 1,100 observations. The research designated the operating profit margin as the dependent variable and selected the cash conversion cycle, the accounts receivable turnover, the accounts payable turnover, and the inventory turnover, as independent variables. Leverage, firm size, liquidity, and sales growth rate were used as control variables. The conclusions of the research, executed using a panel data method, indicate a marked negative relationship between operating profitability and both the accounts receivable turnover and the inventory turnover. Conversely, a longer period for firms to pay their bills is incorporated with increased profitability. Moreover, the study identified a negative relationship between the cash conversion cycle and operating profitability.

Sharma and Kumar (2010) explored how working capital management affects the profitability of Indian firms. Data for the research was sourced from the BSE 500, a wide-ranging market index in the Indian capital market. After constructing a balanced panel data, the final sample consisted of 2367 firm-year observations, with data from 263 firms between 2000 and 2008. The return on assets was chosen as the dependent variable in the study. The independent variables included the accounts receivable turnover, the accounts payable turnover, the inventory turnover, and the cash conversion cycle. Control variables in the study included sales growth, firm size, leverage, and current ratio. Utilizing the panel data method, the research revealed a negative correlation between the accounts payable turnover, inventory turnover, and profitability. Conversely, a positive correlation was found between the accounts receivable turnover and profitability. Lastly, the outcomes showed a positive correlation between the profitability and cash conversion cycle.

Abuzayed (2012) explored how working capital management impacts the performance of Jordanian firms presented in the Amman Stock Market. The study, which spanned from 2000 to 2008. The sample is composed of 52 non-financial entities, resulting in 468 observations in total. Gross operating profits and Tobin’s Q were selected as dependent

variables. With respect to the independent variables, the accounts receivable turnover, accounts payable turnover, inventory turnover, and the cash conversion cycle were considered. Firm size, sales growth, leverage, fixed financial assets ratio, variability of net operating income, and GDP growth rate were demonstrated as control variables. The study found a positive relationship between the firm's profitability and cash conversion cycle.

Yazdanfar and Öhman (2014), carried out research to explore how the cash conversion cycle affects the profitability of Swedish SMEs. The study used panel data from 2008 to 2011, collected from Affärsdata, a Swedish commercial databank. The data included 13,797 SMEs from four different industries: metal, restaurant, retail, and wholesale. Profitability was selected as the dependent variable in the research. The independent variable was selected as the cash conversion cycle. Firm size and firm age were demonstrated as control variables. Utilizing a Seemingly Unrelated Regression (SUR) model, the study revealed that firms with protracted cash conversion cycle periods are less profitable. This is because increased levels of inventory and accounts receivable escalate the working capital and the costs of maintaining it. Furthermore, larger, and younger firms are more likely to be profitable with short cash conversion cycle periods.

Pais and Gama (2015) undertook a study to examine the effect of working capital management on the profitability of non-financial Portuguese SMEs. The study used panel data from the SABI database, covering the period from 2002 to 2009, and included a sample of 6063 SMEs. The study identified return on assets as the dependent variable. Control variables in the research were defined as accounts payable turnover, accounts receivable turnover, inventory turnover, and the cash conversion cycle. Firm size, sales growth, debt ratio, GDP growth rate, current assets ratio, and current liabilities ratio were demonstrated as control variables. The study found that the accounts receivable turnover, accounts payable turnover, inventory turnover, and cash conversion cycle variables are negatively correlated with profitability. In addition to that firm size, sales growth, GDP growth rate, and current assets ratio have a positive impact on profitability. The debt ratio is negatively correlated with profitability.

Gonçalves, Gaio, and Robles (2018) explored how working capital management influences profitability in UK firms during various economic cycles. Utilizing data from the Amadeus database, the research was carried out over the span of 2006 to 2014. The study's final sample included 400 firms, resulting in a comprehensive total of 29,380 firm-year observations. Return on assets was selected as the dependent variable. As for the independent variable, the cash conversion cycle was used in the study. In the study, control variables were defined as the debt ratio current ratio, and the rate of sales growth. The research identified a notable inverse correlation between the profitability and cash conversion cycle. Moreover, the research indicates that by managing their working capital in a more effective manner, firms can boost their profitability. This implies that efficient Working Capital Management (WCM) can lead to value creation for shareholders. This becomes particularly crucial during periods of economic decline.

Charitou, Elfani, and Lois (2016) conducted a study focusing on the impact of working capital management on the profitability of firms in Cyprus. The research utilized data from all industrial companies listed on the Cyprus Stock Exchange spanning the years 1998 to 2007, encompassing a total of 43 firms. As for the dependent variable, the return on assets was selected. The stockholding period, debtors' collection period, cash conversion cycle, and creditors' payment period were used as independent variables in the study. Sales amount, sales growth rate, and debt ratio were included in the model of the study as control variables. The research utilized multivariate regression analysis and discovered that the Cash Conversion Cycle negatively affects profitability. Furthermore, the stock holding period, collection period, and payment period are also negatively correlated with return on assets.

Alvarez, Sensini, and Vazquez (2021) conducted a study focusing on the relationship between working capital management and profitability in a developing economy. The study is based on the Argentine manufacturing SMEs. Data was gathered from SMEs over a three-year period (2016-2018) using a questionnaire. The questionnaire had two sections: one for general company information and another for balance sheet data. The data was normalized to account for inflation. Companies with incomplete data were excluded. In the end, 177 SMEs completed the questionnaire. The data gathered was

utilized to examine the correlation between determinants of working capital and profitability. The study employed a fixed effects model, and in analysis, the return on assets and the return on equity were selected as dependent variables. As for the independent variables they have tested inventory turnover, receivable turnover, supplier turnover, and cash conversion cycle. The current ratio, firm size, and leverage were selected as control variables. The study's findings indicate a positive correlation between profitability and factors such as inventory turnover, the number of days for receivable turnover, supplier turnover, and the cash conversion cycle.

Prempeh and Amankona (2018) studied the effects of working capital management on the profitability of Ghanaian firms. The research data consisted of manufacturing firms listed on the Ghana Stock Exchange from 2011 to 2017. The firms were selected based on their profitability, revenue generation, and the availability of data. This resulted in a balanced panel of 11 firms for the study. As for the dependent variable they have selected return on assets which represents profitability. As for the independent variable, they have used a cash conversion cycle. Firm size, firm leverage, and current ratio were used as control variables in their panel data analysis. The outcomes of the study suggest a positive correlation between the management of working capital and the profitability of a business. The cash conversion cycle positively affects profitability, and similarly, the size of the firm and its leverage also have a positive impact on the profitability of the firm.

Shuaibu, Muhammad, and Isah (2019) conducted a study to investigate the correlation between the cash conversion cycle and the profitability of cement manufacturing firms in Nigeria. The data was sourced from annual reports and the Nigerian Stock Exchange fact book from 2008 to 2017. The study used data from three firms. Dangote Cement Company Plc, Ashaka Cement Plc, and Lafarge (WAPCO) Cement Company Plc were the firms examined in the study. They were all listed on the Nigerian Stock Exchange as of December 31, 2017. The research used a census approach. As for the dependent variables they have used return on assets and return on equity. As for the independent variables they have tested the cash conversion cycle. The study incorporated leverage and firm size as control variables. It was found that the cash conversion cycle has an inverse impact on return on equity and a direct impact on return on assets. Leverage and firm size

show an insignificant relationship with the cash conversion cycle, both inversely and directly, respectively.

Bigger, Gill, and Matur (2010) studied the relationship between working capital management and the profitability of American firms. The data was created from 300 financial reports of publicly traded companies from 2005 to 2007, sourced from Mergent Online. 88 of these reports were usable. In total, they gathered 264 total observations from panel cross-sectional yearly data. In their research, gross operating profit was chosen as the dependent variable. The independent variables in their research were identified as the accounts receivable turnover, inventory turnover, accounts payable turnover, and the cash conversion cycle. Firm size, financial debt ratio, and fixed financial asset ratio were selected as control variables. The outcomes of the study suggest a negative link between the accounts receivable turnover and the profitability of businesses. There was no significant association found in the study between the average days of accounts payable turnover and profitability, or between the inventory turnover and profitability. Additionally, the study discovered a positive correlation between the cash conversion cycle and profit. However, it found no significant association between the size of the firm and its profit.

Vural, Sökmen, and Çetenak (2012), conducted a study examining the impact of working capital on the performance of firms in Türkiye. Data from the financial reports of 75 manufacturing businesses listed on the Istanbul Stock Exchange between 2002 and 2009 were employed in the research, resulting in a total of 600 observations. The study employs dynamic panel data analysis. As for the dependent variables they have selected the firm value and gross profit income. The collection period of account receivables, the duration of accounts payable, the span of inventory days, the operating cycle, and the cash conversion cycle were identified as independent variables in the study. Firm size and leverage were used as control variables. The study reveals that both the collection period of account receivables and the cash conversion cycle have a negative impact on profitability. The relationship between other components of working capital management and profitability is insignificant. The study also finds a negative correlation between leverage and profitability, but a positive relationship between firm size and profitability.

The outcomes for firm value were not significant, except for the leverage and cash conversion cycle. The regression analysis revealed a positive association between the cash conversion cycle and firm value and a negative association between leverage and firm value.

Serrasqueiro (2014) conducted research focusing on how the management of working capital influenced the profit margins of companies based in Portugal. The study collected data from the Bloomberg database for all Portuguese firms, including public, private, unlisted, and listed firms. The sample of the study consisted of 3360 Portuguese firms for the period 2002-2006. For the empirical study, panel data methodology was employed. The dependent variable in the study was represented by the return on assets. The independent variables included the number of days of inventory, the accounts receivable turnover, the accounts payable turnover, and the cash conversion cycle. Leverage, GDP growth rate, sales growth rate, and financial assets ratio were selected as control variables. The results of the research show that the accounts receivable turnover and the number of days of inventory have a negative effect on ROA. The number of days payable has a positive impact on ROA. However, the study found that the cash conversion cycle was not significant in the model.

DATA

The dataset for this study, sourced from EMIS, encompasses the financial data of companies operating in various sectors in Türkiye. This data spans the period from 2017 to 2021. Following its acquisition, the data was restructured into a panel data format, which is suitable for yearly observations. Companies (the cross-section dimension) from the manufacturing, agriculture, transport, and warehousing sectors have been included in the sample, totaling 914 companies in the manufacturing sector, 18 companies in the agriculture sector, and 22 companies in the transport and warehouse sector. As it was pointed out by Deloof (2003), Garcia-Teruel, and Solano (2006), during the restructuring process, extreme values, and anomalies, such as negative days in inventory, negative values in fixed assets, and extreme days receivable values, were identified, and eliminated from the dataset. After the application of these filters, a total of 4570 observations in the manufacturing sector, 90 observations in the agriculture sector, and 110 observations in the transport and warehouse sector were obtained. The detailed number of companies from each sector can be seen in Table 3.1.

Table 3.1. Number of Companies Sector by Sector

	Number of Companies	**Observations**
Manufacturing	914	4570
Agriculture	18	90
Transport and Warehouse	22	110

To assess how the economic cycle affects investment levels in working capital, GDP growth rate data from the World Bank was analyzed.

3.1. Description of Sample of Manufacturing Sector

Table 3.2. shows the descriptive statistics of the manufacturing sector sample. The table shows that firms in the sample are generating a return of 8.26% on their assets. When we look at the receivable turnover, the mean value is 87.15, suggesting that on average, it

takes firms 87.15 days to collect their receivables. The inventory turnover shows that the firms in the manufacturing sector sample turn over their inventory in an average of 68.73 days. When we change our focus supplier turnover, on average, firms pay their suppliers in 68.01 days. The mean value of the cash conversion cycle indicates that on average, it takes firms 87.87 days to convert their investments in inventory and other resources into cash flows from sales. The mean value of the GDP growth rate indicates that on average growth rate was %4 in Türkiye between 2017 and 2021. The mean value of the debt ratio suggests that the debt ratio for firms in the sample is 59.15%. Finally, the average sales growth of the firms in the sample is 38.53%.

Table 3.2. Descriptive Statistics of the Manufacturing Sector

	ROA	REC	INV	AP	CCC	ASSET	GDPGR	DEBT	SGROWTH
Mean	0.0826	87.1580	68.7322	68.0153	87.8749	77222.0400	0.0474	0.5915	0.3853
Median	0.0568	85.4638	64.1445	62.2983	84.8845	12234.1400	0.0297	0.6181	0.3256
Std. Dev.	0.1003	39.7900	41.7946	40.4466	63.4845	415170.7000	0.0375	0.2289	0.3633
Obs.	4570	4570	4570	4570	4570	4570	4570	4570	4570

Table 3.3. displays the correlation matrix for the variables. It indicates that the return on assets is negatively correlated with the receivable turnover, the inventory turnover, and supplier turnover. However, it has a slight positive correlation with the cash conversion cycle.

Table 3.3. Correlation Matrix of the Manufacturing Sector Data

	ROA	REC	INV	AP	CCC	GDPGR	DEBT	SGROWTH	SIZE
ROA	1								
REC	-0.0529	1							
INV	-0.0544	0.0709	1						
AP	-0.1456	0.2147	0.1421	1					
CCC	0.0238	0.5366	0.6123	-0.4090	1				
GDPGR	0.0230	0.0469	0.1788	0.1045	0.0805	1			
DEBT	-0.6007	0.0397	0.0014	0.3074	-0.1700	0.0130	1		
SGROWTH	0.1214	-0.0182	-0.0210	0.0426	-0.0524	0.4722	0.0889	1	
SIZE	0.0167	0.0125	0.2025	-0.0129	0.1493	0.0055	-0.0493	-0.0399	1

3.2. Description of Sample Agriculture Sector

As per the descriptive statistics presented in Table 3.4., the sample of firms in the agriculture sector demonstrates certain financial and operational patterns. These firms, on average, generate a return of 5.4% on their assets. The average collection period for receivables is approximately 58.98 days. The firms cycle through their inventory every 65.81 days on average, and they typically settle their payables to suppliers in about 58.87 days. The cash conversion cycle, which measures the time it takes for firms to convert their resource investments into cash flows from sales, averages 65.92 days. The average GDP growth rate in Türkiye, where these firms operate, was 4% between 2017 and 2021. The firms have an average debt ratio of 64.99%, indicating the proportion of their assets financed by debt. Lastly, the firms have experienced an average sales growth rate of 41.25%.

Table 3.4. Descriptive Statistics of the Agriculture Sector

	ROA	REC	INV	AP	CCC	ASSET	GDPGR	DEBT	SGROWTH
Mean	0.0540	58.9862	65.8138	58.8736	65.9264	89170.3500	0.0474	0.6499	0.4125
Median	0.0361	54.5573	62.3979	56.9505	62.6760	12045.7500	0.0297	0.6854	0.3292
Std. Dev.	0.0744	34.7261	40.0162	38.8015	60.4573	200196.2000	0.0377	0.2369	0.3705
Obs.	90	90	90	90	90	90	90	90	90

Table 3.5. provides a correlation matrix that illustrates the relationships between various variables. The return on assets shows a negative correlation with both the number of days for inventory turnover and supplier turnover. On the other hand, the ROA exhibits a positive correlation with the receivable turnover and the cash conversion cycle.

Table 3.5. Correlation Matrix of the Agriculture Sector Data

	ROA	REC	INV	AP	CCC	SGROWTH	DEBT	GDPGR	SIZE
ROA	1								
REC	0.2935	1							
INV	-0.0261	0.1741	1						
AP	-0.2978	-0.0067	0.3735	1					
CCC	0.3425	0.6940	0.5222	-0.3985	1				
SGROWTH	0.0792	0.1230	-0.1584	-0.0318	-0.0138	1			
DEBT	-0.6903	-0.1733	0.0788	0.2549	-0.2110	0.2027	1		
GDPGR	0.1268	-0.0195	0.1424	0.0297	0.0641	0.1358	-0.0603	1	
SIZE	-0.0553	0.1154	0.2561	0.1133	0.1630	-0.2784	-0.1547	-0.0162	1

3.3. Description of Sample Transport and Warehouse Sector

Table 3.6. provides a comprehensive overview of the financial and operational characteristics of firms in the transport and warehouse sector. On average, these firms can generate a 4.5% return on their assets. They averagely take around 61.95 days to collect their receivables. The average inventory turnover period for these firms is approximately 17.93 days, and they generally pay their suppliers within 60.96 days. The cash conversion cycle, which is the duration required for firms to turn their resource investments into cash flows from sales, averages 18.92 days. These firms operate in Türkiye, where the average GDP growth rate was 4% between 2017 and 2021. The average debt ratio of these firms is 69.95%, signifying the percentage of their assets that are financed by debt. Finally, these firms have seen an average sales growth rate of 32.74%.

Table 3.6. Descriptive Statistics of the Transport and Warehouse Sector

	ROA	REC	INV	AP	CCC	ASSET	GDPGR	DEBT	SGROWTH
Mean	0.0456	61.9543	17.9305	60.9643	18.9205	1372138	0.0474	0.6995	0.3274
Median	0.0124	52.8521	7.8049	51.3482	11.5825	65755.3	0.0297	0.7359	0.2425
Std. Dev.	0.1019	40.9004	25.2806	41.9935	55.5533	1372138	0.0474	0.6995	0.3274
Obs.	110	110	110	110	110	110	110	110	110

Table 3.7. presents a correlation matrix that exhibits the interrelationships among the variables. The return on assets demonstrates a negative correlation with the number of days required for inventory turnover and supplier turnover. Conversely, the ROA displays a positive correlation with the receivable turnover and the duration of the cash conversion cycle.

Table 3.7. Correlation Matrix of the Transport and Warehouse Sector Data

	ROA	REC	INV	AP	CCC	DEBT	SGROWTH	GDPGR	SIZE
ROA	1								
REC	0.1472	1							
INV	-0.1480	0.0764	1						
AP	-0.2478	0.3832	-0.0796	1					
CCC	0.2284	0.4814	0.5715	-0.5100	1				
DEBT	-0.7437	0.0600	0.1663	0.3205	-0.1224	1			
SGROWTH	0.0374	0.0108	-0.0227	0.0406	-0.0331	0.1255	1		
GDPGR	-0.0220	-0.0003	0.1037	-0.0065	0.0519	-0.0462	0.3563	1	
SIZE	-0.1465	-0.2600	0.1084	-0.0151	-0.1307	0.0673	-0.0263	-0.0150	1

VARIABLES

The construction of the model and the selection of variables employed in this study are all based on research conducted by Solano and Garcia-Teruel (2006). This foundation provides a robust and tested framework for our analysis.

4.1. Dependent Variables

In the process of assessing a company's profitability (the dependent variable), various methodologies have been employed in previous research. Shin and Soenen (1998) defined profitability as the sum of operating income and depreciation. Deloof (2003) utilized two distinct measures of profitability: net operating income and gross operating income. For this study, the dependent variable has been chosen in line with Solano and Garcia-Teruel (2006), which is the return on assets. It is calculated using the following formula [net profit/total asset].

4.2. Independent Variables

The independent variables in this research, which are used to calculate working capital management, incorporate the following, the receivable turnover (REC) represents the average collection period. To decrease the amount of accounts receivable, a firm might implement stringent collections procedures and restrict the amount of sales credit extended to its customers which could lead to an increase in cash inflow, thereby enhancing the firm's liquidity and financial stability (Ganesan, 2007). This strategy is crucial for maintaining a healthy cash flow and ensuring the firm's financial sustainability. Receivable turnover is calculated as accounts receivable multiplied by 360 then divided by total sales.

H1. An increase in the receivable turnover is expected to negatively impact on the return on assets.

Inventory turnover is often used as a representation of inventory management. Holding high levels of inventory can lead to significant costs, such as opportunity costs, warehouse leasing expenses, and insurance charges (Kroes, Manikas, 2014). These costs can potentially diminish the profitability of a firm. Therefore, effective inventory management is crucial for maintaining optimal profitability. Inventory turnover (INV) is calculated as total inventory multiplied by 360 then divided by sales cost.

H2. An increase in the inventory turnover is expected to negatively impact the return on assets.

Supplier turnover represents the management of trade creditors. Broadly speaking, an increase in DPO (days payable outstanding) indicates that the company is effectively utilizing its supplier financing, thereby retaining cash for extended periods (López, Pazos, Ares, 2020). This strategy allows the company to optimize its cash flow and financial management. Supplier turnover (AP) is calculated as accounts payable multiplied by 360 then divided by sales cost.

H3. An increase in supplier turnover is expected to positively impact on the return on assets.

Subsequently, these three variables are combined to compute the Cash Conversion Cycle which is calculated as follows receivable turnover plus inventory turnover minus supplier turnover. This indicator offers a thorough evaluation of a company's effectiveness in handling its working capital. It represents the time a business needs to sell its inventory, gather receivables from customers, and settle its supplier invoices (Pham, C., Nguyen, Q., Nguyen, 2020). A shorter cycle is generally more desirable as it indicates more efficient management of working capital.

H4. A longer cash conversion cycle is expected to affect the return on assets negatively.

These variables provide a comprehensive view of the company's working capital management practices.

4.3. Control Variables

Several control variables were incorporated into the model, firm size and sales growth are viewed as significant performance indicators for a firm, and they are often positively related to profitability. It can be inferred that a higher rate of sales growth could lead to increased profitability. Similarly, a larger company size could also result in greater profitability. These factors underline the importance of strategic growth and expansion in enhancing a firm's financial performance (Sharma, Kumar, 2010). The sales growth is calculated as current period sales minus previous period sales multiplied by 100 then divided by previous period sales.

H5. Firm size is expected to have a positive impact on the return on assets.

H6. The sales growth is expected to have a positive impact on the return on assets.

The debt ratio serves as a financial indicator that sheds light on a company's degree of leverage, specifically, the reliance on borrowed funds for its business activities. This ratio is a crucial measure that offers a perspective on a company's leverage strategy (Pais, Gama, 2015). The debt ratio is calculated as the ratio of the company's debt to its total liabilities.

H7. The debt ratio is expected to lead to a decrease in the return on assets.

Lastly, the economic conditions are represented by the GDP growth rate.

H8. GDP growth rate is expected to have a positive impact on the return on assets.

These control variables provide additional context and allow for a more comprehensive analysis of the effects of working capital on a firm's profitability. They account for factors such as the firm's size, its growth trajectory, its debt burden, and the broader economic conditions.

METHODOLOGY

The effect of working capital on firms' profitability has been tested with panel data methodology with equations that were demonstrated in the research of Garcia-Teruel and Solano (2006).

$$ROA_{it}=\beta_0+\beta_1 REC_{it}+\beta_2 SIZE_{it}+\beta_3 SGROWTH_{it}+\beta_4 DEBT_{it}+\beta_5 GDPGR_{it}+n_i+\lambda_t+\varepsilon_{iy} \quad (5.1)$$

$$ROA_{it}=\beta_0+\beta_1 INV_{it}+\beta_2 SIZE_{it}+\beta_3 SGROWTH_{it}+\beta_4 DEBT_{it}+\beta_5 GDPGR_{it}+n_i+\lambda_t+\varepsilon_{iy} \quad (5.2)$$

$$ROA_{it}=\beta_0+\beta_1 AP_{it}+\beta_2 SIZE_{it}+\beta_3 SGROWTH_{it}+\beta_4 DEBT_{it}+\beta_5 GDPGR_{it}+n_i+\lambda_t+\varepsilon_{iy} \quad (5.3)$$

$$ROA_{it}=\beta_0+\beta_1 CCC_{it}+\beta_2 SIZE_{it}+\beta_3 SGROWTH_{it}+\beta_4 DEBT_{it}+\beta_5 GDPGR_{it}+n_i+\lambda_t+\varepsilon_{iy} \quad (5.4)$$

In the equations, ROA represents the return on assets, REC is the receivable turnover, INV is inventory turnover, and AP represents the supplier's turnover. In addition to that CCC represents the cash conversion cycle, DEBT is the debt ratio, SGROWTH shows sales growth, SIZE is the natural logarithms of assets and GDPGR shows GDP growth rate.

Lastly, η_i represents the unobservable heterogeneity, which captures the unique characteristics of each firm that aren't directly measured in the model. These could include factors such as management quality, company culture, or proprietary technology. The parameters λ_t are time dummy variables. These variables change over time, reflecting the different periods considered in the analysis. However, they are equal for all firms within each specific period. This means they capture effects that impact all firms equally in each period, such as macroeconomic conditions or industry-wide trends (Garcia-Teruel, Solano, 2006).

MANUFACTURING SECTOR ANALYSIS

6.1. Univariate Analysis

The initial step involved carrying out a univariate analysis to determine if there were notable differences in the variables being studied between the most profitable and least profitable companies. Table 6.1. displays the mean values of the variables under investigation for each quartile of return on assets. The quartiles were established on an annual basis, leading to an overlap in the range of ROA variation among the quartiles. Subsequently, a parametric test for mean differences, based on Student's t-test, was performed to verify if the mean values of the fourth quartile were significantly different from those of the first (Garcia-Teruel, Solano, 2006).

The findings indicate that the mean values of variables ROA, REC, INV, AP, SGROWTH, and DEBT are different between the most profitable firms (fourth quartile) and the least profitable firms (first quartile).

The companies that find themselves in the first quartile, which is the group of the least profitable firms, return on assets (ROA) shows a mean value of -1%. Therefore, these firms are generating negative returns from their assets. In the meantime, the companies that find themselves in the fourth quartile, which is the group of the most profitable firms, demonstrate an average return on assets of 22%.

When days receivable (REC) is examined, the least profitable firms demonstrate an average of 88.71 days collection period. On the contrary, when the most profitable firms are examined, they have an average of 82.92 days in days receivable. The results show that the most profitable firms have a more efficient receivable management process that causes them to collect their dues faster than the least profitable firms.

The variable of inventory turnover (INV) shows an average of 76.69 days for the companies in the first quartile. When the companies in the fourth quartile are examined they have an average of 67.38 days. The results show that the firms in the fourth quartile can convert their inventory to sales faster than the firms in the first quartile.

For the variable of supplier turnover (AP), the results are different than our expectations. The companies in the first quartile have an average of 75.91 days while the ones in the fourth quartile have an average of 60.11 days. This suggests that the least profitable firms are making their payments over longer periods than the most profitable firms (Serrasqueiro, 2014; Alvarez, Sensini, Vazquez, 2021).

When the sales growth (SGROWTH) variable is analyzed, it shows that the companies in the first quartile have an average of 33% growth in their sales. Therefore, firms in the first quartile can increase their sales by a third from one period to the next. The companies in the fourth quartile have an average of 44% growth in their sales numbers. The result shows that the most profitable firms in the manufacturing sector can increase their sales by nearly half from one period to the next.

Lastly, when the variable of debt ratio (DEBT) is examined, we can see that the companies in the first quartile have an average of %75 debt ratio which means that these firms, on average, finance most of their assets through debt. However, the companies in the fourth quartile have an average of 39% debt ratio. Therefore, the most profitable companies have a significantly lower average debt ratio than the least profitable firms in the manufacturing sector.

In terms of the variables representing firm size (SIZE) and the cash conversion cycle (CCC), it is important to note that we are unable to draw any meaningful interpretations. This is because the results of the t-tests for these variables are statistically insignificant. The specific values for these tests are provided in parentheses beneath the t column.

When comparing the return on assets and the independent variables, we can't rely solely on analyzing quartiles. The mean figures of these factors do not consistently adhere to a uniform trend across quartiles. Consequently, the univariate analysis falls short of comprehending the correlation between working capital and profitability as it was pointed out by Garcia-Teruel and Solano (2006).

Table 6.1. Mean Values by ROA Quartiles of the Manufacturing Sector

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	t
ROA range	**-0.4 to 0.02**	**0.02 to 0.06**	**0.06 to 0.13**	**0.13 to 0.6**	
ROA	-0.0151	0.0355	0.0895	0.2204	-117.8790
	(0.0046)	(0.0348)	(0.0874)	(0.1998)	(0.00)
REC	88.7103	88.3710	88.6195	82.9284	3.488977
	(87.3287)	(85.8754)	(87.5296)	(81.4765)	(0.00)
INV	76.6967	66.9667	63.8901	67.3834	5.159006
	(71.5762)	(61.2636)	(59.0326)	(63.3784)	(0.00)
AP	75.9152	70.9823	65.0501	60.1184	9.307952
	(71.6152)	(65.3775)	(59.6114)	(54.2292)	(0.00)
CCC	89.4918	84.3553	87.4595	90.1935	-0.25295
	(85.4199)	(81.3881)	(84.8446)	(86.8836)	(0.40)
SGROWTH	0.3306	0.3776	0.3885	0.4442	-7.3944
	(0.2744)	(0.3144)	(0.3358)	(0.3727)	(0.00)
SIZE	9.4910	9.3261	9.6955	9.5682	-1.2102
	(9.3827)	(9.1789)	(9.5388)	(9.5512)	(0.11)
DEBT	0.7508	0.6733	0.5514	0.3905	46.4931
	(0.7769)	(0.7119)	(0.5746)	(0.3789)	(0.00)

(*Median values are presented in the parentheses*)

6.2. Multivariate Analysis

In the multivariate analysis of this study, the unit root test was not applied to the variables. The primary reason for this was the time elements did not span a substantial period. Additionally, the extensive data coverage provided by the cross-sectional aspect provided additional justification for this methodology (e.g. Gonçalves, Gaio, Robles, 2018; Garcia-Teruel, Martinez-Solano, 2007; Prempeh, Amankona, 2018).

In the analysis, it has been assessed whether to use pooled ordinary least squares (OLS) regression or fixed effects (FEM) and random effects (REM) regressions. To determine

this decision, it has been conducted Lagrange multiplier tests on the regression models, and the results are summarized in Table 6.2. As a result, the p-value from the Breusch-Pagan Test for cross-section and time elements is less than 0.05. This led us to reject the null hypothesis, indicating the presence of significant effects. Furthermore, pooled OLS was found unstable, which underscored the necessity to consider either FEM or REM for our regression analyses.

Table 6.2. Lagrange Multiplier Tests for Random Effects of the Manufacturing Sector

	Cross Section	Test Hypothesis Time	Both
REC	2158.384	230.0899	2388.474
	0.00	0.00	0.00
INV	2163.894	222.7313	2386.625
	0.00	0.00	0.00
AP	2156.166	190.6464	2346.812
	0.00	0.00	0.00
CCC	2161.392	228.0949	2389.487
	0.00	0.00	0.00

(*H0: No effects*)

We evaluated the appropriateness of using fixed effects models or random effects models for our regressions. Therefore, it has been applied the correlated random effects – Hausman test to decide the appropriate model. The results revealed that probabilities were less than 0.05 for the regressions AP, and CCC favoring fixed effects models. For regressions REC, and INV where the probability exceeded 0.05, both random effects and fixed effects models were appropriate. As a result, it has been decided that the fixed effect model is consistent across regressions have AP, and CCC as independent variables. In the case of the variables REC, and INV, it has been utilized both fixed effects and random effects models since the probability exceeds 0.05. The results of the correlated random effects – Hausman test are presented in Table 6.3.

Table 6.3. Correlated Random Effects - Hausman Test for the Manufacturing Sector Data

	Chi-Sq. Statistic	Chi-Sq D.F.	Prob.
REC	9.147	5	0.2348
INV	7.263	5	0.1856
AP	41.470315	5	0.00
CCC	63.349509	5	0.00

In Table 6.4., we present the results of the regression analysis. When the results are examined, for the first regression where the fixed effect model is applied, the independent variable REC is statistically significant. As per the expectation, the receivable turnover has a negative impact on the return on assets. Increasing 1 day in the receivable turnover in decreasing return on assets by 0.0114%. The coefficient of the independent variable SIZE is found statistically significant in the fixed effects model. The size of the firm positively affects the return on assets. Increasing the firm size by 1% would increase the return on assets by 2%. When the independent variable SGROWTH is examined, it is statistically significant. The result is consistent with our expectations and therefore It suggests that as SGROWTH increases, so does the return on assets, implying a positive relation between these two variables. Increasing the sales growth by 1% is leading to an increase in return on assets of 4%. When the independent variable DEBT is examined, it can be observable that it is statistically significant. It is affecting the return on assets negatively and this suggests an inverse relationship between these two variables. Increasing the debt level by 1% is causing a decrease in return on assets of 30%. Lastly, when the independent variable GPDGR is examined, it is found that it is statistically significant. This is contrary to our initial expectations, suggesting that the relationship between these two variables is more complex than initially assumed. Specifically, it implies an inverse relation between GDP growth rate and the return on assets. A 1% increase in GDP growth rate is leading to a decrease in return on assets by 12%.

When the random effects model of the independent variable REC is examined, the statistical significance previously observed for the independent variables REC and SIZE are no longer significant in this model. SGROWTH is still statistically significant and the

effect of it is positive which is similar result with the fixed effects model. Specifically, an increase in sales growth of 1% results in a corresponding increase in the return on assets of 5%. As for the independent variable DEBT, it is statistically significant. The negative effect of DEBT on the return on assets remains consistent with the fixed effects model. An increase in the debt level of 1% leads to a decrease in the return on assets of 28%. Finally, the independent variable GDPGR is statistically significant in the random effect model. The effect of GDPGR on the return on assets is negative, consistent with the findings from the fixed effects model. A 1% increase in GDP growth rate would decrease the return on assets by %14.

As for the other important independent variable INV, in the third regression, the results of the fixed effect model are presented. According to the results, the independent variable INV is statistically significant. INV exhibits a negative correlation with the return on assets (ROA). Increasing the inventory turnover by 1 day decreases the return on assets by 0.0158%. The coefficient of the independent variable SIZE is statistically significant. It can be observed that there is a positive relation between the SIZE and ROA. Increasing the firm size by 1% leads to an increase in the return on assets of %2. When SGROWTH is examined, it shows statistical significance. The sign of its coefficient suggests that it has an inverse relation with ROA. An increase in sales growth rate of 1% leads to an increase in the return on assets of 4%. When we change our focus to the independent variable DEBT, it is statistically significant, and its relation is like previous regression results. DEBT has a negative impact on ROA. Increasing the debt level by 1% decreases the return on assets by 30%. Finally, for GDPGR, it is statistically significant. For the third regression, where we have the INV as a component of working capital, the effect of GDPGR is like the previous regression results. It is negatively affecting the ROA. Specifically, increasing the GPD growth rate by 1% is causing a decrease in the return on assets by 9%.

In the fourth regression, it has been applied random effects model for the independent variable INV. According to the results, the independent variable INV is statistically significant. Even in the random effects model the impact of INV is negative which is like the fixed effects model results. Increasing 1-day inventory turnover is leading to a

decrease in the return on assets of 0.0112%. As for the independent variable SIZE, in the random effects model, it lost its statistical significance. When we change our focus to SGROWTH, it is statistically significant in the random effects model as well. The relation is like the fixed effect model result. Increasing the sales growth rate by 1% would increase the return on assets by 4%. When the independent variable DEBT is examined, it preserves its statistical significance in the random effects model as well. The relation of its with ROA is negative. Increasing the debt level by 1% is causing a decrease in the return on assets of 31%. Lastly, GDPGR is statistically significant in the random effects model. Like the fixed effects model, it exerts a negative influence on ROA. Increasing the GDP growth rate by 1% would decrease the return on assets by 11%.

In the fifth regression, it has been demonstrated the independent variable AP, which is another component of working capital. According to the fixed effect model results, the independent variable AP is statistically significant. As the supplier turnover increases, so does the ROA. Specifically, increasing supplier turnover by 1 day increases the return on assets by 0.00939%. When the independent variable SIZE is examined, it is statistically significant in the fifth regression. The impact of SIZE shows similarities with the previous findings. It has a positive impact on ROA. Increasing the firm size by 1% is causing an increase in the return on assets of 1%. Like SIZE, SGROWTH has been observed as statistically significant. Its relation is also positive with ROA. Increasing the sales growth rate by 1% leads to an increase in the return on assets of 4%. As for the independent variables DEBT and GDPGR, both variables are found to be statistically significant. Their relationship with the ROA is negative, leading to a decrease in the ROA. Specifically, a 1% increase in the debt level and GDP growth rate leads to a decrease in the ROA by 31% and 14% respectively.

In the sixth regression, CCC has been included in the regression. According to the results of the fixed effects model, the independent variable CCC is statistically significant. The independent variable CCC is impacting ROA negatively. A 1 day increase in the cash conversion cycle causes a 0.019% decrease in the return on assets. When SIZE is examined, it is statistically significant. It is positively related to ROA. Increasing the firm size by 1% increases the return on assets by 2%. The independent variable SGROWTH

is statistically significant where it shows similar effects with SIZE. It is affecting ROA positively. Increasing the sales growth rate by 1% leads to an increase in the return on assets of 4%. Lastly, as for the independent variables DEBT and GDPGR, both are statistically significant like in the previous regressions. Their impact on the dependent variable ROA is observed as negative. When DEBT and GDPGR increase ROA decreases. The values of the coefficients suggest that increasing the debt level and GDP growth rate by 1% is causing a decrease in return on assets by %31 and 8% respectively.

Table 6.4. Regression Results of the Manufacturing Sector

	1	2	3	4	5	6
REC	-0.000114***	-0.0000515				
	(-2.639168)	(-1.535379)				
INV			-0.000158***	-0.000112***		
			(-4.555572)	(-3.737966)		
AP					0.0000939***	
					(2.238756)	
CCC						-0.00019***
						(-6.874515)
SIZE	0.024946***	0.00128	0.025885***	0.00191	0.019851***	0.027957***
	(6.084105)	(1.077146)	(6.441611)	(1.58896)	(4.933359)	(6.9809)
SGROW	0.045733***	0.050407***	0.044484***	0.049183***	0.047609***	0.042067***
	(15.30909)	(17.64417)	(14.88697)	(17.13557)	(16.21717)	(13.97073)
DEBT	-0.301338***	-0.28152***	-0.3041***	-0.281934***	-0.311365***	-0.312162***
	(-30.80339)	(-41.70117)	(-31.39717)	(-41.97116)	(-30.63909)	(-32.14101)
GDPGR	-0.123873***	-0.144402***	-0.092421***	-0.119243***	-0.146722***	-0.086683***
	(-4.765246)	(-5.633099)	(-3.389866)	(-4.478046)	(-5.620101)	(-3.277338)
C	0.02154	0.228864***	0.014132	0.225566***	0.060029	0.005714
	(0.563165)	(18.50801)	(0.373616)	(18.4401)	(1.575441)	(0.152179)
Hausman Test Result	0.2348	0.2348	0.1856	0.1856	0.00	0.00
FEM/REM	**FEM**	**REM**	**FEM**	**REM**	**FEM**	**FEM**

(**Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent. T statistics in parentheses*)

To address the potential endogeneity issue highlighted by Deloof (2003) and Garcia-Teruel and Solano (2006), we have introduced the first lags of the variables REC, INV, AP, and CCC. The outcomes are presented in Table 6.5.

When the table is examined, it can be observed that the independent variable REC is statistically significant after taking the first difference in both fixed effects and random effects models. In both the fixed effects and random effects models, REC exhibits an inverse relationship with the return on assets (ROA). This suggests that as the receivable turnover (represented by REC) increases, the ROA decreases. To provide a more concrete

understanding of this relationship, an increase in the receivable turnover by a single day resulted in a decrease in the ROA by 0.0237% in the fixed effects model and by 0.0188% in the random effects model.

After taking the first difference, the independent variable INV is statistically significant in both fixed effects and random effects models. The relationship of the independent variable INV remains consistent when taking the first difference for both the fixed effects and random effects models. It has been observed that INV has a negative impact on the dependent variable ROA in both the fixed effects and random effects models. The negative relationship between INV and ROA suggests that as inventory turnover increases, the ROA decreases. Specifically, increasing inventory turnover by 1 day results in a decrease in the ROA by 0.0301% in the fixed effects model and by 0.0262% in the random effects model.

It has been observed that an interesting shift in the behavior of the independent variable AP, which represents supplier turnover, after taking its first difference Initially, AP exhibited a positive correlation with ROA. This suggested that as AP increased, the ROA also increased, indicating a direct relationship between these two variables. However, after taking the first difference, the impact of AP on the ROA has reversed. Despite this change, AP maintains its statistical significance. The results now indicate that AP has a negative impact on the ROA. Specifically, an increase in supplier turnover of 1 day resulted in a decrease in the ROA of 0.0102%.

When we focus on the independent variable CCC, after taking its first difference, CCC maintains its statistical significance. The impact of CCC on the ROA remains consistent with our previous results. Specifically, CCC exhibits a negative correlation with the ROA. This suggests that as the CCC increases, the ROA decreases. Our findings reveal that an increase in the cash conversion cycle by 1 day resulted in a decrease in the return on assets of 0.0228%.

When the independent variable SIZE is examined, remains consistent in regressions 1, 3, 4, 5, and 6. This suggests that as SIZE increases, ROA also increases. However, it's worth noting that the statistical significance of SIZE does not hold for the second regression. Interestingly, in the fourth regression, SIZE was previously found to be statistically

insignificant. However, upon further analysis, it is now observed to be statistically significant. To provide a clearer understanding of the relationship between SIZE and ROA, a 1% increase in the firm's size would increase the return on assets by 2.8%, 2.5%, 0.02%, 2.8%, and 2.7% respectively in regressions 1, 3, 4, 5, and 6.

Our findings reveal that the effect of SGROWTH remains consistent across all regressions. It is significant in all regressions. The results indicate that as SGROWTH increases ROA increases. Specifically, a rise of 1% in sales growth would correspondingly result in an enhancement in the return on assets of 4%, 5.21%, 5.25%, 5.56%, 4.68%, and 5.51% respectively.

The independent variable DEBT, the results show that it is still statistically significant in all regression models except the sixth regression. In addition to that, the effect of DEBT is still negative. That indicates that as DEBT increases ROA decreases. A 1% increase in debt level would decrease the dependent variable return on assets by 32.02%, 29.41%, 31.93%, 29.35%, and 32.15% respectively.

Finally, when we examine the independent variable GDPGR, it remains statistically significant. After taking the first differences between REC, INV, AP, and CCC the impact of GDPGR remains negative. Therefore, when GDPGR increases ROA decreases. Based on the coefficients, a 1% increase in GDP growth rate results in a decrease in the return on assets by 12.94%, 15.03%, 15.73%, 17.08%, 13.17%, and 15.1% respectively.

Table 6.5. Regression Results After Deriving the First Lag of REC, INV, AP and CCC of the Manufacturing Sector

	1	2	3	4	5	6
REC	-0.000237***	-0.000188***				
	(-4.780098)	(-4.967635)				
INV			-0.000301***	-0.000262***		
			(-6.698419)	(-7.235564)		
AP					-0.000102**	
					(-2.093389)	
CCC						-0.000228***
						(-6.803498)
SIZE	0.02859***	0.001311	0.025196***	0.002464*	0.028219***	0.027191***
	(5.769602)	(1.048611)	(5.074818)	(1.958556)	(5.66649)	(5.504405)
SGROW	0.047767***	0.052139***	0.052587***	0.055676***	0.046807***	0.051067***
	(14.00714)	(15.9907)	(14.96274)	(16.83506)	(13.68635)	(14.77716)
DEBT	-0.320212***	-0.294194***	-0.319312***	-0.293525***	-0.321536***	(-0.321523)
	(-26.83771)	(-39.64908)	(-26.87609)	(-39.6014)	(-26.82194)	(-27.09835)
GDPGR	-0.129453***	-0.150306***	-0.157308***	-0.170817***	-0.13173***	-0.151023***
	(-4.422532)	(-5.205512)	(-5.356357)	(-5.918372)	(-4.485629)	(-5.161997)
C	0.008047	0.247226***	0.037899	0.235913***	-0.001045	0.020626
	(0.169985)	(18.49659)	(0.796974)	(18.17631)	(-0.021951)	(0.437005)
Hausman Test Result	0.2348	0.2348	0.1856	0.1856	0.00	0.00
FEM/REM	**FEM**	**REM**	**FEM**	**REM**	**FEM**	**FEM**

(**Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent. T statistics in parentheses*)

As for the debt levels of companies, it becomes apparent that inefficient customer payment terms may lead to an increase in their debt levels. This is often done to cover daily operational expenses. However, there could be situations where a company is unable to fulfill its short-term financial liabilities within a certain period. As a result, it might attempt to refinance its obligations, which could lead to increased interest expenses and additional costs for the firm (Fosberg, 2012). The regression results confirm our expectations, indicating that debt has a negative impact on the return on assets.

While our initial expectation was that GDP growth would enhance the Return on Assets due to improved economic conditions increasing profitability, the results showed otherwise. Surprisingly, we found that the growth rate of GDP has a negative impact on the Return on Assets.

AGRICULTURE SECTOR ANALYSIS

7.1. Univariate Analysis

As for the first step, we undertake to investigate whether there exists a significant difference in the mean values of the variables under consideration. This approach mirrors the methodology we employed in our previous analyses of the manufacturing sector. The mean values of these variables are conveniently presented in Table 7.1. for ease of reference and comparison. In the context of the agriculture sector, we have categorized the firms into quartiles based on their profitability. The most profitable firms, those that yield the highest returns, are grouped in the fourth quartile. Conversely, the firms that are least profitable, those that yield the lowest returns, are grouped in the first quartile.

According to the results of this test, the mean values of several key variables - Return on Assets, receivable turnover, supplier turnover, cash conversion cycle, and debt ratio exhibit differences between the most profitable firms and the least profitable firms.

When we examine the variable ROA, it is observed that the firms in the fourth quartile boast an average ROA of 15%. This is in stark contrast to the firms in the first quartile, which have a negative ROA with an average of -2%. This suggests that the most profitable firms are more effective at generating profits from their assets.

The DEBT variable provides us with insights into the debt ratios of the firms. The findings suggest that firms with higher profitability typically have lower debt ratios compared to firms with lower profitability. This could imply that the most profitable firms are less reliant on borrowed funds to finance their operations.

However, the results for the variables REC, AP, and CCC deviate from the findings of Garcia-Teruel and Solano (2006). According to our results, the most profitable firms, which are grouped in the fourth quartile, have a longer average receivable period of 73.81 days compared to the least profitable firms, which have an average of 42.61 days. This implies that the firms with the highest profitability tend to have extended periods for collecting payments from their customers.

When we examine the variable AP, we find that the supplier turnover is lower in the firms in the fourth quartile, with an average of 39.30 days. In contrast, the firms in the first quartile have a larger supplier turnover, with an average of 68.99 days. This suggests that the firms with the highest profitability tend to delay payments to their suppliers.

Lastly, the CCC variable reveals that the most profitable firms have longer cash conversion cycles, with an average of 101.68 days, compared to the least profitable firms, which have an average of 39.43 days. This suggests that the most profitable firms take longer to convert their inventory and other resources into cash.

The result of the univariate analysis shows that in the agriculture sector, decreasing supplier turnover (AP) and increasing days receivable (REC) will have a positive impact on the return on assets (ROA).

Table 7.1. Mean Values by ROA Quartiles of the Agriculture Sector

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	t
ROA range	**-0.2 to 0.01**	**0.01 to 0.03**	**0.03 to 0.09**	**0.09 to 0.24**	
ROA	-0.0258	0.0208	0.0602	0.1556	-30.4032
	(0.0011)	(0.0214)	(0.0645)	(0.1579)	(0.00)
REC	42.6142	54.1366	64.4555	73.8156	-3.2908
	(46.0277)	(56.3196)	(62.3989)	(71.6717)	(0.00)
INV	65.8103	73.7127	56.9036	67.1717	-0.2461
	(52.0694)	(74.8429)	(57.6092)	(70.3333)	(0.40)
AP	68.9933	58.7819	68.8490	39.3059	3.5290
	(65.2747)	(53.1792)	(60.2080)	(27.3857)	(0.00)
CCC	39.4312	69.0673	52.5101	101.6814	-3.6634
	(46.4246)	(73.3219)	(36.6454)	(127.7401)	(0.00)
SGROWTH	0.3528	0.4286	0.4405	0.4259	-0.5251
	(0.3247)	(0.3509)	(0.3238)	(0.3267)	(0.30)
SIZE	9.6707	10.8564	8.6865	9.3830	0.7545
	(9.1714)	(11.0345)	(8.9667)	(9.4245)	(0.22)
DEBT	0.8108	0.7274	0.6324	0.4392	5.2915
	(0.8710)	(0.7235)	(0.6531)	(0.4321)	(0.00)

(*Median values are presented in the parentheses*)

7.2. Multivariate Analysis

It has been applied the Lagrange Multiplier test to the agriculture data. The results are presented in Table 7.2. below. Upon careful examination of these results, it was observed that the probabilities associated with the test were found to be greater than 0.05. This is a significant finding. A probability value greater than 0.05 is generally considered to be the threshold for rejecting the null hypothesis. In this context, the null hypothesis represents the assumption that the fixed effect models and random effect models are stable for the agricultural sector data. However, given the observed probabilities, we find ourselves in a position where we must reject this null hypothesis. This leads us to the conclusion that

the fixed effect models and random effect models are, in fact, unstable when applied to the agricultural sector data. This instability suggests that these models may not provide the most accurate or reliable predictions or insights when used with this dataset. Therefore, fixed effect models and random effect models are unstable for the agriculture sector data. As a result, we have chosen the Pooled OLS method to be applied to the data.

Table 7.2. Lagrange Multiplier Test Results of the Agriculture Data

	Cross Section	Test Hypothesis Time	Both
REC	1.196234	0.040084	1.236318
	(0.2741)	(0.8413)	(0.2662)
INV	3.305039	0.012625	3.317664
	(0.0691)	(0.9105)	(0.0685)
AP	3.810916	0.000106	3.811022
	(0.0509)	(0.9918)	(0.0509)
CCC	0.34914	0.127575	0.476715
	(0.5546)	(0.721)	(0.4899)

(*H0: No effects*)

In Table 7.3., we present the results derived from the pooled ordinary least squares (OLS) regression analysis. Upon close examination of this table, specifically focusing on the regression of the receivable turnover (REC), it is observed that REC holds statistical significance. Interestingly, REC exhibits a positive correlation with Return on Assets (ROA). This finding somewhat contradicts our initial results. It suggests that as REC increases, so does the ROA, indicating a direct relationship between these two variables. To numerically express this correlation, it is determined that a unit increment in the days of receivable would result in a marginal enhancement in the return on assets by 0.0362%. When other variables are examined, the variable denoted as SIZE emerges as statistically significant, Contrary to our previous findings, SIZE exhibits a negative correlation with the Return on Assets (ROA). This is an unexpected result as it contradicts our initial findings. A negative correlation implies that as SIZE increases, ROA decreases, indicating an inverse relationship between these two variables. As a result, a 1% percentage increase in SIZE would lead to a decrease in the return on assets of 0.5109%. Turning our attention

to the independent variable Sales Growth (SGROW), it is statistically significant. The coefficient of the independent variable SIZE aligns with our previous findings. It demonstrates a positive correlation with ROA. This positive correlation suggests that as SIZE increases, so does ROA, indicating a direct relationship between these two variables. In other words, we can say that a 1% increase in SGROW would lead to a substantial 3% increase in the ROA. When we consider the independent variable Debt Ratio (DEBT), it is found to be statistically significant. DEBT demonstrates a negative correlation with ROA. This finding aligns with our expectations and previous findings. As a result, as DEBT increases, ROA decreases, indicating an inverse relationship between these two variables. To quantify this relationship, a 1% increase in DEBT would lead to a substantial 22% decrease in the ROA. Lastly, when we consider the independent variable Gross Domestic Product Growth Rate (GDPGR), it is found to be statistically insignificant.

When the regression with the independent variable INV is examined in Table 7, the independent variable is statistically insignificant. This means that within the context of our model, INV does not have a meaningful impact on the dependent variable, Return on Assets (ROA). The sign of the coefficient of the independent variable SIZE is similar to the previous regression. It demonstrates a negative correlation with ROA. As a result, a 1% increase in SIZE would lead to a decrease in the return on assets of 0.5085%. The independent variables SGROW and DEBT show statistical significance in regression 2. They demonstrate the same relationships with ROA as observed earlier. For SGROW, a positive correlation with ROA is observed. This suggests that as SGROW increases, so does ROA, indicating a direct relationship between these two variables. Therefore, a %1 increase in SGROW would increase the ROA by %4. On the other hand, DEBT demonstrates a negative correlation with ROA. This implies that as DEBT rises, ROA falls, signifying a reverse correlation between these two variables. The coefficient of DEBT tells us that a %1 increase in DEBT would decrease the ROA by 23%. Lastly, the GDPR is insignificant for the second regression as well.

In the third regression, we demonstrated the independent variable AP. However, according to the regression results the independent variables AP, SIZE, and GDPGR are

not statistically significant. When we turn our focus to the variable representing Sales Growth, denoted as SGROW. The statistical tests reveal that SGROW holds a position of significance in the model. SGROW exhibits a positive correlation with ROA. This direct relationship suggests that an increase in SGROW is leading to an increase in ROA. Therefore, it has been determined that a 1% increase in SGROW would result in a significant 3% rise in the ROA. Finally, when the DEBT variable is examined in the third regression, we can see similar results from the first and second regressions. It is statistically significant. It has an inverse relationship with the dependent variable ROA. A 1% increase in DEBT would decrease ROA by 22%.

In the fourth regression, where we demonstrated the cash conversion cycle (CCC), we can observe that CCC is statistically significant. In the agriculture sector, we observe that an increase in days receivable (REC), an increase in inventory turnover (INV), and a decrease in supplier turnover (AP) all have a positive impact on ROA. This suggests that in the context of the agriculture sector, longer receivable periods, and higher inventory turnover rates, coupled with shorter supplier payment periods, can lead to improved return on assets (ROA). Therefore, an increase in CCC would increase the ROA by 0.0269%. When other independent variables are examined, the results show similarities with previous regressions. Both the firm's size (SIZE) and its debt level (DEBT) are statistically significant, and they have a detrimental effect on the return on assets (ROA). A 1% increase in SIZE would decrease ROA by 0.543% and a 1% increase in DEBT would decrease ROA by 21%. As for the direct relation, SGROW is statistically significant, and it has a positive impact on ROA. A 1% increase in SGROW would increase ROA by 3%.

In summary, the outcomes derived from the first and fourth regression analyses align with the findings from the univariate analysis conducted on the agriculture sector.

Table 7.3. Regression Results of the Agriculture Sector

	1	2	3	4
REC	0.000362**			
	(2.261316)			
INV		0.00018		
		(1.236044)		
AP			-0.000192	
			(-1.302638)	
CCC				0.000269***
				(3.007462)
SIZE	-0.005109*	-0.005085*	-0.003714	-0.00543***
	(-1.854109)	(-1.772677)	(-1.321416)	(-2.011501)
SGROW	0.031041*	0.04102**	0.036992**	0.035464**
	(1.97671)	(2.584866)	(2.354264)	(2.351541)
DEBT	-0.222993***	-0.238207***	-0.224266***	-0.219901***
	(-9.422055)	(-9.924763)	(-9.080369)	(-9.495893)
GDPGR	0.126142	0.07345	0.118325	0.087008
	(0.877878)	(0.493282)	(0.807513)	(0.619135)
C	0.207989***	0.225545***	0.225923***	0.2127***
	(5.937408)	(6.470803)	(6.487979)	(6.312525)

(**Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent. T statistics in parentheses*)

In Table 7.4., we present the outcomes of the regression analyses conducted after applying the first differences to the variables REC, INV, AP, and CCC. This step was taken to mitigate potential endogeneity issues, as suggested by Garcia-Teruel and Solano (2006).

According to the results, the variables REC and CCC lost their statistical significance in the first and fourth regression models. This suggests that the impact of these variables on the dependent variable may not be consistent over time. the independent variables REC and CCC lost their significance in regressions 1 and 4. On the other hand, the variables INV and AP remained statistically insignificant, consistent with the results from the

previous regression analyses. This indicates that these variables may not have a substantial or direct impact on the dependent variable in the model.

Upon examining the independent variable SIZE, it is found to be statistically significant in the third regression model as well. The sign of its coefficient remains consistent across the models, indicating a negative relationship with the Return on Assets (ROA). This suggests that as the SIZE increases, the ROA tends to decrease, implying that larger firms in our sample have lower returns on assets. Increasing it by 1% would decrease the ROA by 0.56%, 0.61%, 0.51%, and 0.62% respectively.

When the SGROW was investigated, the results were found to be consistent across all regression models, both before and after taking the first difference. The study unveils a positive association between SGROW and Return on Assets (ROA). This implies that a rise in sales growth correlates with an increase in ROA, suggesting that companies with greater sales growth often have higher returns on assets. This relationship is observable and statistically significant across all models. A 1% increase in SGROW would increase ROA by %3,69, %3,62, %4, and %3,4.

For independent variable DEBT, continues to hold its significance across all regression models. The sign of the coefficient for DEBT remains unchanged, indicating a persistent negative relationship with Return on Assets (ROA). This suggests that as the debt ratio of a firm increases, its ROA tends to decrease. More specifically, a 1% increase in DEBT would decrease ROA by %22,63, %23,35, %22,94, and %22,67 respectively.

Finally, the variable GDPR, which we included in our regression models, does not show statistical significance in any of the models.

Table 7.4. Regression Results After Deriving the First Lag of REC, INV, AP and CCC of the Agriculture Sector

	1	2	3	4
REC	0.000244			
	(1.43565)			
INV		0.000109		
		(0.650463)		
AP			-0.0000536	
			-0.341971	
CCC				0.000147
				(1.468016)
SIZE	-0.005691*	-0.006136*	-0.00518*	-0.006239**
	(-1.896993)	(-1.874842)	(-1.691724)	(-2.044602)
SGROW	0.036942*	0.036271**	0.040332**	0.034692**
	(2.209661)	(2.052829)	(2.386026)	(2.046609)
DEBT	-0.226312***	-0.233558***	-0.229405***	-0.226727***
	(-8.979546)	(-9.139389)	(-8.875922)	(-9.018247)
GDPGR	0.064038	0.066988	0.05478	0.057499
	(0.42501)	(0.438193)	(0.356619)	(0.381914)
C	0.220284***	0.237396***	0.23436***	0.232425***
	(5.758968)	(6.251136)	(6.218974)	(6.268655)

(**Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent. T statistics in parentheses*)

TRANSPORT AND WAREHOUSE SECTOR ANALYSIS

8.1. Univariate Analysis

The objective is to discern if there's a notable disparity in the average values of the variables being studied. This strategy reflects the approach that was utilized in our previous analyses of the manufacturing sector and the agriculture sector. The average values of these variables are presented in Table 8.1. Similarly in the manufacturing sector and agriculture sector, the companies have been divided into four groups based on how much profit they make. The firms that are most profitable, yielding the highest returns, are assembled in the fourth quartile. On the other hand, the firms that are least profitable, yielding the lowest returns, are assembled in the first quartile.

The univariate analysis results reveal differences in the average values of variables, including ROA, REC, INV, AP, CCC, SIZE, and DEBT, between the top-performing companies (located in the fourth quartile) and the least profitable entities (residing in the first quartile).

In the first quartile, the mean return on assets (ROA) is recorded at -0.03%, indicating a deficit in asset returns for these firms. Conversely, within the fourth quartile, encompassing the most profitable companies, the average ROA stands at 17%, underscoring their robust asset performance.

When exhibiting days receivable (REC), it can be observed that the least profitable firms exhibit an average collection period of 47.01 days. In contrast, the most profitable firms have a significantly higher average of 74.34 days in days receivable in the transport and warehouse sector. These findings show similarities with the agriculture sector. As a result, the most profitable firms have a longer duration in collecting payments from their customers.

The inventory turnover variable (INV) reveals an average of 23.19 days for companies in the first quartile. In contrast, companies in the fourth quartile demonstrate a lower average

of 10.4 days. These results emphasize the fourth-quartile firms' proficiency in swiftly converting inventory into sales compared to their counterparts in the first quartile.

The findings regarding the supplier turnover variable (AP) present similar results to the agriculture sector. Companies in the first quartile exhibit an average of 62.93 days, whereas those in the fourth quartile showcase a lower average of 42.62 days. This indicates that the least profitable firms are extending their payment periods more than the most profitable firms, contrary to anticipated patterns in the transport and warehouse sector.

The examination of the CCC variable also reveals a similar trend to the agriculture sector, the most profitable firms demonstrate longer cash conversion cycles, averaging 42.13 days, compared to the least profitable firms with an average of 7.28 days. This indicates that contrary to the initial results of the manufacturing sector, the most profitable firms take more time to convert their inventory and other resources into cash.

The findings concerning the SIZE variable indicate that, despite a slight variance, companies grouped in the first quartile possess more assets compared to those grouped in the fourth quartile.

Upon examining the variable of debt ratio (DEBT), companies in the first quartile exhibit an average debt ratio of 83%, indicating that these firms, on average, rely heavily on debt to finance their assets. Conversely, companies in the fourth quartile showcase a markedly lower average debt ratio of 46%. These results show similarities between the agriculture sector and the manufacturing sector. The companies in the transport and warehouse sector that make the most money tend to have a significantly lower average debt ratio. This means they rely less on borrowed money to finance their operations compared to the companies that are not as profitable.

When it comes to the variable that stands for sales growth (SGROWTH), we can’t draw any significant conclusions. This is because the t-test result for that variable is not statistically significant. The exact values for these tests can be found in parentheses under the ‘t’ column.

Table 8.1. Mean Values by ROA Quartiles of the Transport and Warehouse Sector

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	t
ROA range	**-0.16 to 0**	**0 to 0.01**	**0.01 to 0.06**	**0.06 to 0.44**	
ROA	-0.0370	0.0056	0.0352	0.1767	-11.6973
	(-0.0243)	(0.0052)	(0.0327)	(0.1311)	(0.00)
REC	47.0185	61.7166	64.8288	74.3472	-2.8551
	(38.8781)	(57.6589)	(48.8212)	(66.3765)	(0.00)
INV	23.1948	17.0349	21.1696	10.4063	2.3437
	(10.8026)	(8.5584)	(7.5905)	(3.3864)	(0.01)
AP	62.9317	68.0561	70.8555	42.6202	1.7133
	(54.5640)	(52.9839)	(56.5930)	(37.5675)	(0.04)
CCC	7.2815	10.6954	15.1429	42.1333	-3.0365
	(2.9758)	(3.1643)	(2.7559)	(27.5081)	(0.00)
SGROWTH	0.3505	0.2037	0.4082	0.3455	0.0454
	(0.2262)	(0.1773)	(0.2720)	(0.3037)	(0.48)
SIZE	11.6560	9.6915	11.5347	10.3693	2.4754
	(11.3418)	(8.8056)	(11.4186)	(9.6550)	(0.00)
DEBT	0.8331	0.7597	0.7397	0.4688	6.2556
	(0.8480)	(0.8055)	(0.7281)	(0.5568)	(0.00)

(*Median values are presented in parentheses*)

8.2. Multivariate Analysis

In the analysis of the transport and warehouse sector, similarly in the manufacturing sector and the agriculture sector, we evaluated whether to use pooled ordinary least squares (OLS) regression or fixed effects (FEM) and random effects (REM) regressions. To help us decide, we carried out Lagrange multiplier tests on the regression models. The results are presented in Table 8.2. The p-value from the Breusch-Pagan Test for cross-section and time elements turned out to be less than 0.05. This made us reject the null hypothesis. As

a result, it has been found that pooled OLS was not stable for the transport and warehouse sector, which highlighted the need to use either FEM or REM for our regression analyses.

Table 8.2. Lagrange Multiplier Tests for Random Effects of the Transport and Warehouse Sector

	Cross Section	Test Hypothesis Time	Both
REC	27.6040	1.2905	28.8945
	0.00	0.00	0.00
INV	31.6741	1.291893	32.9660
	0.00	0.00	0.00
AP	31.1683	1.237374	32.4057
	0.00	0.00	0.00
CCC	28.6991	1.2069	29.9060
	0.00	0.00	0.00

(*H0: No effects*)

In transport and warehouse sector analysis, as per previous sector analyses, it has been conducted an evaluation to determine the suitability of employing fixed effects models or random effects models for our regressions. To make this determination in the transport and warehouse sector, it has been employed the correlated random effects – Hausman test. The results of this test indicated that for the regressions involving variables REC, AP, INV, and CCC, the probabilities exceed 0.05. Therefore, both random effects and fixed effects models were appropriate for the regressions involving REC, INV, AP, and CCC. As a result, we decided to utilize both the fixed effects model and the random effects model. Detailed results of the correlated random effects – Hausman test can be found in Table 8.3.

Table 8.3. Correlated Random Effects - Hausman Test of the Transport and Warehouse Sector

	Chi-Sq. Statistic	Chi-Sq D.F.	Prob.
REC	5.325117	5	0.4337
INV	5.129457	5	0.4003
AP	5.64005	5	0.3428
CCC	6.754226	5	0.2396

In Table 8.4., the results of the regression analyses have been presented. In the first regression, the independent variable REC has been demonstrated. The outcomes of the fixed model reveal that REC holds no statistical significance. As we investigate the independent variable SGROWTH, it is statistical significance. The results align with the previous results of the manufacturing sector and the agriculture sector. The positive sign of the coefficient indicates a direct relationship between ROA and SGROWTH. For every 1% increase in sales growth, there is a corresponding 2% increase in ROA. Upon analysis of the independent variable DEBT, its statistical significance is pronounced. It shows a negative effect on ROA, suggesting an inverse relationship between the two. A 1% increase in debt level results in a substantial 42% decrease in ROA. Lastly, when examining the independent variable GDPGR, it is notable for its statistical significance. The sign of its coefficient implies an inverse relation between GDPGR and ROA. Specifically, a 1% increase in GDP growth rate corresponds to a 24% decrease in ROA. As for the independent variable SIZE, since it is statistically insignificant, we are unable to interpret its coefficient.

Upon examining the random effects model, the previously observed statistical insignificance for the independent variable REC changes. In the random effects model also the independent variable REC is statistically significant. It has a positive impact on ROA. Increasing the 1-day receivable turnover would increase the return on assets by 0.0453%. The independent variable SGROWTH retains its statistical significance, with a positive effect on ROA. Specifically, a 1% increase in sales growth corresponds to a 3% increase in return on assets (ROA). Furthermore, the independent variable DEBT remains statistically significant, with its negative impact on ROA persisting in line with the fixed

effects model. A 1% increase in the debt level precipitates a substantial 36% decrease in ROA. In the random effects model, the independent variable GDPGR proves to be statistically significant. Its negative effect on ROA is like the findings from the fixed effects model, indicating an inverse relationship. Specifically, a 1% increase in GDP growth rate correlates with a 28% decrease in ROA. The independent variable SIZE is statistically insignificant in the random effects model as well therefore, we are unable to interpret its coefficient.

In the third regression, conducted under the fixed effect model, the crucial independent variable INV, the result of the regression shows that it is statistically insignificant. Similarly, the coefficient of the independent variable SIZE stands out as statistically insignificant. For the fixed effects model of INV, the independent variables SGROWTH and GDPGR are statistically insignificant. Shifting the focus to the independent variable DEBT, its statistical significance, maintaining a negative impact on ROA. Elevating the debt level by 1% corresponds to a substantial 40% decrease in ROA.

In the fourth regression, utilizing the random effects model for the independent variable INV. The independent variable INV remains statistically insignificant. Along with INV, the independent variable SIZE is statistically insignificant. However, in the random effects model, we observe that the independent variables SGROWTH and GDPGR are statistically significant. The results show that SGROWTH has a positive impact on ROA. A 1% increase in sales growth rate corresponds to a 2% increase in ROA. Lastly, as for GDPGR, the result is like the previous findings. It has a negative effect on ROA. Increasing the GDP growth rate by 1% correlates with a 28% decrease in ROA.

In the fifth regression, we introduce the independent variable AP. According to the fixed effect model results, AP emerges as statistically insignificant. The independent variable DEBT remains statistically significant in the fifth regression. In the fifth regression, we are facing a similar result to the third regression's results. Only the independent variable DEBT is statistically significant, the other independent variables such as SIZE, SGROWTH, and GDPGR are statistically insignificant. DEBT has a negative impact on ROA, with a 1% increase in debt level and GDP growth rate leading to a 40% decrease in ROA.

In the sixth regression, the random effects model results have better results than the fixed effects model. However, the independent variable AP remains insignificant in the random effects model. As a result, we are unable to interpret its effect on ROA. Therefore, in the random effects model, the independent variables SGROWTH and GDPGR are found to be statistically significant. The impact of the SGROWTH can be evaluated as positive on the ROA. Increasing the sales growth rate by 1% in the transport and warehouse sector would increase the return on assets by 2%. On the other hand, the effect of GDPGR is the same with the other sectors. It has a negative impact on the ROA. Increasing the GDP growth rate by 1% correlates with a 27% decrease in ROA.

In the seventh regression, for the transport and warehouse sector, CCC has been examined with a fixed effects model. Remarkably, based on the outcomes of the fixed effects model, CCC appears to be statistically significant. Its impact on ROA shows similarities with the agriculture sector. It has a positive impact on ROA. Therefore, an increase in CCC would increase the ROA by 0.0466%. Furthermore, the enduring significance of DEBT and GDPGR remains statistically significant in the seventh regression. Both variables exhibit a negative impact on ROA. Each 1% increase in debt level and GDP growth rate precipitates a substantial 40% and 24% decrease in ROA, respectively. As for the other independent variables, SIZE and SGROWTH is statistically insignificant. Therefore, we are unable to interpret their coefficients.

In the eighth regression, the random effects model for the regression that includes CCC has been applied. According to the results, CCC is statistically significant. Like the fixed effects model, it has a positive impact on the ROA. As the cash conversion cycle increases, so does the ROA. Specifically, a 1-day increase in CCC would increase the ROA by 0.0296%. The results reveal that SGROW is statistically significant. SGROW shows a positive relation with ROA. This direct relationship suggests that an increase in SGROW is associated with an increase in ROA. A 1% increase in sales growth rate would increase the return on assets by 2%. When we investigated the independent variable DEBT, the random effects model results demonstrated that the debt ratio has a detrimental effect on ROA in the eighth regression. Furthermore, increasing the debt level by 1% results in a decrease in the return on assets of 35%. As we change our focus to GDPGR

in the eighth regression, the result is the same as to fixed effects model and previous regressions. It is statistically significant. In addition to that it is affecting the ROA negatively. Therefore, a 1% increase in GDP growth rate causes a %29 decrease in the return on assets. Lastly, since the independent variable SIZE is statistically insignificant in the eighth regression, we are unable to interpret its effect on the return on assets.

Table 8.4. Regression Results of the Transport and Warehouse Sector

	1	2	3	4	5	6	7	8
REC	0.000436	0.000453**						
	(1.616724)	(2.306093)						
INV			0.000225	0.000166				
			(0.661699)	(0.579507)				
AP					0.0000739	0.0000714		
					(0.256823)	(0.357527)		
CCC							0.000466*	0.000296*
							(1.823287)	(1.884589)
SIZE	0.027641	-0.001181	0.029393	-0.003181	0.029098	-0.003025	0.037597	-0.002184
	(1.048722)	(-0.288582)	(1.098267)	(-0.756502)	(1.036322)	(-0.733631)	(1.425736)	(-0.541178)
SGROW	0.026068*	0.032485**	0.022997	0.029792**	0.022545	0.029707**	0.020801	0.02933**
	(1.692107)	(2.224443)	(1.476599)	(1.998995)	(1.370175)	(1.978147)	(1.384795)	(2.027761)
DEBT	-0.42029***	-0.366997***	-0.405894***	-0.360403***	-0.406143***	-0.360877***	-0.401727***	-0.350798***
	(-7.085772)	(-9.799931)	(-6.84613)	(-9.298669)	(-6.584911)	(-9.027528)	(-6.934156)	(-9.434404)
GDPGR	-0.248188*	-0.286409**	-0.246618	-0.288162**	-0.22907	-0.275721**	-0.248903*	-0.293779**
	(-1.699918)	(-2.043565)	(-1.620621)	(-1.986159)	(-1.515358)	(-1.931872)	(-1.713882)	(-2.09939)
C	0.016818	0.289906***	0.011685	0.332998***	0.013892	0.329713***	-0.083927	0.3133***
	(0.058535)	(5.365546)	(0.039976)	(6.255822)	(0.045575)	(6.277069)	(-0.290799)	(6.044761)
Haus. T. Res.	0.4337	0.4337	0.4003	0.4003	0.3428	0.3428	0.2396	0.2396
F/R	**FEM**	**REM**	**FEM**	**REM**	**FEM**	**REM**	**FEM**	**REM**

(**Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent. T statistics in parentheses*)

In Table 8.5., we unveil the results derived from our regression analyses, following the application of the first differences to the variables REC, INV, AP, and CCC.

After taking the first differences of the variables that are components of the working capital, we couldn't get clear results from both fixed effects model regressions and random effects model regressions. The independent variables REC and CCC are statistically insignificant. The results of INV and AP remain the same in the first difference. They are statistically insignificant.

When we change our focus to other independent variables, the results show that SIZE, SGROWTH, and GDPGR are statistically insignificant. Therefore, it is not possible to interpret their coefficients and their impacts on the return on assets.

According to the results, only the DEBT variable is statistically significant across all regressions. Even in the first difference DEBT is affecting ROA negatively. Therefore, increasing the debt level by 1% would decrease the return on assets by 32.05%, 36.37%, 31.7%, 35.21%, 31.97%, 35.53%, 32.26%, and 35.79% respectively.

Table 8.5. Regression Results After Deriving the First Lag of REC, INV, AP and CCC of the Transport and Warehouse Sector

	1	2	3	4	5	6	7	8
REC	0.000207	0.000256						
	(0.819366)	(1.287445)						
INV			-0.000792	-0.000651				
			(-1.464304)	(-1.536966)				
AP					-0.00011	-0.000118		
					(-0.439527)	(-0.613255)		
CCC							0.000206	0.000187
							(0.696666)	(1.064484)
SIZE	0.022852	-0.003278	0.0248	-0.003583	0.021295	-0.004377	0.022196	-0.003873
	(0.774571)	(-0.752273)	(0.849599)	(-0.809755)	(0.72077)	(-0.993033)	(0.75211)	(-0.893656)
SGROW	-0.00129	0.008408	0.000822	0.010041	0.001194	0.010754	-0.000245	0.009839
	(-0.081509)	(0.550234)	(0.053099)	(0.667567)	(0.075709)	(0.702666)	(-0.01558)	(0.646015)
DEBT	-0.320517***	-0.363731***	-0.317085***	-0.352171***	-0.319723***	-0.355454***	-0.322683***	-0.357983***
	(-4.902133)	(-9.00211)	(-4.908941)	(-8.568632)	(-4.870989)	(-8.528041)	(-4.912539)	(-8.818704)
GDPGR	-0.057656	-0.140715	-0.043572	-0.127814	-0.07065	-0.150127	-0.073218	-0.15376
	(-0.405309)	(-1.053509)	(-0.308883)	(-0.964808)	(-0.494074)	(-1.118391)	(-0.513461)	(-1.148997)
C	0.016714	0.326928***	0.017173	0.347011***	0.052037	0.355421***	0.034726	0.341838***
	(0.051145)	(5.671398)	(0.053402)	(6.214563)	(0.159498)	(6.290436)	(0.106624)	(6.156047)
Haus. T. Res.	0.4337	0.4337	0.4003	0.4003	0.3428	0.3428	0.2396	0.2396
F/R	**FEM**	**REM**	**FEM**	**REM**	**FEM**	**REM**	**FEM**	**REM**

(**Significant at 10 percent. ** Significant at 5 percent. *** Significant at 1 percent. T statistics in parentheses*)

EVALUATION OF THE RESULTS

The findings from the analysis of the manufacturing sector provide significant insights into the dynamics of financial management. These insights are particularly evident when examining the implications of the fixed effects model. The fixed effect model demonstrates that in the manufacturing sector, there's a negative correlation between the receivable turnover and the return on assets. The results of the manufacturing sector show that in the fixed effects model, the increasing receivable turnover results in the allocation of funds to working capital until its maturity. This causes a decrease in liquidity, which in turn adversely impacts profitability (Özkaya, Yaşar, 2023). The negative effect of the receivable turnover does not diminish even after taking the first difference of the variable in the manufacturing sector. This observation aligns with the results obtained by Garcia-Teruel and Martinez-Solano (2007). The results of the fixed effects model for the manufacturing sector align with our initial expectations and corroborate the findings of previous studies (e.g. Vural, Sökmen, Çetenak, 2012; Gama, Pais, 2015; Öner 2016). Contrary to the fixed effects model, the random effects model exhibited statistical insignificance for the receivable turnover. However, after taking the first difference the results show consistency with the results of the fixed effects model.

In contrast to the manufacturing sector, the agriculture sector presents a different scenario. In this scenario, the receivable turnover has been shown to have a beneficial effect on the return on assets. The results from the agriculture sector indicate that an increase in the receivable turnover can have beneficial effects. This increase can result in an expansion in the receivable turnover, resulting from a tolerated credit policy extended to clients, having the potential to increase the volume of sales and consequently enhance profitability (Al-Eitan, Khanji, Saraireh, 2023; Özkaya, Yaşar, 2023). However, the positive effect of receivable turnover diminished after taking the first difference of the variable.

When we changed our focus to the transport and warehouse sector, we couldn't get any significant results from the fixed effects model. However, the random effects exhibited

similar results in the agriculture sector. The results indicate that in some cases to maintain the market presence, it is essential to provide more generous credit terms (Sharma, Kumar, 2010). The results imply that firms in the transport and warehouse sector can benefit from the longer receivable turnover. Similarly, with the agriculture sector, the positive effect diminished after taking the first difference of variable.

The results that were obtained from the agriculture sector and the transport and warehouse sector align with the results that were obtained by Sharma and S. Kumar (2010).

On the inventory management side, the outcomes derived from both the fixed effects model and the random effects model reveal that an increase in inventory turnover has a negative effect on the profitability of firms within the manufacturing sector. The adverse impact of inventory turnover can be attributed to low sales. When sales are low, inventory turnover increases because goods remain in stock for a longer period which leads to increased holding costs and potential aging of goods, negatively affecting the firm's profitability (Deloof, 2003; Shin, Soenen, 1998). The negative impact observed in both the fixed effects and random effects models persists even after taking the first difference of the variable. This constancy emphasizes the solidity of the observed link between inventory turnover and profitability. The results of both models for the manufacturing sector align with our initial expectations and corroborate the findings of previous studies (e.g. Karaduman, Akbas, Ozsozgun, Duruer, 2010; Sharma, Kumar, 2010).

From the results derived from the agriculture sector and the transport and warehouse sector, there is no significant effect of the inventory turnover on firms' profitability. After taking the first difference the results that we obtained did show no differences. It's worth noting that these results diverge from the findings of several previous studies. For instance, the studies conducted by Öner (2016), Deloof (2003), and Shin and Soenen (1998) found a significant relationship between inventory turnover and profitability. However, our results seem to be more in line with the studies carried out by Bigger, Gill, and Matur (2010), as well as Ali and Showkat (2022), which also observed no notable influence of inventory turnover on profitability.

In the firms within the manufacturing sector, supplier turnover has a positive effect on firms' profitability. This positive correlation suggests that firms are effectively leveraging

the financing provided by their suppliers. By doing so, they can retain cash for longer durations, which in turn enables them to reduce operational costs (Ares, López, Pazos, 2018). This result meets our initial expectations. However, these dynamic shifts when considering the first difference of the independent variable. In this context, it appears that supplier turnover has a detrimental impact on profitability. This adverse effect can be attributed to the inability of companies to capitalize on the discounts that suppliers often offer for early payments. As a result, firms may end up paying more for their supplies than they would have if they had been able to make early payments (Allison, C., Nwude, E., Nwude, 2020). These findings are aligned with the previous studies of Enqvist, Graham, and Nikkinen (2013), Deloof (2003), Karaduman, Akbas, Ozsozgun, and Durer (2010).

The outcomes derived from the analysis of both the agriculture sector and the transport and warehouse sector suggest that supplier turnover does not significantly influence firms' profitability. This conclusion remains consistent even after taking the first difference of the variables into account. It's interesting to note that these findings diverge from several previous studies. For example, research conducted by Garcia-Teruel and Martinez-Solano (2007), Deloof (2003), and Shin and Soenen (1998) identified a significant correlation between supplier turnover and profitability. However, our results are more in line with the studies carried out by Bigger, Gill, and Matur (2010), and Vural, Sökmen, and Çetenak (2012). These studies also concluded that supplier turnover does not have a significant impact on profitability.

For the Cash Conversion Cycle, a pattern emerges among companies within the manufacturing sector. Specifically, it has been observed that a longer CCC tends to correlate with lower profitability. This can be interpreted to mean that an increase in the cash conversion cycle, which encompasses factors such as inventory turnover, receivable turnover, and supplier turnover, precipitates a decrease in the firm's profitability (Öhman, Yazdanfar, 2014). The negative impact of the cash conversion cycle remains in the manufacturing sector after taking the first difference of the independent variable. These findings align with our initial expectations and are consistent with the results of several previous studies. For instance, the studies conducted by Deloof (2003), Shin and Soenen

(1998), and Garcia-Teruel and Martinez-Solano (2007) all found a similar relationship between the length of the CCC and profitability.

When we shift our focus to the agriculture and, transport and warehouse sectors, the results present a contrasting picture compared to those in the manufacturing sector. In this case, an increase in the cash conversion cycle appears to enhance the profitability of firms operating within the agriculture sector and transport and warehouse sector. This suggests that these firms may benefit from a longer cash conversion cycle. These findings diverge from our initial expectations, highlighting the complexity and variability of financial dynamics across different sectors. similar results were found in the studies conducted by Abuzayed (2012), Alvarez, Sensini, and Vazquez (2021), and Prempeh and Amankona (2018). These analyses also uncovered a positive relation between the cash conversion cycle and profitability. Nonetheless, this association between the cash conversion cycle and return on assets turns insignificant upon taking the first difference. This indicates that the impact of changes in the cash conversion cycle on profitability may not be as straightforward or consistent in the agriculture sector and transport and warehouse sector.

When we shifted our attention to the outcomes of the control variables, our initial hypothesis was that a company's size would positively influence its return on assets. Within the manufacturing industry, the fixed model regression results validated our hypothesis, demonstrating a positive correlation between the size of the firm and its return on assets. However, in two random effects regressions, the effect of firm size was found to be insignificant. The positive impact of firm size suggests that larger firms tend to enjoy more favorable terms' dates. This includes both accounts payable and receivable, implying that larger firms can negotiate shorter terms for receivable and longer terms for payables. This advantageous position can positively impact the return on assets (Abuzayed, 2012; Yazdanfar, Öhman, 2014). The results validate our expectations, as an increase in the size of the firms enhances profitability. These results align with our initial expectations and validate the hypothesis that an increase in the size of firms enhances their profitability. Furthermore, these findings are consistent with previous research conducted by Garcia-Teruel and Martinez-Solano (2007), Deloof (2003), and Alvarez, Sensini, and Vazquez (2021). These research efforts also discovered a positive correlation

between the size of a firm and its profitability, thereby emphasizing the significance of a firm's size in dictating its financial performance.

When we change our focus to the agriculture sector, unlike our initial expectations, firm size exhibits a negative correlation with profitability.

Interestingly, the results derived from the transport and warehouse sector present a different picture. Contrary to our initial expectations, the size of the firm does not appear to have any significant impact on the return on assets in this sector.

Sales growth side, it is observed that an escalation in the volume of sales is directly linked to a corresponding rise in the investment in inventory. This increase in inventory investment is a significant factor that leads to a decrease in the duration of inventory turnover. In simpler terms, as the volume of sales grows, the company needs to invest more in its inventory to meet the demand, which in turn speeds up the turnover of inventory. The speed at which a company's working capital circulates - that is, the rate at which it uses its short-term assets and liabilities - has a direct impact on its profitability. The faster this circulation, the greater the chances of a company enhancing its profitability. (Ginting, Hutagalung, Simorangkir, Waroka, 2023). The results of the analysis in all three sectors show that increasing sales growth positively affects profitability. These findings are not only consistent with our initial predictions but also corroborate the research conducted by various scholars in the field. For instance, the research conducted by Serrasqueiro (2014), Garcia-Teruel and Martinez-Solano (2007), and Deloof (2003).

As for the debt ratio, it was observed that all the regression results displayed a negative influence on the return on assets. This means that as the debt ratio increases, the return on assets decreases. This outcome aligns with our initial expectations and is consistent with the findings of previous research. Specifically, our results are in line with the work of Deloof (2003), who also found a negative relationship between the debt ratio and the return on assets. Similarly, the studies conducted by Gonçalves, Gaio, and Robles (2018) and Pais and Gama (2015) support our findings, further validating our results.

Lastly, the GDP growth rate yielded results that diverged from our initial expectations. Unlike the findings of Deloof (2003), Garcia-Teruel and Martinez-Solano (2007), and Shin and Soenen (1998), our analysis revealed a negative correlation between the GDP growth rate and the return on assets in both the manufacturing sector and the transport and warehouse sectors. This implies that a surge in the GDP growth rate doesn't necessarily guarantee an enhancement in the return on assets for these sectors. Furthermore, our results indicate that the GDP growth rate does not have any significant impact on the return on assets in the agriculture sector.

CONCLUSION

This empirical study presents the influence of diverse components of working capital management on the profitability of firms within the manufacturing, agriculture, transport, and warehouse sectors in Türkiye, spanning the period from 2017 to 2021. Based on the comprehensive analysis of the impact of working capital management on firm profitability, in the manufacturing sector, an increase in REC led to a decrease in Return on Assets (ROA), indicating efficient receivables management. However, in the agriculture sector and transport, and warehouse sectors, an increase in REC had a positive impact on ROA, suggesting that longer receivable periods could be beneficial in certain contexts. However, it should be noted that the effect of REC is not certain, as its significance is lost after the first difference is taken.

As for the inventory turnover in the manufacturing sector, an increase in INV negatively impacted ROA. However, INV did not significantly influence firms' profitability in the agriculture sector and transport and warehouse sector.

Supplier turnover in the manufacturing sector and an increase in AP positively impacted ROA, suggesting effective use of supplier credit. After taking the first difference its effect turned negative. However, AP did not significantly influence firms' profitability in the agriculture sector and transport and warehouse sector.

Cash conversion cycle in the manufacturing sector, a longer CCC correlated with lower profitability. However, in the other sectors, it has lost its significance after the first difference. As a result, we couldn't confirm it is effect.

As for the firm size, larger firms and firms with higher sales growth tended to have higher ROA in the manufacturing sector. Contrary with the results of the manufacturing sector, in the agriculture sector, firm size exhibited negative correlation with ROA. However, firm size did not significantly impact ROA in the transport and warehouse sector.

The results showed a positive correlation between sales growth and profitability in every sector, except for some regressions in the transport and warehouse sector.

Across all sectors, higher debt levels tended to correlate with lower ROA, underscoring the importance of prudent debt management.

Finally, Contrary to initial expectations, an increase in the GDP growth rate did not necessarily lead to an increase in ROA in the manufacturing sector. This suggests that macroeconomic conditions might have complex and varying impacts on firm profitability across different sectors.

For future research, considering the limited data available for the agriculture sector and transport and warehouse sector, a more comprehensive data set could provide a more in-depth analysis of the relationship between working capital and firm profitability. Additionally, while this research was confined to data from Türkiye, future studies could benefit from a comparative analysis with data from other countries. This would provide a broader perspective and potentially reveal interesting cross-country differences in working capital management and its impact on firm profitability.

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