REPUBLIC OF TURKEY
CUKUROVA UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES
BUSINESS ADMINISTRATION DEPARTMENT

EFFECT OF THE WORKING CAPITAL ON PROFITABILITY: A STUDY ON THE COMPANIES IN THE BIST

Emre GÖZDAMLA

MASTER THESIS

ADANA/2024

REPUBLIC OF TURKEY
CUKUROVA UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES
BUSINESS ADMINISTRATION DEPARTMENT

EFFECT OF THE WORKING CAPITAL ON PROFITABILITY: A STUDY ON THE COMPANIES IN THE BIST

Emre GÖZDAMLA

Supervisor: Prof. Dr. Hatice DÜZAKIN
Member of Examining Committee: Prof. Dr. Mehmet ÖZMEN
Member of Examining Committee: Dr. Süreyya YILMAZ ÖZEKENCİ

MASTER THESIS

ADANA/2024

APPROVAL

To Directorate of Cukurova University Social Sciences Institute:

This study has been accepted as a MASTER OF ARTS in the Department of Business Administration by the following jury members.

Chair of Committee (Supervisor): Prof. Dr. Hatice DÜZAKIN

Committee Member: Prof. Dr. Mehmet ÖZMEN

Committee Member: Dr. Süreyya YILMAZ ÖZEKENCİ

APPROVAL

I authorize that the above signatures belong to the jury members.

…/…/2024.

Prof. Dr. Serap ÇABUK

Director of the Institute

NOTE: The uncited usage of reports, charts, figures and photographs in this dissertation, whether original or quoted from other sources, is subject to the provisions under the 5846 numbered Law on Intellectual and Artistic Works.

DECLARATION OF ETHICS

The thesis was prepared in accordance with the Dissertation Rules of the Institute of Social Sciences, Cukurova University where;

- I have obtained the data, information and documents in the thesis within the framework of academic and ethical rules,
- I present all the information, documents, and evaluation results in accordance with the rules of scientific ethics,
- I am referring to all of the study works with appropriate reference,
- I have not made any changes to the data used and the results of analysis,
- I declare that the work I presented in this thesis is original.

…. / …. / 2024

Emre GÖZDAMLA

ETİK BEYANI

Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Tez Yazım Kurallarına uygun olarak hazırladığım bu tez çalışmasında;

- Tez içinde sunduğum verileri, bilgileri ve dokümanları akademik ve etik kurallar çerçevesinde elde ettiğimi,
- Tüm bilgi, belge, değerlendirme ve sonuçları bilimsel etik ve ahlak kurallarına uygun olarak sunduğumu,
- Tez çalışmasında yararlandığım eserlerin tümüne uygun atıfta bulunarak kaynak gösterdiğimi,
- Kullanılan verilerde ve ortaya çıkan sonuçlarda herhangi bir değişiklik yapmadığımı,
- Bu tezde sunduğum çalışmanın özgün olduğunu,

bildirir, aksi bir durumda aleyhime doğabilecek tüm hak kayıplarını kabullendiğimi beyan ederim. …. / …. / 2024

Emre GÖZDAMLA

ABSTRACT

EFFECT OF THE WORKING CAPITAL ON PROFITABILITY: A STUDY ON THE COMPANIES IN THE BIST

Emre GÖZDAMLA

Master Thesis, Department of Business
Supervisor: Prof. Dr. Hatice DÜZAKIN
January 2024, 67 pages

In this study, in order to investigate the effect of working capital on profitability, 78 firms whose data were able to be accessed were considered the sample among a population composed of 209 manufacturing firms, and financial ratios were utilized. Return on assets(ROA), operating profit margin(OPM), net profit margin(NPM), and return on equity(ROE) were dependent variables. Financial leverage(FL), receivables turnover(RT), stock turnover(ST), accounts payable turnover(APT), and current ratio(CR) were independent variables. Firm size was control variable and it was calculated by dividing the total assets of each company by the sum of the total assets of 78 companies in the study and, in order to make it a percentage, multiplying it by 100. Data were obtained from Public Disclosure Platform and Finnet. Within the scope of the study, the annual data of 78 companies whose shares are traded on Borsa İstanbul were utilized between 2010 and 2021. In order to perform the required analyses R programming language was utilized. Panel data analyses were conducted with the help of R language. Fixed effects model(FEM), pooling model(PM), and random effects model(REM) were formed for each dependent variable. Then, these models compared with the help of F-Test, Lagrange Multiplier Test, and Hausman Test. By this method, the most suitable model was selected for each dependent variable. In conclusion, a significant and positive relationship between ROA and RT, APT, CR, and FS, and a significant and negative relationship between ROA and FL were found. A significant and positive relationship between OPM and CR, and FS, and a significant and negative relationship between OPM and ST, and FL were found. A significant and positive relationship between NPM and CR, and FS, and a significant and negative relationship between NPM and FL were found. A significant and positive relationship between ROE and CR, APT and FS, and a significant and negative relationship between ROE and FL were found.

Keywords: Working capital, Profitability, Borsa İstanbul, Panel data analysis

ÖZET

ÇALIŞMA SERMAYESİNİN KARLILIK ÜZERİNDEKİ ETKİSİ: BORSA İSTANBULDAKİ FİRMALAR ÜZERİNE BİR ÇALIŞMA

Emre GÖZDAMLA

Yüksek Lisans Tezi, İşletme Bölümü
Danışman: Prof. Dr. Hatice DÜZAKIN
Ocak 2024, 67 sayfa

Bu çalışmada işletme sermayesinin karlılık üzerindeki etkisi araştırmak için 209 imalat firmasından oluşan evren içinden verilerine ulaşılabilen 78 firma örneklem olarak alınmış ve finansal oranlardan yararlanılmıştır. Çalışmada aktif karlılığı(ROA), faaliyet kar marjı(OPM), net kar marjı(NPM) ve öz sermaye karlılığı(ROE) bağımlı değişkenler olarak belirlenmiştir. Finansal kaldıraç(FL), alacak devir hızı(RT), stok devir hızı(ST), borç devir hızı(APT) ve cari oran(CR) bağımsız değişkenler olarak ele alınmıştır. Firma büyüklüğü(FS), kontrol değişkeni olarak ele alınmıştır ve her bir firmanın toplam aktiflerinin, çalışmadaki 78 adet firmanın toplam toplam aktiflerine bölündükten sonra 100 ile çarpılarak yüzde haline getirilmesiyle hesaplanmıştır. Veriler Kamuyu Aydınlatma Platformu(KAP) ve Finnet'ten elde edilmiştir. Çalışma kapsamında Borsa İstanbul'da işlem gören 78 şirketin 2010-2021 yılları arasındaki yıllık verilerinden yararlanılmıştır. Gerekli analizlerin yapılabilmesi için R programlama dilinden yararlanılmıştır. Panel veri analizleri R programlama dili yardımıyla gerçekleştirilmiştir. Her bağımlı değişken için sabit etkiler modeli(FEM), havuzlama modeli(PM) ve rassal etkiler modeli(REM) oluşturulmuştur. Daha sonra bu modeller F-Test, Lagrange Multiplier Testi ve Hausman Testi yardımıyla karşılaştırılmıştır. Bu şekilde her bağımlı değişken için en uygun model seçilmiştir. Çalışma sonunda ROA ile RT, APT, CR ve FS arasında anlamlı ve pozitif, ROA ile FL arasında anlamlı ve negatif bir ilişki bulunmuştur. OPM ile CR ve FS arasında anlamlı ve pozitif bir ilişki ve OPM ile ST ve FL arasında anlamlı ve negatif bir ilişki bulunmuştur. NPM ile CR ve FS arasında anlamlı ve pozitif bir ilişki ve NPM ile FL arasında anlamlı ve negatif bir ilişki bulunmuştur. ROE ile CR, APT ve FS arasında anlamlı ve pozitif bir ilişki ve ROE ile FL arasında anlamlı ve negatif bir ilişki bulunmuştur.

Anahtar Kelimeler: Çalışma sermayesi, Karlılık, Borsa İstanbul, Panel veri analizi

ACKNOWLEDGEMENTS

The author of this thesis stated that

"I present my deepest gratitude to my deary deceased father Mennan GÖZDAMLA who provided the opportunities to have well education to me, my mother, and my brother. He was also a great singing artist.

As well as my deary late father, I also present my deepest gratitude to my deary mother Dr. Nurdan GÖZDAMLA who also provided the opportunities to have well education to me together with my deary late father.

I also present my deepest gratitude to my supervisor Prof. Dr. Hatice DÜZAKIN, Prof. Dr. Mehmet ÖZMEN, Prof. Dr. Kemal Can KILIÇ, Prof. Dr. Yıldırım Beyazıt ÖNAL, Dr. Metin BORAK, and Dr. Süreyya YILMAZ ÖZEKENCİ.

TABLE OF CONTENTS

Page

LIST OF ABBREVIATIONS

BIST : Borsa İstanbul
C_O : Operating cost
CR : Current ratio
APT : Accounts payable turnover
E_G : General expenses for a year
FEM : Fixed effects model
FL : Financial leverage
FS : Firm size
G_{FT} : Finished goods waiting time
IMKB : İstanbul securities exchange
ISE : İstanbul securities exchange
L_A : Average raw material and supplies
L_T : Raw material and supplies waiting time
M_C : Maturities that company offers
M_V : Maturities that vendors offer
NPM : Net profit margin
OPM : Operating profit margin
P_G : Gross profit
P_T : Production time
PM : Pooling Model
REM : Random effects model
ROA : Return on assets
ROE : Return on equity
RT : Receivables turnover
S : Sales
St_A : Average stock amount
T_A : Activity time
WC : Working capital
WCM : Working capital management
FM : Financial management
WCC : Working capital cycle
WCE : Working capital elements
WC_G : Gross working capital

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER I

INTRODUCTION

1.1. The Research Problem and Reason of the Study

The effect of the working capital on profitability is a popular subject that a great number of researchers have been studying on it. Although there were a great number of studies made before on this subject, it could not have been reached a precise result about it. Besides, because economic conditions changed over time, the data which were obtained from the other studies may have also lost their currentness. On the other hand, dynamically changing economic conditions and markets make it more difficult to determine the effect of the working capital on profitability. Therefore, new studies in the same subjects sometimes might be necessary. This situation created a study problem making this study necessary and formed a fundamental reason for this study to be carried out. This study started with this kind of motivation.

1.2. The Aim of the Study

The main aim of this study is to explain what the working capital and its components are and to present current data on how and how much they may affect the profitability of the companies which are traded in the Borsa İstanbul (BIST). In order to reach this aim, at first, comprehensive knowledge about the working capital and related subjects should have been covered. Because of this situation, working capital and the subjects, which are related to working capital, such as working capital cycle, working capital management, working capital elements, working capital types, determination of the working capital, effect of the inflation on the working capital, working capital financing, working capital finance strategies, amount and adequateness of the working capital, and factors that affect working capital amount were explained extensively in the study. Besides, most of these subjects have various subtopics. For example; the working capital types split a great number of sub-headings as gross working capital, net working capital, fixed(constant) working capital, variable working capital, seasonal working capital, periodical working capital, and extraordinary working capital. Working capital management has subtopics as cash management, receivable management, debt management, and stock management. Working capital elements has also subtopics as cur-

rent assets and short-term foreign assets. When it comes to the determination of the working capital, it has various methods as determination of the working capital by using the activity turnover coefficient, determination of the working capital by using daily expense amount, determination of the working capital by using the Schmallenbach formula, determination of the working capital by using the Mellerowicz formula, determination of the working capital by using activity stages, determination of the working capital by proportioning expenses to sales, determination of the working capital by pro forma balance sheet, and determination of the working capital by cash budgeting. Working capital financing could be done in two ways; financing working capital from internal resources, or financing working capital from external resources (Serinoğlu, 2023, pp. 31-33). Working capital finance strategies have three subtopics; hedging financial strategy of the working capital, conservative financing strategy of the working capital, and aggressive financing strategy of the working capital. Amount and adequateness of the working capital have three situations as inadequate working capital, adequate working capital, and excessive working capital. There are three factors that affect the working capital amount; technological condition of the company and length of the production time, size of the activity field of the company, and seasonal and economic fluctuations. Each one of these topics was covered in the study in order to give the readers the required substructure and provide a comprehensive point of view to them so that they can easily understand the subject and the aim of the study. After that, before beginning the practical work, the theoretical data from the past were mentioned shortly about the effect of the working capital on profitability. With this respect, working capital and its components were explained in detail. Then, practical work started, and how and how much the working capital of the 78 companies in question may affect their profitability was tried to be understood.

1.3. The Importance of the Study

This study aims at scrutinizing the relation between working capital and profitability of 78 companies which are traded in the BIST. In terms of investigating the relation between working capital and profitability, it also has similar properties with the studies conducted before and it presented current data about the subject. The study's presenting current data, which are compatible with changing economic and market conditions, makes it easier to analyze the effect of the working capital on profitability ac-

cording to current conditions. It was thought that with the help of the data it provided, the study would contribute to future studies and make it easier to understand the effect of the working capital and its components on the profitability of the companies.

CHAPTER II

LITERATURE REVIEW

2.1. Information about Previous Studies

Kırbaş (2010), in his thesis study named "The working capital management in hospital organizations: To investigate to the effectiveness of working capital management and current status of ministry of health hospitals which have revolving founds in the province of Antalya", examined the financial statements of 14 hospitals in Antalya province in 2005, 2006, 2007 and 2008. He used ratio analyses to find out the relationship between data and profitability. He also benefited from Pearson correlation analysis. As a result of the study, it was found that the amount of working capital in the assets of hospitals was on average 0.83, and the importance of working capital management on the financial performance of hospitals was revealed.

Yıldız (2019), in his thesis study named "The effect of working capital management on firm performance: An application on BIST informatics sector", have investigated the relationship between working capital management and firm performance. In the study, data from 13 enterprises were used and panel data analysis was used. Data were accessed through the ’Kamuyu Aydınlatma Platformu‘, and the’ Finnet 2000 ' program. As a result of the study, it was concluded that the effect of working capital on the performance of the firm differs from company to company.

Güdelci (2016), in his academic article named "İşletme düzeyinde çalışma sermayesi ve karlılık ilişkisi – BIST’de faaliyet gösteren gübre işletmeleri üzerine bir çalışma", benefited from the data of three enterprises traded in the BIST, and in the fertilizer sector between 2006 and 2015. In the results of the study, a strong, significant, and negative relation between working capital and profitability, which is suitable to literature, could not be found. The strongest relation with the dependent variable was the relation between the current ratio and it was found quite low as 7.1%. At the end of the study, a relation between working capital and gross profit could not be detected.

Helhel and Karasakal (2017), in their academic paper named "The effects of working capital management on profitability performance in accommodation establishments: an application on Borsa İstanbul (BİST)", used data between 2005 and 2015 from five accommodation enterprises that do not have a consolidated balance sheet.

They determined profitability performance variables as the ratio of return on assets and return on equity. At the end of the study, they concluded that financial leverage and net working capital ratio negatively affect both the two performance variables, asset turnover rate and receivable turnover rate positively affect the return on assets, and other variables do not affect profitability.

Eskin and Güvemli (2020), in their academic article named "Effect of Working Capital Management on Profitability: Evidence from Borsa İstanbul 50 Index", analyzed data from 33 nonfinancial companies traded in the BIST 50 index in 2012 and 2016. They used multiple regression correlation methods in data analysis. At the end of the study, they were unable to detect a significant relation between the cash return time and the return on assets or operating profit for these companies. They detected a positive correlation between return on assets and company age, liquidity ratio and cash return time, operating profit and financial leverage, and the number of employees and company size.

Akyüz and Atmaca (2019), in their study named "Effects of working capital related financial ratios on business profitability: an application in Borsa İstanbul's listed manufacturing industry companies", calculated the financial ratios of 160 companies in the manufacturing sector between 2010 and 2018. In the study, they used panel data analysis, cointegration analysis and regression analysis. In the study, current ratio, receivables turnover, receivables collection period, stock turnover, in-stock period and cash conversion period are considered as independent variables. Profitability of sales, return on assets and return on equity are considered as dependent variables. At the end of the study, a significant relationship was determined between the independent variables and the profitability of sales. This relationship was negative for holding time and positive for other independent variables. A significant relationship was found between independent variables and return on assets. This relationship was negative for receivable collection period and stock holding period, and positive for other independent variables.

Akyüz, Yıldırım, Akyüz, Ersen, Aydın and the Üçüncü (2019), in their academic article named "Relationship between the working capital and profitability in the companies operating in paper and paper products sector", investigated the relation between working capital and profitability for 14 companies which are traded in the Borsa İstanbul and in the paper sector by benefiting from the data from 2011-2016. In the study, they used regression and correlation analyses. In the study, they concluded that the asset

turnover rate affects working capital and profitability positively, and the leverage ratio negatively.

Aytürk and Yanık (2015), in their academic article named "Çalışma sermayesi yönetimi Türkiye'deki KOBİ'lerde karlılığı nasıl etkiler?", investigated the relationship between working capital and profitability in SMEs. In the study, the data of 1123 SMEs between 2009 and 2013 were examined. In the study, a negative relationship was found between cash cycle and profitability.

Çerçel and Sökmen (2019), in their study named "The Effect of Working Capital Management on Firms' Profitability: A Research on Metal Goods, Machinery and Equipment Construction Which Firms Listed on BIST ", investigated whether there is a relationship between working capital management and profitability for 32 companies which are traded in the Borsa İstanbul and from the manufacturing sector. In the study, 243 annual data for the years 2010-2017 were used. Return on assets was considered as the dependent variable of the study. In the study, the independent variables were considered as leverage ratio, firm size, stock turnover and cash conversion period. As a result of the study, a negative relation was determined between leverage ratio and return on assets. A positive relation was found between firm size, stock turnover and cash conversion cycle, and return on assets.

Sağlam and Karaca (2015), in their study named "The effect on firm profitability of component of working capital: An application over Borsa İstanbul firm", examined the data of 17 textile companies traded in Borsa Istanbul between the years 2000-2012. Return on equity, return on assets and market value were used as dependent variables. Asset turnover, receivables turnover, current ratio, stock turnover, net working capital, working capital turnover, total debt ratio, acid-test ratio, cash ratio and short-term debt ratio were used as independent variables. In the study, it was concluded that the short-term debt ratio and the total debt ratio affect the profitability of the firm negatively and the current ratio does not have a significant effect on profitability. At the end of the study, it was determined that asset turnover, receivables turnover, stock turnover, net working capital, working capital turnover, acid-test ratio and cash ratio positively affect the profitability.

Yıldız and Deniz (2020), in their study named "Working capital factors affecting the profitability of firms traded in BIST stars index", examined the effects of working capital components on the profitability of BIST star index companies. In the study, the data of the companies between 2010 and 2018 were analyzed with the panel data meth-

od. A positive and significant relationship was found between the asset turnover, stock turnover, ratio of current assets to total assets, firm size and return on assets. In the same way, a positive and significant relation was found between these variables and the return on equity. The effect of leverage ratio on return on assets and return on equity was found to be negative and significant. No relationship was found between the profitability of the firms and the receivables turnover, accounts payable turnover, and cash conversion cycle.

Coşkun and Kök (2011), in their study named "Effect of working capital policies on profitability: A dynamic panel analysis", used the annual data of 74 companies traded in the BIST between 1991 and 2005. They used cash conversion cycle, receivables collection period, debt payment period and stock turnover period as criteria of working capital. They used the return on assets as a measure of profitability. As a result of the study, they determined a negative relationship between cash conversion cycle, receivable collection period, stock turnover period and profitability. A positive relationship was found between debt payment period and profitability.

Korkmaz and Yaman (2019), in their study named "Impact of working capital management on firm's profitability: an application on BIST tourism companies", examined the data of 6 tourism companies between 2011 and 2017. They investigated the effect of working capital management on firm profitability with panel data analysis. At the end of the study, they detected a significant and negative relationship between cash conversion period, receivable collection period, inventory turnover period and operating profitability. In addition, it has been found that the debt service period has a positive and significant effect on the operating profitability.

Altan and Şekeroğlu (2013), in their study named "The effects of working capital financing strategies on profitability: a research on companıes listed on ISE", examined the data of 16 weaving industry companies traded in the IMKB. In the study, regression analysis was performed in SPSS 15.0 program. At the end of the study, it was found that there is a significant relationship between working capital financing strategies and the return on assets.

Atmaca (2016), in his study named "Effect of components of working capital over profitability by financial ratios: A research study about the businesses in the chemicals, petroleum, rubber and plastic goods sector in Borsa İstanbul", investigated the effect of working capital components on profitability through financial ratios. In the study, the data of 24 companies which are traded in the Borsa İstanbul and in the chem-

ical, plastic and rubber sectors were used. The used data belonged to the 2009-2015 period. In the research, a negative correlation was found between holding period in stock, receivable collection period, debt payment period and return on equity. A positive relationship was found between holding period, cash conversion cycle, current ratio and the return on assets. A negative relationship was determined between the debt payment period, receivable collection period and the return on assets.

2.2. Theoretical Information Related to Working Capital and Its Components

2.2.1. Definition of the Working Capital

Working capital (WC) is one of the important parts of a great number of macro-economic models which emphasize the effect on company decisions of the fluctuations in capital cost (Schwartzman, 2013, p. 300). Each firm needs WC for its routine work activities regardless of its size, sector, or social aim (Shrivastava et al., 2017, p. 568). WC means available capital of the companies, organizations, and other legal entities whether they are in the state body or in the private sector to start its activities and to last them after they are constituted with the help of their real capitals and procure their fixed assets. In other words, it means the remained part of the current assets of the company after short-term debts are subtracted.

WC directly affects companies' sustaining their lives (Spînache, 2011, p. 463). The composition, structure, turnover rate, and use efficacy of the WC determine the financial situation and market position of the company (Bondina et al., 2020, p. 89). With fixed assets such as plants, buildings, and equipment, WC is accepted as a part of the total capital of the company. Gross WC and current assets are equal. In order to find the net WC, simply subtracting the short-term debts from the current assets is enough. In this condition, if the monetary value of the current assets is below the short-term debts, WC deficit, in other words, negative WC emerges, and this is not a desired circumstance in the way of the companies' sustaining their activities, growth, and reaching their aims.

Holding a positive WC on condition that it is sufficient level, enables companies, organizations, and legal entities whether they are in the state body or in the private sector to sustain their activities, to meet the debts whose payment dates are approaching and operating expenses. In this respect, WC of a company is quite important to sustain its existence. If companies do not have enough WC, they may not pay their current ma-

turities and face various sanctions as making loss by being obliged to pay them with progressed interest or they may not meet operating expenses. This kind of situation may put the existence of the organizations at risk in time. Because of these kinds of risks, WC is an important subject which is required to be considered. Due to this, the importance of WC in the financial management (FM) understandings of the companies and organizations is a subject that is required to be scrutinized meticulously. Being at the sufficient level of the WC enables companies to maintain their production with a suitable capacity, and to offer the best services to their customers by using their service capacity in the most suitable way, and prevents the financial losses which may originate from lack of these factors. Besides, having a sufficient WC helps companies and organizations to overcome extraordinary monetary processes.

The first most important aim of the companies is to increase their share prices and the second one is to make a profit. In order that the company reaches these most important two aims, it should be able to sustain its services appropriately, to continue its production with a most suitable capacity if it makes production, to manage correctly its stock capacity, particularly, to be able to pay its short term debts, and to be able to allocate resource for its customers if it is a bank or a similar financial institution. In order that the company can do all of these things, it should keep its WC above a certain limit as positive, and give the deserved importance to the subject of the WC. Otherwise, the company cannot reach its aims which are vital for it such as paying debts, supply the goods from the stocks, increasing share price or profitableness because production and service processes may have a hitch, and, moreover, this situation may even put its sustaining its existence at risk. In order to avert the emergence of all of these situations, having WC consciousness in terms of businesses and giving the required importance to the WCM should be in the agendas of the companies and organizations as a quite vital matter.

As well as keeping WC above a certain level and managing it correctly is one of the most crucial aspects for companies and organizations in terms of maintaining their existence and functions, companies give the required importance with a good WCM in the way of reaching their some crucial aims such as increasing share price, making profit, and increasing their profitability.

2.2.2. Working Capital Cycle

Working capital cycle (WCC) is also known as cash conversion cycle or operating cycle. WCC means the period which is encountered after the duration of the short-term debts is subtracted from the duration in which current assets become liquid. Being longer of this duration from a certain time creates a disadvantage for the company. Findings of the various studies are quite obvious about this subject, and they suggest that, in most instances, diminishing WCC has a positive effect on profitability (Gołaś, 2020, p. 278). While the duration of the WCC changes from company to company by their activity fields, if a company cannot succeed in keeping its WCC under a certain level for a long time, or if it does not give the required importance to this subject, the company's reaching its various aims such as increasing its share price, making a profit, increasing its profitability, may become impossible and this situation may put the sustainability of the company's activities and existence at serious risk. In order that all of these bad scenarios do not realize, companies should manage their WCC in the best way. In this respect, being careful of the companies about maturities of their short-term debts, stock turnover rate, and the maturities which the company determines for receivables from its customers is crucial.

Companies try to decrease their capital cycles by collecting their receivables or, sometimes, prolonging their accounts payable. In some conditions, for example, in situations in which the unexpected demand increments exceed stocks or liquid deficit restricts the company's capacity to obtain commercial and production inputs. A positive WCC balances incoming and outgoing payments in order to decrease the net WC to a minimum level and to increase free cash flow to a maximum level. For instance, for a company that makes payment to its supplier once 40 days and collects its receivables once 60 days, WCC is 20 days, and this 20-day WCC may be generally financed by a bank, and interest of this financing is a holding cost which decreases company's profitability.

Clients scrutinize the WCC of the company carefully because this gives an idea about the efficacy of the administrative body on managing balance sheets and creating free cash flow. Because a positive WC is a sign to show that current assets are sufficient to meet current liabilities, funders generally desire to see a positive WC. When WC of the company is negative, the company encounters with the risk of not being able to meet current liabilities through its current assets.

2.2.3. Working Capital Elements

Administrators realized that it should be worked on the relation between working capital elements (WCE) and factors that affects working capital, and thought that while the performance of the company is evaluated, this relation should be considered (Haron and Nomran, 2016, p. 462). This situation, besides, emphasizes the importance of scrutinizing the WCE. WCE consists of current assets and short-term foreign assets (short-term debts).

Current assets consist of elements below.

-Liquid assets

-Marketable Securities

-Trade receivables

-Stocks

-Other receivables

-Construction and repair costs spread over years

-Short-term prepaid expenses and accrued income

-Other current assets

The accounts which are in the liquid assets consist of the elements below. The codes of the accounts were not given, just their names were given.

-Cash account

-Banks account

-Checks received account

-Checks given and payment orders account

-Other liquid assets account

The accounts which are in the marketable securities consist of the elements below. The codes of the accounts were not given, just their names were given.

-Stocks account

-Public sector bonds, notes, and bills account

- Private sector bonds, notes, and bills account

-Other marketable securities account

-Provision for decrease in value of marketable securities

The accounts which are in the trade receivables consist of the elements below. The codes of the accounts were not given, just their names were given.

-Buyers account

-Notes receivable account
-Unearned lease interest income account
-Deposits and guarantees given account
-Doubtful trade receivables account
-Provision for doubtful trade receivables account
-Other trade receivables account

The accounts which are in other receivables consist of the elements below. The codes of the accounts were not given, just their names were given.

-Receivables from shareholders account
-Receivables from participations account
-Receivables from related companies account
-Receivables from personnel account
-Other doubtful receivables account
-Provision for other doubtful receivables account
-Other miscellaneous receivables account
-Rediscount on other notes receivable account

The accounts which are in the stocks consist of the elements below. The codes of the accounts were not given, just their names were given.

-Raw materials and supplies account
-Semi-finished goods account
-Finished goods account
-Trade goods account
-Other stocks account
-Provision for the decline in the value of stocks account
-Advances given to suppliers account

The accounts which are in the construction and repair cost spread over years consist of the elements below. The codes of the accounts were not given, just their names were given.

-Construction and repair costs spread over years account
-Inflation adjustments on contract progress account
-Advances given to sub-contractors account

The accounts which are in the short-term prepaid expenses and accrued income consist of the elements below. The codes of the accounts were not given, just their names were given.

-Prepaid expenses for the next months' account

-Income accruals account

The accounts which are in other current assets consist of the elements below. The codes of the accounts were not given, just their names were given.

-Value added tax carried forward account

-Value added tax to deduct account

-Other value added tax account

-Prepaid taxes and funds account

-Work advances account

-Personnel advances account

-Count and delivery shortages account

-Other current assets account

-Provision for other current assets account

Short-term foreign assets consist of the elements below.

-Financial liabilities

-Trade liabilities

-Other liabilities

-Advances received

-Construction and repair billings spread over years

-Taxes payable and other liabilities

-Provision for liabilities and expenses

-Short-term deferred income and accrued expenses

-Other short-term liabilities

The accounts which are in the financial liabilities consist of the elements below. The codes of the accounts were not given, just their names were given.

-Bank loans account

-Principal installments and interests of long-term loans account

-Current maturities of bonds and accrued interest account

-Bonds and notes issued account

-Other marketable securities issued account

-Premiums on marketable securities account

-Other financial liabilities account

The accounts which are in the trade liabilities consist of the elements below. The codes of the accounts were not given, just their names were given.

-Salespeople account

-Notes payable account

-Rediscount on notes payables account

-Deposits and guarantees received account

-Other trade payables account

The accounts which are in other liabilities consist of the elements below. The codes of the accounts were not given, just their names were given.

-Payables to shareholders account

-Payables to participations account

-Payables to subsidiaries account

-Payables to personnel account

-Other miscellaneous payables account

-Rediscount on other notes payable account

The accounts which are in the advances received consist of the elements below. The codes of the accounts were not given, just their names were given.

-Advances received from customers account

-Other advances received account

The accounts which are in the construction and repair billings spread over years consist of the elements below. The codes of the accounts were not given, just their names were given.

-Progress payments for long-term construction and repair projects account

The accounts which are in the taxes payable and other liabilities consist of the elements below. The codes of the accounts were not given, just their names were given.

-Taxes and funds payable account

-Social security premiums payable account

-Overdue, deferred or structured taxes and other liabilities account

-Other liabilities payable account

The accounts which are in the provisions for liabilities and expenses consist of the elements below. The codes of the accounts were not given, just their names were given.

-Provision for cost expenses account
-Provision for taxation on current period profit and other liabilities account
-Prepaid tax and other liabilities on current year profit account
-Provision for employee termination benefits
-Provisions for other liabilities and expenses

The accounts which are in the short-term deferred income and accrued expenses consist of the elements below. The codes of the accounts were not given, just their names were given.

-Revenue collected in advance relevant to coming months account
-Expense accruals account

The accounts which are in other short-term liabilities consist of the elements below. The codes of the accounts were not given, just their names were given.

-Value added tax calculated account
-Other value added tax account
-Current account for head office and branches
-Count and delivery surplus account
-Other miscellaneous liabilities account

2.2.4. Working Capital Management

Managerial problems increased in time as parallel to the enlargement of the business volume (Düzakın, 2009, p. 150). Until the 1950s, the incumbency of the finance manager was to keep the accounting records, to prepare the financial reports between certain time intervals, and to provide funds which the company needed. However, as a result of the economic, legal, technological, commercial, social, and political developments which were experienced, the financial manager has undertaken new duties such as detecting finance policies and strategies and realizing them by preparing suitable programs (Önal and Karadeniz, 2004, p. 140). Thus, the responsibility of the financial managers increased. Today, they are required to decide much more important financial matters. In order to make a decision on financial matters, it is required to be in the know in quite different fields (Düzakın, 2013, p. 19). Due to this, financial managers' being knowledgeable is significant for the companies. Financial management has various sub-branches such as debt management, receivable management, etc. One of the most significant ones of these sub-branches is the working capital management (WCM).

In a company, WCM is one of the most important incumbencies of the financial manager (Wasilewski and Zabolotnyy, 2009, p. 111). The importance of an effective WCM is unquestionable (Ramachandran and Janakiraman, 2009, p. 72). Because the WCM is quite important to companies in terms of being able to reach their targets, to sustain their existence and activities, a good WCM is also a crucial issue for the companies. What WCM dwells on are short-term investment decisions and financing of these decisions (Dursun and Ayrıçay, 2012, p. 200). Managing the relation between current assets and short-term debts of a company is about WCM. The aim of the WCM is to enable companies so that they continue their activities, and that they have sufficient cash flow to meet both their upcoming short-term debts and their future operating expenses. WCM is a managerial accounting strategy that focuses upon keeping the effect levels of both the components of current assets and current liabilities. WCM gives companies an opportunity to have adequate cash flow in order to meet short-term obligations and operating expenses.

The phenomenon of growth and sustaining their existence, which is one of the fundamental aims of the companies, has gradually become more important and it drives companies to use their resources optimally (Konak et al., 2018, p. 12). In this respect, WCM is a part of the financial management in the companies, and a good WCM will also affect the management of other resources implicitly. The last financial crisis (for 2016 and before) which caused in America some big companies to collapse, such as Lehman Brother, Bear Stearns, and General Motors, did a further emphasis on an effective WCM and other elements of the capital (Azeez et al., 2016, p. 10).

The decisions which were made during WCM are generally about the next one-year period and most of the time they are short-term decisions which are revocable. Thus, these decisions depend upon cash flows and profitability as different from capital investment decisions. A measurement for the cash flow is provided by the operating cycle which is also stated as the number of days which pass from cash spending for the raw material to taking payment from the customer. This measurement obviously manifests that there is a relation among stocks, receivables, accounts payable, and cash as a management means. Because the operating cycle value means the time when the money of the firm is bound to activities and not used for other functions, companies generally desire to obtain a low operating cycle value.

One other factor which affects WCM is the credit policy of the company. This policy, comprises buying raw material and selling the finished goods in exchange for

cash or credit, which affects the cash conversion cycle. Company uses a series of policies and techniques, and these policies aim to manage current assets and short-term financing in a way in which their cash flows and returns are acceptable.

WCM comprises the subjects of cash management, stock management, receivable management, management of short term liabilities. Success of the work is substantially bound to the company's capability to manage its receivables, stocks, and debts effectively (Wang and Li, 2015, p. 123). As well as each one of the subjects of the cash management, receivable management, management of short term liabilities, and stock management are different fundamental elements of WCM, managing of each one of these correctly is a serious factor in terms of companies' sustaining their activities in order to reach their targets. These four elements were handled under the titles below separately. Each title was analyzed in detail. Besides, the figure which shows the sub-branches of the WCM is below (Figure 2.1).

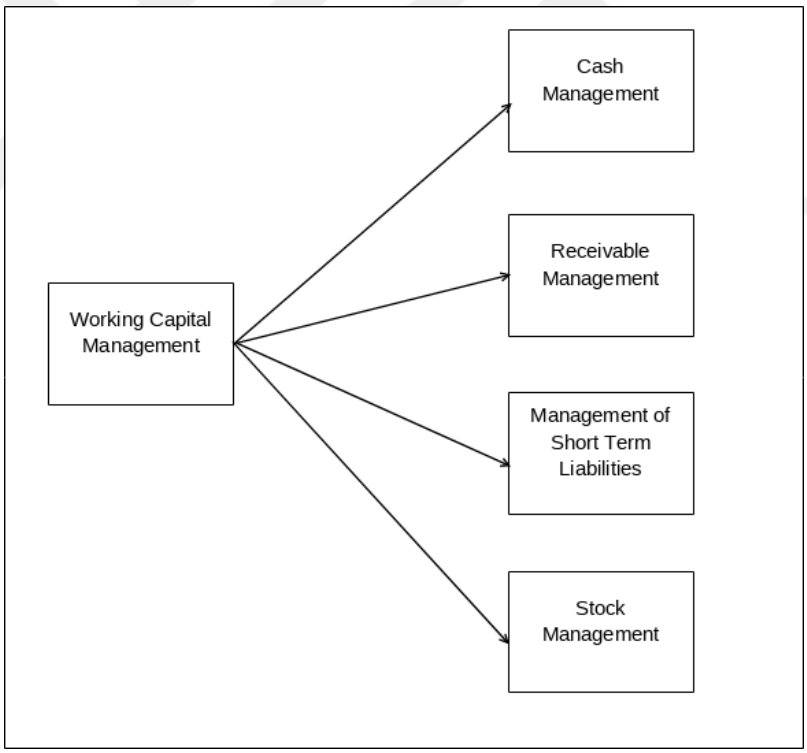

Figure 2.1. Sub-branches of the Working Capital Management (Gholizadeh Khajeh, 2014, pp. 36-49)

2.2.4.1. Cash Management

Cash management can be summarized as the management of cash input and outputs in the companies. Cash management is a quite important means to the companies in

the way of reaching their targets such as increasing share price, or profitability. A good cash management averts suffering cash shortage of the companies both in their debt payments and their activity processes or investments. Cash is a means which establishes a bond among all financial activities of the company; thus, cash management is of significance among all activities of the company. For companies that can pay their debts on time, the possibility of confronting challenging situations decreases and they exhibit a solid image to credit institutions (Sönmez, 2022, p. 24).

2.2.4.2. Receivable Management

When it is looked at in the terms of companies' reaching their aims such as being able to sustain their existence, to increase their share prices and profitability, receivable management is quite important. Particularly, for the financial businesses which give credits such as banks receivable management is more significant. Companies, particularly companies which give financial credit, may encounter too serious problems in case they do not collect their receivables. In the management of receivables, when evaluating potential customers, their payment habits, financial situations, investments they will use as collateral and the general course of the economy are effective (Yıldız, 2019, p. 30).

2.2.4.3. Management of Short Term Liabilities

For the companies which make production in particular, debts generally originate from credits which were drawn to provide raw materials and supplies, goods, and sometimes services. Paying these debts in time is significant to companies in terms of their not being aggrieved. While paying debts before their maturities sometimes causes the company making a profit, it can also cause the company making loss. In this respect, managing debts correctly is quite significant in terms of the companies. Foreign resources can be classified as short-term foreign resources if the maturity is less than one year, and long-term foreign resources if the maturity is longer than 1 year (Sönmez, 2022, pp. 29-30).

2.2.4.4. Stock management

During the activities of the companies, one of the most important current assets is stocks. Stocks' being kept at a certain level is required. If stock level decreases very

low levels, company has a hard time maintaining their activities. If stock level is too much, this may cause too much holding cost. There are various methods to control the stocks. ABC method, and minimum order quantity method can be shown as examples for this (Çevik, 2012, pp. 58-64).

Stock management has a huge importance and it is a serious issue for the companies so that they can maintain their activities. All companies should follow a good stock management policy especially the ones which make production. If companies do not follow a good stock management policy, stock shortage or excessive holding cost may emerge. Because of this, stock management is one of the most significant elements in their operating cycle. Fluctuations in stock levels have a significant economic impact on businesses (Yıldız, 2019, p. 31).

2.2.5. Working Capital Types

Working capital types are gross working capital, net working capital, fixed(constant) working capital, variable working capital, seasonal working capital, periodical working capital, and extraordinary working capital (Serinoğlu, 2023, pp. 16-20). Working capital types were analyzed under titles separately and shown in the table below (Table 2.1).

Table 2.1.
Working Capital Types

Working Capital Types	Gross Working Capital
	Net Working Capital
	Fixed Working Capital
	Variable Working Capital
	Seasonal Working Capital
	Periodical Working Capital
	Extraordinary Working Capital

Gross WC means monetary value of the company assets whose being converted into cash in the related period is quite possible, in other word, it means that current assets. Net WC means the difference between current assets and short-term debts of the company in the related period. The value of the net WC is affected by the company

properties such as sale expectations, financial constraints, and risk of bankruptcy (Baños-Caballero and García-Teruel, 2019, p. 235). Fixed WC is the monetary value of the current assets which the company is required to hold constantly in the related term so that it can maintain their activities. In other words, it means the capital which is needed to be in the company constantly. Variable WC means the WC except for fixed WC. It is named as variable WC because it may change by change in demand. This means any WC amount beyond fixed WC. (Bacaklıoğlu, 2023, pp. 28-30).

In some business sectors, the WC which is required so that the company conducts its functions may change seasonally. This situation is stated through the seasonal WC notion. For example, because difficult winter conditions make production more difficult in mining sector, WC decreases in winter. On the other hand, WC increases in summer because production can be made more. When it comes to periodical WC periodical WC is different from and shouldn't be confused with seasonal WC. Periodical WC means the WC which is affected by the periodical changes as a result of companies' analyzing periodic data. Extraordinary WC means the WC which emerges in the case of the WC of the company being affected from extraordinary reasons. For example, most companies' working capitals in the world were affected from corona virus pandemic. As a result of this extraordinary situation, while WC for a great number of sectors decreased, WC increased for some sectors such as the companies which produce mask.

2.2.6. Determination of the Working Capital

Whether the companies which continue their activities or the companies which start their activities recently are in question, estimation the amount of the WC in advance is a necessity for the companies in the way of reaching their aims such as increasing share price and profitability, and making a profit. In this respect, determining the WC before the related period correctly or approximately correctly is a quite important issue. Although the predictions about the WC are made meticulously, free-market conditions may be full of surprises. Yet, predicting the WC by benefiting statistical data and methods will increase the companies' possibility to be successful and to reach their targets considerably. Besides, the companies which do not have sufficient data may utilize data of other companies in the direction of their permits. Sometimes, companies may also pay other companies to utilize these kinds of data. War, pandemic, and the

similar extraordinary conditions are unforeseeable. On the other hand, except for these kinds of extraordinary conditions, predictions about WC will provide foresight to companies and preserve them from the market's ordinary and expectable fluctuations. When determining the working capital need in the next period, the finance manager should work in coordination with production, marketing and other department managers (Aksu, 2016, p. 137).

2.2.6.1. Determination of the Working Capital by Using the Activity Turnover Coefficient

Ratios are utilized as means in planning and controlling the activities of the companies as well as they are utilized to comprehend current and past performance (Düzakın and Düzakın, 2007, p. 1412). In order to determine the WC, some ratios can be used. One of these ratios is the activity turnover coefficient. In this method, the obtained value by dividing the number of 365, which is the number of days in a year, by the activity time, which is the number of days which the company requires in order to complete its activities, is called the activity turnover coefficient. Being higher the activity turnover coefficient in a company means that the company's activity completing day-number is higher, and being lower it means that the company's activity completing day-number is lower. Because dividing a bigger number to 365 creates bigger number than dividing a lesser number to 365 does. The activity turnover coefficient is a significant indicator in terms of WC, and by dividing total cost by it, the gross WC can be calculated. This calculation was formulated below (Formula 2.1), and in this formula in order to find the gross working capital (WC_G), annual operating cost (C_O) and activity time (T_A) data were used (Okuyan, 2021, p. 90).

Formula of The Gross Working Capital

$$WC_G = \frac{C_O \times T_A}{365} \qquad \textbf{Formula 1}$$

C_O=Annual Operating Cost

T_A=Activity Time

WC_G= Gross Working Capital

2.2.6.2. Determination of the Working Capital by Using Daily Expense Amount

In this method, WC is calculated by depending on how the costs affect the production process. This method asserted in order to remove the lack in the determination of the WC by using activity turnover coefficient. In this method, the monetary value of the current assets is estimated by adding the cost items to the cost during production processes. Then, how much the amount of the WC should be can be found by subtracting the monetary value of the short-term debts from the determined monetary value of the current assets.

In order to do that at first, raw material and supplies are divided by 365 to find the daily raw material and supplies expenses. After that, daily labor costs are found in a similar way. Then, the daily general production expenses and financing expenses and half of them are found. Five items should be found after these calculations. The first item is daily raw material and supplies, which is already known. The second item is daily semi-finished goods expenses. In order to calculate it, daily raw material and supplies expenses, daily labor expenses, half of the daily general production expenses, and half of the daily financing expenses are summed. The third item is daily finished goods expenses. In order to calculate it, daily raw material and supplies expenses, daily labor expenses, daily general production expenses, and daily financing expenses are summed. The fourth item is daily receivables and the fifth item is cash and banks. These five items are multiplied by their turnover rates separately. Then, they are summed. This found amount is called rude WC. After that, the total amount of the daily amortizations and daily profits for each one of these five items are calculated and then they are multiplied by their turnover rates separately before they are summed. In order to find the gross WC, this amount is subtracted from the rude WC. In order to find the net WC, short-term credits which the company benefits should be subtracted from the gross WC (Okuyan, 2021 pp. 92-94).

2.2.6.3. Determination of the Working Capital by Using the Schmallenbach Formula

This method provides precise results particularly for the companies which sell their products directly without attaching added value. There are two different Schmallenbach Formulas. One of them is for commercial undertakes and the second one is for industrial enterprises. In the formulas, WC amount (WC), Sales (S), Gross Profit (P_G),

average stock amount (St_A), general expenses for a year (E_G), maturities that vendors offer (M_V), maturities that the company offers (M_C), and average raw material and supplies (L_A) data were used.

Because the relevant formula do not consider the cash and banks, after the calculations, daily cash and banks should be found and multiplied by its turnover rate and added to the result obtained from relevant the formula in order to find net WC (Aksu, 2016, pp. 143-147).

Schmallenbach Formula for Commercial Undertakes(Aksu, 2016, p. 144)

$$WC = St_A + \left(1 - \frac{P_G}{100}\right)\left(S \times \frac{M_C - M_V}{12}\right) + \left(E_G \times \frac{M_C}{12}\right)$$ **Formula 2**

E_G=General Expenses For A Year

M_C=Maturities That Company Offers

M_V=Maturities That Vendors Offer

P_G=Gross Profit(%)

S=Sales

St_A=Average Stock Amount

WC= Working Capital

Schmallenbach Formula for Industrial Enterprises(Aksu, 2016, p. 144)

$$WC = St_A + \left(1 - \frac{P_G}{100}\right)\left(S \times \frac{M_C}{12}\right) - \left(L_A \times \frac{M_V}{12}\right) + \left(E_G \times \frac{M_C}{12}\right)$$ **Formula 3**

E_G=General Expenses For A Year

L_A=Average Raw Material And Supplies

M_C=Maturities That Company Offers

M_V=Maturities That Vendors Offer

P_G=Gross Profit(%)

S=Sales

St_A=Average Stock Amount

WC= Working Capital

2.2.6.4. Determination of the Working Capital by Using the Mellerowicz Formula

In the Mellorowicz formula, WC amount (WC), maturities that vendors offer (M_V), maturities that the company offers (M_C), average raw material and supplies (L_A), daily cost (C_D), raw material and supplies waiting time (L_T), finished goods waiting time (G_{FT}), and production time (P_T) data were used.

In this method, after the calculations were done, some corrections should be conducted. First of all, daily general management and selling expenses should be multiplied by activity turnover rate and added to the receivables. After that, cash and banks and the receivables must be added to the result. Then, the difference between daily cost and daily semi-finished goods should be multiplied by semi-finished goods turnover rate and subtracted from the result. Finally, daily amortizations should be multiplied by their capital tying up time and subtracted from the last result because amortizations do not require capital (Aksu, 2016, pp.147-149).

Mellerowicz Formula(Toy, 2022, p. 56)

$$WC = L_A(L_T - M_V) + C_D(P_T + G_{FT} + M_C) \quad \textbf{Formula 4}$$

C_D=Daily Cost

G_{FT}=Finished Goods Waiting Time

L_A=Average Raw Material And Supplies

L_T=Raw Material And Supplies Waiting Time

M_C=Maturities That Company Offers

M_V=Maturities That Vendors Offer

P_T=Production Time

WC= Working Capital

2.2.6.5. Other Methods

One of the methods in determining WC is determination of WC by using activity stages. In this method, WC is tried to be determined by utilizing the data from the previous periods. WC is determined by taking into account the monetary amounts which will be obtained from short-term resources in each stage. Another method to determine WC is proportioning expenses to sales. In this method, WC is tried to be determined with the help of estimated sales and detection of the changes in the departments which varies through the amount of the sales. Another method is determination of the working capital by pro forma balance sheet. The pro forma balance sheet is a presumptive balance sheet prepared before preparation of the real balance sheet. Determination of the working capital through pro forma balance sheet is one of the WC calculation methods in which predictions as to items that will be able to come true in the balance sheet in a certain period are done. The last method in determining WC is determination of the working capital by cash budgeting. In this method, in order to calculate WC, cash inputs

and outputs in a certain period are used as data. Whether there is a cash shortage or cash surplus is also considered so as to understand whether there is a need or not.

2.2.7. Effect of the Inflation on the Working Capital

Inflation increment always constitutes a serious risk for the companies. In some periods when prices soar up because of inflation, predicted WC may remain insufficient. In this kind of condition in which predicted WC remains insufficient, recalculated WC as a result of inflation may be much more than predicted WC. The company may have a hard time meeting the WC, which it needs to use, or it may not be able to meet this WC. These kinds of conditions constitute a huge risk for the company. On the one hand, the company may not reach its targets such as increasing share price and increasing its profitability. On the other hand, its existence may be even at risk. Due to this, inflation should be considered in the calculation of WC.

If companies' making a profit, increasing their share prices, or at least sustaining their activities is desired, customers' having the purchasing power for the sold products and services is a must. On the other hand, when these kinds of inflationary periods are in question, the purchasing power of the customers also decreases in general. While decreasing the purchasing power and increasing joblessness causes the loss of potential customers, it also averts gaining new customers. Because of this, inflationary periods are extremely dangerous and risky periods for companies. In order to alleviate the devastating effects of the negations which companies may encounter, considering these kinds of inflationary periods, and the possible inflation amount which may be encountered in these kinds of periods, and holding their WC with a safety coefficient slightly higher than the first calculations by including the inflation rate which may be possibly encountered by the companies are beneficial in terms of not encountering negative surprises. Because in inflationary periods, in which the general level of prices constantly increases, companies' working capitals weaken and working capital needs increase (Aytekin, 2006, p. 29).

In order to estimate future inflations, companies can also use statistical methods such as trend analysis, exponential smoothing, regression analysis, moving average, and weighted moving average. The inflation rate can be predicted by using the most suitable of these methods or similar methods. After that, estimation of the WC can be done by considering the inflation effect. Determining the WC correctly will provide the compa-

ny's sustaining its activities without a problem. The assets of a company that sustains its activities without a problem are not at risk. In the escalating competition medium, the company can compete against its rivals more powerfully, and its possibility to reach its targets such as increasing share price, making more profit increases considerably.

2.2.8. Working Capital Financing

Finance function has become more important in the companies in time. The fundamental aim of the finance function is rendering the firm value maximum in terms of shareholders (Önal et al., 2005, p. 369). Financing of WC is a notion that states from which resource the WC will be obtained. Financing of WC is a part of the whole financing policy of the company. There are two kinds of financing resources in the companies. The first one of these is internal financing resources, and the second one is external financing resources. Resources as to the financing of WC were shown in the table below (Table 2.2) and analyzed under titles in detail.

Table 2.2.

Financing Resources of Working Capital

Working Capital Financing	Financing Working Capital from Internal Resources
	Financing Working Capital from External Resources

(Serinoğlu, 2023, pp. 31-33)

2.2.8.1. Financing Working Capital from Internal Resources

If companies finance their WC with the help of their internal funds, meeting the WC from internal resources situation emerges. One of the methods to finance WC from internal resources is financing WC through obtained profit. In this financing method, the obtained net profit can be used regardless the period. In this kind of financing, the company does not borrow. This method is also called auto financing of the working capital. Another way to finance WC from internal resources is amortizations. Amortizations mean the wear and tear levels of the fixed assets. Benefiting from the amortizations in financing of the working capital is a working capital internal financing method. Amortization methods were split into three parts.

- Ordinary amortization method
- Declining balance method
- Extraordinary amortization method

Another method to finance WC from internal resources is financing WC through accelerating the cash flow. Liquidity demonstrates a company's meeting capacity to its short-term liabilities (Shahzad et al., 2015, p. 87). Due to this, cash conversion process is benefited in this method. In this method, cash return time is desired to be decreased to minimum level. For example, for a company which makes production, the variable which cash return time is dependent on is production time because realizing the sales is dependent on the production time. Due to this, this company can provide more WC financing by decreasing this time.

2.2.8.2. Financing Working Capital from External Resources

External financing resources are the financial resources which company can use by borrowing. These resources are the money which was taken from outside of the company for a certain period in exchange for repaying with its interest. When WC is met from these kinds of foreign capitals, meeting the WC from external resources situation emerges. In these kinds of situations, short-term debts are used more often than long-term debts as financial resource in order to procure WC. In financing WC, the most important resource for the companies is trade debts (Çınar and Kaymaz, 2020, p. 597). Some short-time debt resources are short-term bank credits, short-term trade credits, commercial papers, factoring, and repurchase agreements.

2.2.9. Working Capital Finance Strategies

As is known, in the companies, financing necessity of current assets is met from short-term resources while financing necessity of fixed assets is met from long-term resources. If this strategy is not conducted as it is needed to be done, a complex financial problem emerges in the companies. When financing strategies of WC is said, three different strategic methods come into mind. These strategies are hedging financing strategy, conservative financing strategy, and aggressive financing strategy. These strategies were firstly listed in the table below (Table 2.3) and then analyzed under titles separately.

Table 2.3.

Financial Strategies of Working Capital

Financing Strategies of the Working Capital	Hedging Financing Strategy
	Conservative Financing Strategy
	Aggressive Financing Strategy

(Serinoğlu, 2023, pp. 48-51)

2.2.9.1. Hedging Financial Strategy of the Working Capital

In this strategy, variable WC is financed from short-term resources while fixed WC is financed from long-term resources. This strategy is a strategy that is implemented by the companies, whose WC vary from season to season.

2.2.9.2. Conservative Financing Strategy of the Working Capital

In this strategy, there are two methods, and one of the two methods can be followed. While the whole WC is financed from long-term resources in the first method, in the second method, fixed WC is financed from short-term resources, and variable WC is financed from long-term resources.

2.2.9.3. Aggressive Financing Strategy of the Working Capital

In this strategy, financing strategy is accordingly shaped as the amount of the short-term debts increases, and as this increasing continues, this strategy becomes more aggressive. In this strategy, in which trade debts and short-term credits are often used in order to finance WC, the dependence on the short-term debts become more powerful.

2.2.10. Amount and Adequateness of the Working Capital

There are three different situations regarding the approximate amount and sufficiency of the working capital. These situations are inadequate working capital, adequate working capital, and excessive working capital. These 3 situations about the amount and adequateness of the working capital were demonstrated in the figure below (Figure 2.2) and analyzed under titles.

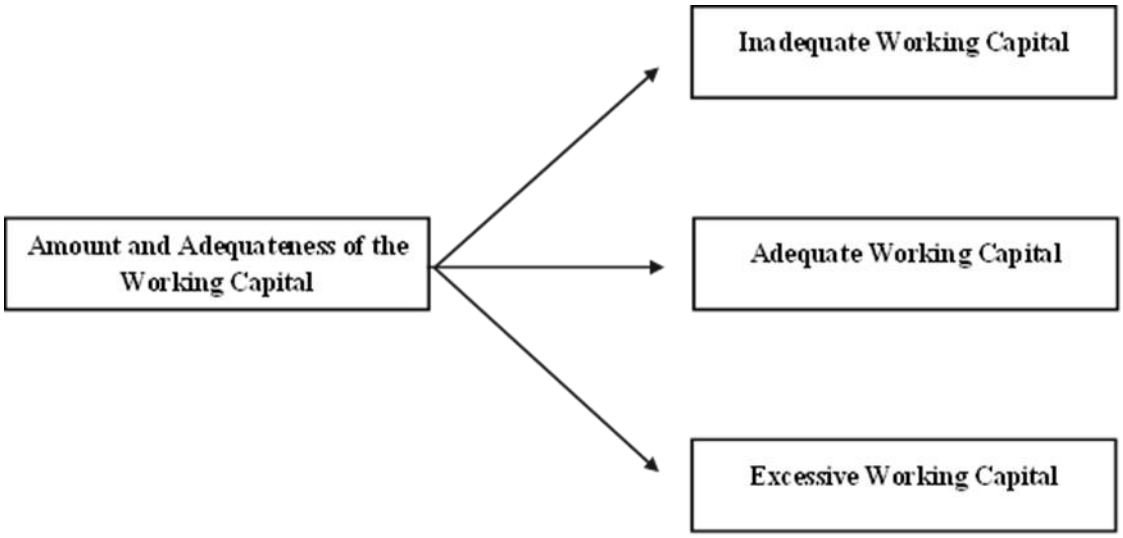

Figure 2.2. Amount and Adequateness of Working Capital (Aksu, 2016, pp.197-199)

When the WC is inadequate, quite a disadvantageous situation emerges for the company because business and production capacities are restrained. The company may not be able to meet some expenses sufficiently. Some of those expenses are raw material and supplies, labor expenses, and general production expenses such as electric bill, water bill, etc.

In production companies, the amount which was produced and dispatched to the stocks will decrease because of production hitches. Although there is no a new constraint originating from the market, sales volume will also decrease in time because the product amount will decrease in the stocks. The company may be able to find itself in a vicious circle while the continuous decrease in the sales may even put the company's existence at risk. Due to all of these reasons, inadequate WC is one of the most dangerous situations which the company may encounter. Therefore, the companies should give the required importance to the adequate financing of the WC, chose the most suitable WC determination method as much as possible by considering inflation and other threats, and determine the financial strategy of WC the most correctly.

When the WC is adequate, the companies can continue their activities such as production and service with optimum capacity unless there is an extraordinary situation. But, when the extraordinary situations which may affect the market profoundly are in question such as pandemic, excessive inflation, and stagflation, WC of the company may remain insufficient. In this respect, companies' carrying out its activities with adequate WC without compelling their financial resources is the most correct decision when the whole company is considered.

Excessive WC means that the company is under an excessive financial load. If this financing has been met from shareholders equity, other potential users of these funds may not be able to benefit from these resources. This situation may cause financial difficulties in other departments of the company. If this financing has been met from foreign assets, company will be under more borrow and interest load. Therefore, while this situation strengthens the company in one respect, it weakens the company in other respects. Of course, this situation changes from company to company. For the companies which have quite powerful financial capacity, procuring excessive WC may not create a funding shortage and it may not drive the company under a heavy financial load. In this kind of situation, excessive WC may be exceptionally in the interest of the company, and it may protect the company from extraordinary market fluctuations which originated from pandemics, stagflation, and the similar conditions. However, it should not be forgotten that the number of these kinds of companies whose financial capacity are quite high is very low. Consequently, as long as extraordinary situations and market conditions are not in question, excessive WC is harmful for the companies although it is not harmful as much as inadequate WC does. Working capital's being higher or lower than the necessary amount creates problems (Tekin and Bastak, 2021, p. 139).

2.2.11. Factors That Affect the Working Capital Amount

Determination of the WC need as amount constitutes one of the important hardships in the financial management process. First of all, each company's being a living existence and having different needs is a significant issue which should be considered. Previous studies have shown that WCM factors such as size, leverage, and capaciousness had a significant effect on the company performance (Rahman et al., 2019, p. 109). Examinations as to the main factors of the WC are not a simple issue (Palombini and Nakamura, 2012, p. 56). Type, size, the production or service capacity of the company, the relevant countries' law and tax policy, and a lot of similar factors affects the companies' working capitals. As well as the companies' working capitals changes from company to company, time is also a crucial factor on the WC. Therefore, companies' WC may increase or decrease in time. This situation brings about a quite complex matter, which differs from company to company, from time to time, and from condition to condition.

Because of these reasons, the factors that affect WC amounts of the companies are quite significant matter. It should not be forgotten that determining these factors and observing the changes which occurs in time in them should be conducted meticulously and the time factor should be also considered. Some of these factors were listed below and analyzed under titles separately.

-Technological condition of the company and length of the production time

-Size of the activity field of the company

-Seasonal and economic fluctuations

Technological condition of the company and length of the production time is one of the most important factors that affect the WC of the company. The companies whose technological superiorities are high can produce more amounts of products with higher quality in less time. Producing products in more amounts enables companies to seize the scale economy, or if they have already seized, to hold it. While the technology decreases the labor expenses by undertaking the works which people do, it also reduces some general production costs such as electric bill, and the like by decreasing production time. In this respect, WC need diminishes compared to company's size with the help of the technology.

Working capitals of the companies differ by the activity fields of the companies. Because processes, inputs, and outputs which functions in the sectors are different from each other. As the products become more complex and developed, production process stretches and this situation naturally increases the WC need. For example, the WC need of a car producer company is more than the WC need of a wafer producer company when two equal-sized firms are considered. For this reason, activity fields of the companies should be considered in the calculation of the working capital as a factor which affects companies' working capitals directly.

Seasons can affect some companies' working capitals. Agricultural sector can be given as an example for this. Besides, extraordinary economic fluctuations may also affect the companies' working capitals. In the war, pandemic, and the similar extraordinary periods in which hyperinflation, economic shrinkage, or recession is in question, working capitals of the companies can be affected by this situation naturally.

2.2.12. Effect of the Working Capital on Profitability

WC and a good WCM will affect the companies' profitability directly. First of all, a good WCM is an indispensable condition so that companies sustain their existence. While the companies which manage their WC well can sustain their existence, reaching their aims also becomes easier for them.

In the previous studies which were about the effect of the working capital on profitability, a negative and significant relation was detected between gross profit on sale and stock time while a negative and insignificant relationship was detected with the collection process (Durdu, 2019, p. 50). In another study, when asset turnover rate and current ratio are in question, 5% positive and significant relation, and 0.04 point asset turnover rate increment per 1-point increment in the BIST information sector were detected (Yıldız, 2019, pp. 142-143). In a study, data from 102 industrial enterprises which constantly continued their activities between 2010 and 2018 were analyzed. In the study, while significant relations were detected for all variables except for stock turnover rate, a negative relation was detected between receivables collection period, debt payment period, leverage ratio and return on assets, and a positive relation was detected between current ratio, company size and return on assets. (Erdoğan, 2019, p. 100).

The literature about the effect of the working capital on profitability is quite voluminous. The common point of all of these studies is that they unite on the fact that a good WCM will positively affect the profitability. This situation offers the concrete evidences of why a good WCM is effective and how the WCM affects companies' profitability as well as demonstrating the importance of the WC.

CHAPTER III

METHOD

3.1. Method

In this study, the effect of working capital on profitability was investigated. Data were obtained from Public Disclosure Platform and Finnet. Within the scope of the study, the annual data of 78 manufacturing companies whose data were able to be accessed were utilized between 2010 and 2021. These 78 firms in question were considered the sample among a population composed of 209 manufacturing firms, and commercial ratios were utilized. Return on assets(ROA), operating profit margin(OPM), net profit margin(NPM), and return on equity(ROE) were dependent variables. Financial leverage(FL), receivables turnover(RT), stock turnover(ST), accounts payable turnover(APT), and current ratio(CR) were independent variables. Firm size(FS) was the control variable and it was calculated with the help of the formula below.

Firm Size Calculation

$$\frac{Total\ Assets\ of\ the\ Company}{Total\ Assets\ of\ the\ 78\ Companies\ in\ the\ Study} \times 100 \quad \textbf{Formula 5}$$

After that hypotheses and research model were composed. List of research hypotheses and figure of research model were given below (Table 3.1 and Figure 3.1).

Table 3.1.

Hypotheses of the Study

HYPOTHESIS NAME	**HYPOTHESIS CONTENT**
H_{1A}	There is a relationship between FL and ROA
H_{1B}	There is a relationship between FL and OPM
H_{1C}	There is a relationship between FL and NPM
H_{1D}	There is a relationship between FL and ROE
H_{2A}	There is a relationship between RT and ROA
H_{2B}	There is a relationship between RT and OPM
H_{2C}	There is a relationship between RT and NPM
H_{2D}	There is a relationship between RT and ROE
H_{3A}	There is a relationship between ST and ROA
H_{3B}	There is a relationship between ST and OPM
H_{3C}	There is a relationship between ST and NPM
H_{3D}	There is a relationship between ST and ROE
H_{4A}	There is a relationship between APT and ROA
H_{4B}	There is a relationship between APT and OPM
H_{4C}	There is a relationship between APT and NPM
H_{4D}	There is a relationship between APT and ROE
H_{5A}	There is a relationship between CR and ROA
H_{5B}	There is a relationship between CR and OPM
H_{5C}	There is a relationship between CR and NPM
H_{5D}	There is a relationship between CR and ROE

In order to perform the required analyses R programming language was utilized. Panel data analysis was conducted with the help of R language. In order to do that, firstly, the required packages were loaded. After that analyses were performed.

Within the scope of this, fixed effects model(FEM), pooling model(PM), and random effects model(REM) were formed for each dependent variable. After that, these models were compared to each other with the help of the F-Test, Lagrange Multiplier Test, and Hausman Test. The results were demonstrated in the results section of the study. After that, conclusions were found and proposals were presented.

In fixed effects, random effects, and pooling models, if the probability value of a model is below 0.05, it is understood that the model is valid. If the probability value of an independent variable is below 0.05, it is understood that there is a strong relationship between the dependent variable and the independent variable. Being positive or negative of the sign of estimate is also important. If the sign of estimate is positive, the direction of the relationship is positive. If the sign of estimate is negative, the direction of the relationship is negative.

If the p-value of the F-Test is below 0.05 the fixed effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the fixed effects model. If the p-value of the Lagrange Multiplier Test is below 0.05 the random effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the random effects model. If the p-value of the Hausman Test is below 0.05 the fixed effects model is preferred to the random effects model. Otherwise, the random effects model is preferred to the fixed effects model.

CHAPTER IV

RESULTS

4.1. Results

When correlation between variables was looked at, it was observed that correlation between FL and RT was 0.08, correlation between FL and ST was 0.05, correlation between FL and APT was -0.28, correlation between FL and CR was-0.66, correlation between FL and FS was 0.16, correlation between RT and ST was 0.06, correlation between RT and APT was 0.09, correlation between RT and CR was -0.08, correlation between RT and FS was 0.15, correlation between ST and APT was 0.08, correlation between ST and CR was -0.04, correlation between ST and FS was 0.01, correlation between APT and CR was 0.35, correlation between APT and FS was 0.02, and correlation between CR and FS was -0.09. This means that a strong correlation between two independent variables was not observed. It was also observed that there was no strong correlation between a dependent and an independent variable. The related table was given below (Table 4.1).

Table 4.1.

Correlation Between Variables

	ROA	OPM	NPM	ROE	FL	RT	ST	APT	CR	FS
ROA	1									
OPM	0.64	1								
NPM	0.83	0.64	1							
ROE	0.83	0.56	0.72	1						
FL	-0.4	-0.12	-0.44	-0.17	1					
RT	0.05	0.05	-0.01	0.06	0.08	1				
ST	0.02	-0.15	-0.05	0.01	0.05	0.06	1			
APT	0.28	0.04	0.14	0.14	-0.28	0.09	0.08	1		
CR	0.42	0.19	0.36	0.19	-0.66	-0.08	-0.04	0.35	1	
FS	0.01	0.06	0.02	0.12	0.16	0.15	0.01	0.02	-0.09	1

ROA: Return on assets OPM: Operating profit margin NPM: Net Profit Margin ROE: Return on equity FL: Financial Leverage RT: Receivables turnover ST: Stock turnover APT: Accounts payable turnover CR: Current ratio FS: Firm Size

According to the fixed effects model between ROA and independent variables, probability values between ROA and RT, APT, CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between ROA and RT, APT, CR, and FS, and there is a significant and negative relationship between ROA and FL. The related table was given below (Table 4.2).

Table 4.2.

Fixed Effects Model Results for ROA

	Coefficient	Pr(>|t|)	Std. Error	t-value
(Intercept)	8.0130	0.0000***	1.2292	6.5191
Financial Leverage(FL)	-0.1292	0.0000***	0.0171	-7.5550
Receivables Turnover(RT)	0.0719	0.0456**	0.0359	2.0016
Stock Turnover(ST)	0.0208	0.3752	0.0235	0.8872
Accounts Payable Turnover(APT)	0.2080	0.0000***	0.0465	4.4727
Current Ratio(CR)	1.3478	0.0000***	0.2158	6.2448
Firm Size(FS)	0.2419	0.0135**	9.7688	2.4760
R-Squared:	0.2824			
Adj. R-Squared:	0.2778			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

According to the pooling model between ROA and independent variables, probability values between ROA and RT, APT, CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between ROA and RT, APT, CR, and FS, and there is a significant and negative relationship between ROA and FL. The related table was given below (Table 4.3).

Table 4.3.

Pooling Model Results for ROA

	Coefficient	Pr(>|t|)	Std. Error	t-value
(Intercept)	6.5813	0.0000***	1.2839	5.1261
Financial Leverage(FL)	-0.1004	0.0000***	0.0177	-5.6625
Receivables Turnover(RT)	0.0900	0.0170**	0.0377	2.3902
Stock Turnover(ST)	0.0167	0.5005	0.0248	0.6740
Accounts Payable Turnover(APT)	0.1964	0.0000***	0.0489	4.0178
Current Ratio(CR)	1.3823	0.0000***	0.2272	6.0836
Firm Size(FS)	0.2029	0.0491**	10.2964	1.9702
R-Squared:	0.2288			
Adj. R-Squared:	0.2238			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

According to the random effects model between ROA and independent variables, probability values between ROA and RT, APT, CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between ROA and RT, APT, CR, and FS, and there is a significant and negative relationship between ROA and FL. The related table was given below (Table 4.4).

Table 4.4.

Random Effects Model Results for ROA

	Coefficient	Pr(>|z|)	Std. Error	z-value
(Intercept)	7.8645	0.0000***	1.4644	5.3706
Financial Leverage(FL)	-0.1262	0.0000***	0.0171	-7.3902
Receivables Turnover(RT)	0.0738	0.0399**	0.0359	2.0550
Stock Turnover(ST)	0.0204	0.3851	0.0235	0.8685
Accounts Payable Turnover(APT)	0.2067	0.0000***	0.0465	4.4456
Current Ratio(CR)	1.3515	0.0000***	0.2159	6.2605
Firm Size(FS)	0.2378	0.0149**	9.7723	2.4338
R-Squared:	0.2766			
Adj. R-Squared:	0.2719			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

In order to scrutinize the data of the fixed effects model(FEM), pooling model(PM), and random effects model(REM) which were established for ROA in an easier way, an integrated table was formed. The combined table was given below (Table 4.5).

Table 4.5.

Integrated Table for Models Established for ROA

ROA	FEM Coeffi-cient	FEM Probabil-ity	PM Coeffi-cient	PM Proba-bility	REM Coeffi-cient	REM Probability
Financial Leverage(FL)	**-0.1292**	**0.0000**	**-0.1004**	**0.0000**	**-0.1262**	**0.0000**
Receivables Turnover(RT)	**0.0719**	**0.0456**	**0.0900**	**0.0170**	**0.0738**	**0.0399**
Stock Turnover(ST)	0.0208	0.3752	0.0167	0.5005	0.0204	0.3851
Accounts Payable Turnover (APT)	**0.2080**	**0.0000**	**0.1964**	**0.0001**	**0.2067**	**0.0000**
Current Ratio(CR)	**1.3478**	**0.0000**	**1.3823**	**0.0000**	**1.3515**	**0.0000**
Firm Size(FS)	**0.2419**	**0.0135**	**0.2029**	**0.0491**	**0.2378**	**0.0149**

Formed fixed effects, random effects and pooling models can be compared with the help of comparison tests. If the p-value of the F-Test is below 0.05 the fixed effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the fixed effects model. If the p-value of the Lagrange Multiplier Test is below 0.05 the random effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the random effects model. If the p-value of the Hausman Test is below 0.05 the fixed effects model is preferred to the random effects model. Otherwise, the random effects model is preferred to the fixed effects model.

In the comparison tests below, the p-value of the F-Test and Lagrange multiplier test was found below 0.05. This means that the fixed effects and the random effects models should be preferred to the pooling model. According to the results, the p-value of the Hausman Test was found above 0.05. This means that the random effects model should be preferred among the others (Table 4.6).

Table 4.6.

Comparison Tests for ROA Models

Test	P-Value
F-Test	0.0000
Lagrage Multiplier Test	0.0000
Hausman Test	0.1504

According to the fixed effects model between OPM and independent variables, probability values between OPM and CR, FS, ST, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between OPM and CR, and FS, and there is a significant and negative relationship between OPM and ST, and FL. The related table was given below (Table 4.7).

Table 4.7.

Fixed Effects Model Results for OPM

	Coefficient	Pr(>|t|)	Std. Error	t-value
(Intercept)	8.4003	0.0000***	1.2514	6.7129
Financial Leverage(FL)	-0.0359	0.0393**	0.0174	-2.0635
Receivables Turnover(RT)	0.0625	0.0874*	0.0366	1.7111
Stock Turnover(ST)	-0.1057	0.0000***	0.0239	-4.4204
Accounts Payable Turnover(APT)	-0.0299	0.5280	0.0473	-0.6312
Current Ratio(CR)	1.0684	0.0000***	0.2197	4.8621
Firm Size(FS)	0.2906	0.0036***	9.9453	2.9217
R-Squared:	0.0974			
Adj. R-Squared:	0.0916			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

According to the pooling model between OPM and independent variables, probability values between OPM and CR, FS, ST, and RT were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between OPM and RT, CR, and FS, and there is a significant and negative relationship between OPM and ST. The related table was given below (Table 4.8).

Table 4.8.

Pooling Model Results for OPM

	Coefficient	Pr(>|t|)	Std. Error	t-value
(Intercept)	6.6550	0.0000***	1.3200	5.0416
Financial Leverage(FL)	-0.0007	0.9691	0.0182	-0.0388
Receivables Turnover(RT)	0.0834	0.0314**	0.0387	2.1556
Stock Turnover(ST)	-0.1114	0.0000***	0.0255	-4.3746
Accounts Payable Turnover(APT)	-0.0510	0.3101	0.0503	-1.0156
Current Ratio(CR)	1.1367	0.0000***	0.2336	4.8657
Firm Size(FS)	0.2453	0.0207**	10.5862	2.3169
R-Squared:	0.0686			
Adj. R-Squared:	0.0626			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

According to the random effects model between OPM and independent variables, probability values between OPM and CR, FS, and ST were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between OPM and CR, and FS, and there is a significant and negative relationship between OPM and ST. The related table was given below (Table 4.9).

Table 4.9.

Random Effects Model for OPM

	Coefficient	Pr(>|z|)	Std. Error	z-value
(Intercept)	8.2477	0.0000***	1.5360	5.3696
Financial Leverage(FL)	-0.0329	0.0589*	0.0174	-1.8888
Receivables Turnover(RT)	0.0644	0.0781*	0.0366	1.7620
Stock Turnover(ST)	-0.1062	0.0000***	0.0239	-4.4393
Accounts Payable Turnover(APT)	-0.0317	0.5026	0.0473	-0.6704
Current Ratio(CR)	1.0743	0.0000***	0.2198	4.8880
Firm Size(FS)	0.2866	0.0040***	9.9490	2.8807
R-Squared:	0.0943			
Adj. R-Squared:	0.0884			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

In order to scrutinize the data of the fixed effects model(FEM), pooling model(PM), and random effects model(REM) which were established for OPM in an easier way, an integrated table was formed. The combined table was given below (Table 4.10).

Table 4.10.

Integrated Table for Models Established for OPM

OPM	FEM Coeffi-cient	FEM Probabil-ity	PM Coeffi-cient	PM Probabil-ity	REM Coeffi-cient	REM Probability
Financial Lev-erage(FL)	**-0.0359**	**0.0393**	-0.0007	0.9691	-0.0328	0.0589
Receivables Turnover(RT)	0.0625	0.0874	**0.0834**	**0.0314**	0.0644	0.0781
Stock Turnover(ST)	**-0.1057**	**0.0000**	**-0.1114**	**0.0000**	**-0.1062**	**0.0000**
Accounts Pay-able Turnover (APT)	-0.0299	0.5280	-0.0510	0.3101	-0.0317	0.5026
Current Ratio(CR)	**1.0684**	**0.0000**	**1.1367**	**0.0000**	**1.0743**	**0.0000**
Firm Size(FS)	**0.2906**	**0.0036**	**0.2453**	**0.0207**	**0.2866**	**0.0040**

Formed fixed effects, random effects and pooling models can be compared with the help of comparison tests. If the p-value of the F-Test is below 0.05 the fixed effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the fixed effects model. If the p-value of the Lagrange Multiplier Test is below 0.05 the random effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the random effects model. If the p-value of the Hausman Test is below 0.05 the fixed effects model is preferred to the random effects model. Otherwise, the random effects model is preferred to the fixed effects model.

In the comparison tests below, the p-value of the F-Test and Lagrange multiplier test was found below 0.05. This means that the fixed effects and the random effects models should be preferred to the pooling model. According to the results, the p-value of the Hausman Test was found below 0.05. This means that the fixed effects model should be preferred among the others (Table 4.11).

Table 4.11.

Comparison Tests for OPM Models

Test	P-Value
F-Test	0.0000
Lagrage Multiplier Test	0.0000
Hausman Test	0.0001

According to the fixed effects model between NPM and independent variables, probability values between NPM and CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between NPM and CR, and FS, and there is a significant and negative relationship between NPM and FL. The related table was given below (Table 4.12).

Table 4.12.

Fixed Effects Model for NPM

	Coefficient	Pr(>|t|)	Std. Error	t-value
(Intercept)	16.6957	0.0000***	1.5091	11.0635
Financial Leverage(FL)	-0.2386	0.0000***	0.0210	-11.3666
Receivables Turnover(RT)	-0.0008	0.9859	0.0441	-0.0177
Stock Turnover(ST)	-0.0294	0.3079	0.0288	-1.0202
Accounts Payable Turnover(APT)	0.0027	0.9623	0.0571	0.0472
Current Ratio(CR)	0.8108	0.0023***	0.2650	3.0600
Firm Size(FS)	0.4299	0.0004***	11.9934	3.5847
R-Squared:	0.2634			
Adj. R-Squared:	0.2587			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

According to the pooling model between NPM and independent variables, probability values between NPM and CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between NPM and CR, and FS, and there is a significant and negative relationship between NPM and FL. The related table was given below (Table 4.13).

Table 4.13.

Pooling Model for NPM

	Coefficient	Pr(>|t|)	Std. Error	t-value
(Intercept)	15.0129	0.0000***	1.5695	9.5656
Financial Leverage(FL)	-0.2047	0.0000***	0.0217	-9.4486
Receivables Turnover(RT)	0.0221	0.6318	0.0460	0.4794
Stock Turnover(ST)	-0.0335	0.2693	0.0303	-1.1053
Accounts Payable Turnover(APT)	-0.0159	0.7906	0.0598	-0.2656
Current Ratio(CR)	0.8600	0.0020***	0.2778	3.0964
Firm Size(FS)	0.3841	0.0023***	12.5868	3.0515
R-Squared:	0.2102			
Adj. R-Squared:	0.2051			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

According to the random effects model between NPM and independent variables, probability values between NPM and CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between NPM and CR, and FS, and there is a significant and negative relationship between NPM and FL. The related table was given below (Table 4.14).

Table 4.14.

Random Effects Model for NPM

	Coefficient	Pr(>|z|)	Std. Error	z-value
(Intercept)	16.5067	0.0000***	1.7751	9.2988
Financial Leverage(FL)	-0.2348	0.0000***	0.0210	-11.2022
Receivables Turnover(RT)	0.0018	0.9673	0.0441	0.0410
Stock Turnover(ST)	-0.0299	0.3003	0.0288	-1.0358
Accounts Payable Turnover(APT)	0.0006	0.9918	0.0571	0.0103
Current Ratio(CR)	0.8165	0.0021***	0.2650	3.0806
Firm Size(FS)	0.4248	0.0004***	11.9976	3.5406
R-Squared:	0.2572			
Adj. R-Squared:	0.2524			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

In order to scrutinize the data of the fixed effects model(FEM), pooling model(PM), and random effects model(REM) which were established for NPM in an easier way, an integrated table was formed. The combined table was given below (Table 4.15).

Table 4.15.

Integrated Table for Models Established for NPM

NPM	FEM Coeffi-cient	FEM Probabil-ity	PM Coeffi-cient	PM Probabil-ity	REM Coeffi-cient	REM Probability
Financial Lev-erage(FL)	**-0.2386**	**0.0000**	**-0.2047**	**0.0000**	**-0.2348**	**0.0000**
Receivables Turnover(RT)	-0.0008	0.9859	0.0221	0.6318	0.0018	0.9673
Stock Turnover(ST)	-0.0294	0.3079	-0.0335	0.2693	-0.0299	0.3003
Accounts Pay-able Turnover (APT)	0.0027	0.9623	-0.0159	0.7906	0.0006	0.9918
Current Ratio(CR)	**0.8108**	**0.0023**	**0.8600**	**0.0020**	**0.8165**	**0.0021**
Firm Size(FS)	**0.4299**	**0.0004**	**0.3841**	**0.0023**	**0.4248**	**0.0004**

Formed fixed effects, random effects and pooling models can be compared with the help of comparison tests. If the p-value of the F-Test is below 0.05 the fixed effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the fixed effects model. If the p-value of the Lagrange Multiplier Test is below 0.05 the random effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the random effects model. If the p-value of the Hausman Test is below 0.05 the fixed effects model is preferred to the random effects model. Otherwise, the random effects model is preferred to the fixed effects model.

In the comparison tests below, the p-value of the F-Test and Lagrange multiplier test was found below 0.05. This means that the fixed effects and the random effects models should be preferred to the pooling model. According to the results, the p-value of the Hausman Test was above 0.05. This means that the random effects model should be preferred among the others (Table 4.16).

Table 4.16.

Comparison Tests for NPM Models

Test	P-Value
F-Test	0.0000
Lagrage Multiplier Test	0.0000
Hausman Test	0.1270

According to the fixed effects model between ROE and independent variables, probability values between ROE and APT, CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between ROE and APT, CR, and FS, and there is a significant and negative relationship between ROE and FL. The related table was given below (Table 4.17).

Table 4.17.

Fixed Effects Model for ROE

	Coefficient	Pr(>|t|)	Std. Error	t-value
(Intercept)	12.5828	0.0000***	3.0920	4.0695
Financial Leverage(FL)	-0.1493	0.0005***	0.0430	-3.4707
Receivables Turnover(RT)	0.1038	0.2506	0.0903	1.1496
Stock Turnover(ST)	0.0358	0.5448	0.0591	0.6057
Accounts Payable Turnover(APT)	0.2424	0.0385**	0.1170	2.0724
Current Ratio(CR)	1.4953	0.0060***	0.5429	2.7541
Firm Size(FS)	1.1491	0.0000***	24.5735	4.6762
R-Squared:	0.0893			
Adj. R-Squared:	0.0834			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

According to the pooling model between ROE and independent variables, probability values between ROE and CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between ROE and CR, and FS, and there is a significant and negative relationship between ROE and FL. The related table was given below (Table 4.18).

Table 4.18.

Pooling Model for ROE

	Coefficient	Pr(>|t|)	Std. Error	t-value
(Intercept)	9.8511	0.0019***	3.1555	3.1219
Financial Leverage(FL)	-0.0948	0.0299**	0.0436	-2.1750
Receivables Turnover(RT)	0.1428	0.1232	0.0925	1.5430
Stock Turnover(ST)	0.0271	0.6559	0.0609	0.4457
Accounts Payable Turnover(APT)	0.2226	0.0643*	0.1201	1.8525
Current Ratio(CR)	1.5552	0.0055***	0.5584	2.7849
Firm Size(FS)	1.0730	0.0000***	25.3063	4.2401
R-Squared:	0.0669			
Adj. R-Squared:	0.0608			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

According to the random effects model between ROE and independent variables, probability values between ROE and APT, CR, FS, and FL were below 0.05. Considering the signs of the estimates, it can be stated that there is a significant and positive relationship between ROE and APT, CR, and FS, and there is a significant and negative relationship between ROE and FL. The related table was given below (Table 4.19).

Table 4.19.

Random Effects Model for ROE

	Coefficient	Pr(>|z|)	Std. Error	z-value
(Intercept)	12.1087	0.0004***	3.4282	3.5321
Financial Leverage(FL)	-0.1398	0.0011***	0.0429	-3.2593
Receivables Turnover(RT)	0.1106	0.2203	0.0903	1.2257
Stock Turnover(ST)	0.0343	0.5618	0.0591	0.5802
Accounts Payable Turnover(APT)	0.2388	0.0411**	0.1170	2.0422
Current Ratio(CR)	1.5061	0.0055***	0.5430	2.7739
Firm Size(FS)	1.1359	0.0000***	24.5800	4.6213
R-Squared:	0.0851			
Adj. R-Squared:	0.0791			
p-value:	0.0000			

* in the table above means that probability value is below 0.10. ** in the table above means that probability value is below 0.05. *** in the table above means that probability value is below 0.01.

In order to scrutinize the data of the fixed effects model(FEM), pooling model(PM), and random effects model(REM) which were established for ROE in an easier way, an integrated table was formed. The combined table was given below (Table 4.20).

Table 4.20.

Integrated Table for Models Established for ROE

ROE	FEM Coeffi-cient	FEM Probabil-ity	PM Coeffi-cient	PM Proba-bility	REM Coeffi-cient	REM Probability
Financial Lev-erage(FL)	**-0.1493**	**0.0005**	**-0.0947**	**0.0299**	**-0.1398**	**0.0011**
Receivables Turnover(RT)	0.1038	0.2506	0.1428	0.1232	0.1106	0.2203
Stock Turnover(ST)	0.0358	0.5448	0.0271	0.6559	0.0343	0.5618
Accounts Pay-able Turnover (APT)	**0.2424**	**0.0385**	0.2226	0.0643	**0.2388**	**0.0411**
Current Ratio(CR)	**1.4953**	**0.0060**	**1.5552**	**0.0055**	**1.5061**	**0.0055**
Firm Size(FS)	**1.1491**	**0.0000**	**1.0730**	**0.0000**	**1.1359**	**0.0000**

Formed fixed effects, random effects and pooling models can be compared with the help of comparison tests. If the p-value of the F-Test is below 0.05 the fixed effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the fixed effects model. If the p-value of the Lagrange Multiplier Test is below 0.05 the random effects model is preferred to the pooling model. Otherwise, the pooling model is preferred to the random effects model. If the p-value of the Hausman Test is below 0.05 the fixed effects model is preferred to the random effects model. Otherwise, the random effects model is preferred to the fixed effects model.

In the comparison tests below, the p-value of the F-Test and Lagrange multiplier test was found below 0.05. This means that the fixed effects and the random effects models should be preferred to the pooling model. According to the results, the p-value of the Hausman Test was above 0.05. This means that the random effects model should be preferred among the others (Table 4.21).

Table 4.21.

Comparison Tests for ROE Models

Test	P-Value
F-Test	0.0000
Lagrage Multiplier Test	0.0000
Hausman Test	0.3392

Table 4.22.

Signs of Coefficients of Independent Variable by Models and Dependent Variables

	ROA			OPM			NPM			ROE		
	FEM	PM	REM	FEM	PM	REM	FEM	PM	REM	FEM	PM	REM
Financial Leverage(FL)	-	-	-	-			-	-	-	-	-	-
Receivables Turnover(RT)	+	+	+		+							
Stock Turnover(ST)				-	-	-						
Accounts Payable Turnover (APT)	+	+	+							+		+
Current Ratio(CR)	+	+	+	+	+	+	+	+	+	+	+	+
Firm Size(FS)	+	+	+	+	+	+	+	+	+	+	+	+

CHAPTER V

CONCLUSIONS

5.1. Conclusions

The main aim of this study was to explain what the working capital and its components are and to present current data on how and how much they may affect the profitability of the companies which are traded in the Borsa İstanbul (BIST). In order to reach this aim, 78 firms whose data were able to be accessed were considered the sample among a population composed of 209 manufacturing firms, and commercial ratios were utilized.

Return on assets(ROA), operating profit margin(OPM), net profit margin(NPM), and return on equity(ROE) were dependent variables. Financial leverage(FL), receivables turnover(RT), stock turnover(ST), accounts payable turnover(APT), current ratio(CR), and firm size(FS) were independent variables.

In the study, the fixed, random effects, and pooling models were formed for each dependent variable. After that, models were compared to each other with the help of F-Test, Lagrage Multiplier Test, and Hausman Test.

According to the comparison test results, for dependent variable ROA, the random effects model was preferred to other models. According to the random effects model between ROA and independent variables, there is a significant and positive relationship between ROA and RT, APT, CR, and FS. On the other hand, there is a significant and negative relationship between ROA and FL. According to these results, H_{1A}, H_{2A}, H_{4A}, and H_{5A} hypotheses were accepted. H_{3A} hypothesis was rejected. The positive relationship between ROA and CR is compatible with the findings of Toraman and Sönmez (Toraman and Sönmez, 2021, pp. 391-393).

For dependent variable OPM, the fixed effects model was preferred to other models. According to the fixed effects model between OPM and independent variables, there is a significant and positive relationship between OPM and CR, and FS. On the other hand, there is a significant and negative relationship between OPM and ST, and FL. According to these results, H_{1B}, H_{3B}, and H_{5B} hypotheses were accepted. H_{2B}, and H_{4B} hypotheses were rejected.

For dependent variable NPM, the random effects model was preferred to other models. According to the random effects model between NPM and independent variables, there is a significant and positive relationship between NPM and CR, and FS. On the other hand, there is a significant and negative relationship between NPM and FL. According to these results, H_{1C}, and H_{5C} hypotheses were accepted. H_{2C}, H_{3C}, and H_{4C} hypotheses were rejected.

For dependent variable ROE, the random effects model was preferred to other models. According to the random effects model between ROE and independent variables, there is a significant and positive relationship between ROE and APT, CR and FS. On the other hand, there is a significant and negative relationship between ROE and FL. According to these results, H_{1D}, H_{4D}, and H_{5D} hypotheses were accepted. H_{2D}, and H_{3D} hypotheses were rejected.

Research hypotheses and their acceptance or rejection situations were given in the table below (Table 5.1).

Table 5.1.

Research Hypothesis and Their Acceptance or Rejection Situations

HYPOTHESIS NAME	HYPOTHESIS CONTENT	ACCEPTED or REJECTED	MODEL
H_{1A}	There is a relationship between FL and ROA	Accepted	REM
H_{1B}	There is a relationship between FL and OPM	Accepted	REM
H_{1C}	There is a relationship between FL and NPM	Accepted	REM
H_{1D}	There is a relationship between FL and ROE	Accepted	REM
H_{2A}	There is a relationship between RT and ROA	Accepted	FEM
H_{2B}	There is a relationship between RT and OPM	Rejected	FEM
H_{2C}	There is a relationship between RT and NPM	Rejected	FEM
H_{2D}	There is a relationship between RT and ROE	Rejected	FEM
H_{3A}	There is a relationship between ST and ROA	Rejected	REM
H_{3B}	There is a relationship between ST and OPM	Accepted	REM

H_{3C}	There is a relationship between ST and NPM	Rejected	REM
H_{3D}	There is a relationship between ST and ROE	Rejected	REM
H_{4A}	There is a relationship between APT and ROA	Accepted	REM
H_{4B}	There is a relationship between APT and OPM	Rejected	REM
H_{4C}	There is a relationship between APT and NPM	Rejected	REM
H_{4D}	There is a relationship between APT and ROE	Accepted	REM
H_{5A}	There is a relationship between CR and ROA	Accepted	REM
H_{5B}	There is a relationship between CR and OPM	Accepted	REM
H_{5C}	There is a relationship between CR and NPM	Accepted	REM
H_{5D}	There is a relationship between CR and ROE	Accepted	REM

Note: For OPM, fixed effects model was used. For other dependent variables, random effects model was used.

According to the results of the study, it may be asserted that there is a relationship between working capital and profitability. However, because of the changing market conditions, further research will be necessary. In addition, investigating variables separately may be beneficial for comparison. Because of this, for further research, studying the variables separately can be proposed.

REFERENCES

Aksu H. (2016) İşletmelerde Çalışma Sermayesi İhtiyacının Belirlenmesinde Bir Model Önerisi: Borsa'da İşlem Gören Ünye -Adana Çimento A.Ş. Uygulaması. *Okan Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Yüksek Lisans Tezi*

Akyüz, H. S. (2019). Çalışma Sermayesine İlişkin Finansal Oranların İşletme kârlılığına Etkisi: BİST İmalat Sektöründe Bir Uygulama. *Çanakkale Onsekiz Mart Üniversitesi Uluslararası Sosyal Bilimler Dergisi*, 4(2), 217-233.

Akyüz, K. C., Yıldırım, İ., Akyüz, İ., Ersen, N., Aydın, A., ve Üçüncü, K. Kağıt ve Kağıt Ürünleri Sanayi Sektöründe Faaliyet Gösteren İşletmelerde Çalışma Sermayesi ve Karlılık İlişkisi. *Düzce Üniversitesi Bilim ve Teknoloji Dergisi*, 7(3), 1394-1402.

Altan, M., ve Şekeroğlu, G. (2013). Çalışma Sermayesi Finanslama Stratejilerinin Firma Karlılığı Üzerine Etkileri: İMKB'de Kayıtlı Firmalar Üzerinde Bir Araştırma. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (30), 223-228.

Atmaca, M. (2016). Finansal oranlar aracılığıyla çalışma sermayesi bileşenlerinin karlılığa etkisi: Borsa İstanbul'da işlem gören kimya, plastik ve kauçuk şirketlerinde bir araştırma. *Yönetim Bilimleri Dergisi*, 14(28), 633-649.

Aytekin S. (2006). Hastane İşletmelerinde Finansal Açıdan Stok Yönetiminin Çalışma Sermayesi Üzerindeki Etkilerinin Değerlendirilmesi. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Muhasebe ve Finansman Programı Yüksek Lisans Tezi.*

Aytürk, Y., ve Yanık, S. (2015). Çalışma Sermayesi Yönetimi Türkiye'deki KOBİ'lerde Karlılığı Nasıl Etkiler?. *Muhasebe ve Finansman Dergisi*, (68), 157-168.

Azeez, O. T., Abubakar, M. A., & Olamide, F. T. (2016). Analysis of the Effects of Working Capital Management on Profitability of Listed Nigerian Conglomerate Companies. *FWU Journal of Social Sciences*, 10(1), 10-20.

Bacaklıoğlu G. (2023). Büyük Ölçekli Konaklama İşletmelerinde Çalışma Sermayesi Yönetimi-Firma Karlılık Performansı İlişkisi (Muğla İli Örneği). Muğla Sıtkı Koçman Üniversitesi Sosyal Bilimler Enstitüsü İşletme Ana Bilim Dalı Yüksek Lisans Tezi

Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2019). Net Operating Working Capital and Firm Value: A Cross-Country Analysis. *BRQ Business Research Quarterly*.

Bondına, N., Bondın, I., Lavrına, O., & Zubkova, T. (2020). Modeling the Use of Working Capital in order to Ensure Stabilization of the Reproduction Process in Agriculture. *Scientific Papers Series-Management, Economic Engineering in Agriculture and Rural Development*, 20(2), 89-93.

Coşkun, E., ve Kök, D. (2011). Çalışma sermayesi politikalarının karlılık üzerine etkisi: dinamik panel uygulaması. *Ege Akademik Bakış*, 11(Özel), 75-85.

Çerçel, Ö. N., ve Sökmen, A. G. (2019). Çalışma Sermayesi Yönetiminin Firma kârlılığı Üzerindeki Etkisi: BİST'te İşlem Gören Metal Eşya, Makine ve Gereç Yapım Sektörü Üzerinde Bir Araştırma. *Çağ Üniversitesi Sosyal Bilimler Dergisi*, 16(2), 35-42.

Çevik C. (2012) Lojistik Yönetiminde Stok Kontrolü Ve Dinamik Stok Kontrol Modellerinin Karşılaştırmalı Olarak Bir İşletmede Analizi. *Dumlupınar Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı*

Çınar, Ö., ve Kaymaz, M. T. (2020). Çalışma Sermayesi İle Firma Kârlılığı İlişkisinin Panel Veri İle Analizi: BIST'te Kayıtlı Üretim Firmaları Üzerine Bir Uygulama (2009-2018). *Igdir University Journal of Social Sciences*, (23). 593-615.

Durdu, D. (2019). Çalışma Sermayesi Yönetimi ile İşletme Kârlılığı Arasındaki ilişkinin Analizi: Bist'te Gıda, Tütün Ve İçki Sektöründeki Firmalar Üzerine Bir Uygulama. *Sivas Cumhuriyet Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Yüksek Lisans Tezi*

Dursun, A., ve Ayrıçay, Y. (2012). Çalışma Sermayesi-Kârlılık İlişkisinin İMKB Örneğinde 1996-2005 Dönemi Analizi. *Atatürk Üniversitesi İktisadi Ve İdari Bilimler Dergisi*, 26(3-4), 199-214.

Düzakın, E., ve Düzakın, H. (2007). Measuring the Performance of Manufacturing Firms with Super Slacks Based Model of Data Envelopment Analysis: An Application of 500 Major Industrial Enterprises in Turkey. *European Journal of Operational Research*, 182(3), 1412-1432.

Düzakın, E., ve Yılmaz, Ö. (2009). İşletme Mezunlarının Iş Hayatındaki Yeri Ve Işletme Eğitimi: 1000 Büyük Sanayi Kuruluşunun Işletme Mezunlarından Beklentileri Üzerine Araştırma. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 18(1), 149-164.

Düzakın, H. (2013) İşletme Finansmanı Excel Çözümlü Örneklerle. *Ankara: Seçkin Yayıncılık*.

Erdoğan, E. Z. (2019) Çalışma Sermayesi Yönetiminin İşletme Karlılığına Etkisi: Borsa İstanbul Uygulaması. *Marmara Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Yüksek Lisans Tezi.*

Eskin, İ., ve Güvemli, B. (2020). Çalışma Sermayesi Yönetiminin Kârlılığa Etkisi: Borsa İstanbul 50 Endeksi Örneği. *Muhasebe ve Finansman Dergisi*, (85), 65-76.

Gholizadeh Khajeh S. (2014) BIST Tekstil Deri Sektöründeki Firmalarda Çalışma Sermayesi Yönetiminin Frima Karlılığı Üzerine Etkileri. Atatürk Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Yüksek Lisans Tezi.

Gołaś, Z. (2020). Impact of Working Capital Management on Business Profitability: Evidence from the Polish Dairy İndustry. *Agricultural Economics*, 66(6), 278-285.

Güdelci, E. N. (2016). İşletme Düzeyinde Çalışma Sermayesi ve Karlılık İlişkisi-BİST'de Faaliyet Gösteren Gübre İşletmeleri Üzerine Bir Çalışma. *Batman Üniversitesi Yaşam Bilimleri Dergisi*, 6(2/1), 183-192.

Haron, R., & Nomran, N. M. (2016). Determinants of Working Capital Management Before, During, and After the Global Financial Crisis of 2008: Evidence from Malaysia. *The Journal of Developing Areas*, 50(5), 461-468.

Helhel, Y., ve Karasakal, S. (2017). Konaklama İşletmelerinde Çalışma Sermayesi Yönetiminin Karlılık Performansına Etkisi: Borsa İstanbul'da (BİST) Bir Uygulama. *Seyahat ve Otel İşletmeciliği Dergisi*, 14(3), 27-39.

Kırbaş, H. (2010). Hastane İşletmelerinde Çalışma Sermayesi Yönetimi: Antalya İli Sağlık Bakanlığı'na Bağlı Kamu Hastanelerinin Çalışma Sermayesi Yönetimleri Etkinliklerinin İncelenmesi. *Akdeniz Üniversitesi Sosyal Bilimler Enstitüsü İşletme Ana Bilim Dalı Yüksek Lisans Tezi*.

Konak, T., Elbir, G., Yılmaz, S., Karataş, B. M., Durman, Y., ve Düzakın, H. (2018). Borsa İstanbul'da İşlem Gören Tekstil Firmalarının TOPSIS ve MOORA Yöntemi ile Analizi. *Çukurova Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 22(1), 11-44.

Korkmaz, T., ve Yaman, S. (2019). Çalışma sermayesi yönetiminin firma karlılığına etkisi: BIST turizm firmaları üzerine bir uygulama. *Journal of Tourism Theory and Research*, 5(2), 301-316.

Okuyan, H. A. (2021). Çalışma sermayesi yönetimi. *Güncel Finansal Yönetim Yaklaşımları*, 77.

Önal, Y. B., ve Karadeniz, E. (2004). Firma Değerinin Ekonomik Katma Değer (EVATM) Yöntemiyle Tespit Edilmesi: İMKB'ye Kote Bir Turizm işletmesi Üzerine Uygulama. *Anatolia: Turizm Araştırmaları Dergisi*, 15(2), 139-157.

Önal, Y. B., Karadeniz, E., ve Kandır, S. Y. (2005). Devam Eden Değerin Hesaplanmasi: İMKB'ye Kote Bir Turizm İşletmesi Üzerinde Uygulama. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 14(2), 369-389.

Palombini, N. V. N., & Nakamura, W. T. (2012). Key Factors in Working Capital Management in The Brazilian Market. *Revista De Administração De Empresas*, 52(1), 55-69.

Ramachandran, A., & Janakiraman, M. (2009). The relationship between working capital management efficiency and EBIT. *Managing Global Transitions: International Research Journal*, 7(1).

Sağlam, M., ve Karaca, S. S. (2015). Çalışma sermayesi unsurlarının firma karlılığına etkisi: Borsa İstanbul şirketleri üzerine bir uygulama. *Sosyal Bilimler Araştırmaları Dergisi*, 10(1), 119-132.

Sönmez D. (2022). Çalışma Sermayesi Yönetiminin Firma Karlılığı Ve Sürdürülebilir Büyüme Üzerine Etkisi, *Bandırma Onyedi Eylül Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Yüksek Lisans Tezi*

Schwartzman, F. (2013). The Business Cycle Behavior of Working Capital. *Economic Quarterly-Federal Reserve Bank of Richmond*, 99(4), 287.

Serinoğlu S. (2023). Çalışma Sermayesi Yönetiminin Firma Karlılığına Etkisi: Borsa İstanbul Ana Metal Sanayi Sektörü Örneği. *Karabük Üniversitesi Lisansüstü Eğitim Enstitüsü Finans ve Bankacılık Anabilim Dalı Yüksek Lisans Tezi.*

Shahzad, F., Fareed, Z., & Zulfiqar, B. (2015). Impact of Working Capital Management on Firm's Profitability: A Case Study of Cement İndustry of Pakistan. *European Researcher. Series A*, (2), 86-93.

Shrivastava, A., Kumar, N., & Kumar, P. (2017). Bayesian Analysis of Working Capital Management on Corporate Profitability: Evidence from India. *Journal of Economic Studies*, 44(4), 568-584.

Spînache, A. (2011). The Influence of Working Capital on Rentability at Sc Agraria Com Srl Sălcioara, Vaslui County. *Agronomy Series of Scientific Research/Lucrari Stiintifice Seria Agronomie*, 54(2), 460-463.

Tekin, B., ve Bastak, S. N. (2021). Borsa İstanbul'da İşlem Gören En Karlı Şirketlerde İşletme Sermayesi-Karlılık İlişkisinin Araştırılması: Panel Veri Analizi Yöntemi. *Finans Politik ve Ekonomik Yorumlar Dergisi*, (658), 137-156.

Toraman, C., ve Sönmez, A. R. (2021). Çalışma sermayesi bileşenlerinin sektörel ortalamalar üzerindeki etkisi: imalat sektörü üzerine bir uygulama. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, (68), 384-396.

Toy, A. (2022). The Effect of Working Capital Management on the Profitability of the Textile Firms: Evidence From Fragile Five Countries. *Ankara Yıldırım Beyazıt University Graduate School of Social Sciences The Department of Finance and Banking PhD Thesis.*

Ur Rahman, S., Iqbal, K., & Nadeem, A. (2019). Effect of Working Capital Management on Firm Performance: The Role of Ownership Structure. *Global Social Sciences Review*, 4(1), 108-119.

Wang, L., & Li, Y. (2015). Effects of Working Capital Management on Company Value under Different Competitive Strategies. *Metallurgical & Mining Industry*, (4), 122-131.

Wasilewski, M., & Zabolotnyy, S. (2009). Strategies and Effectiveness of Working Capital Management in Food Industry Enterprises. *In Economic Science for Rural Development Conference Proceedings* (No. 18).

Yıldız, B., ve Deniz, T. İ. (2020). BİST Yıldız Endeksinde İşlem Gören Firmaların Kârlılıklarına Etki Eden Çalışma Sermayesi Faktörleri. *Ekonomi Politika ve Finans Araştırmaları Dergisi*, 5(1), 91-110.

Yıldız, E. (2019). Çalışma Sermayesi Yönetiminin İşletme Performansı Üzerindeki Etkisi: BIST Bilişim Sektörü Üzerine Bir Uygulama. *Bingöl Üniversitesi Sosyal Bilimler Enstitüsü İşletme Anabilim Dalı Yüksek Lisans Tezi*

APPENDIX

Appendix I- R Programming Language Code Information Used In The Study

```
#After writing R codes, choose a CRAN mirror(For example; USA TX 1)

#In tests, if p-value < 0.05, null hypothesis is rejected and
#alternative hypothesis is accepted

#In models, if p-value < 0.05, model is valid

#In models, if an independent variable's p-value < 0.05, it is in a significant relationship
#with dependent variable

#Before starting, required packages should be installed with the help of the codes below
install.packages("sandwich")
library(sandwich)
install.packages("plm")
library(plm)
install.packages("olsrr")
library(olsrr)
install.packages("jtools")
library(jtools)
install.packages("lmtest")
library(lmtest)
install.packages("moments")
library(moments)
install.packages("car")
library(car)
install.packages("QuantPsyc")
library(QuantPsyc)
install.packages("Formula")
library(Formula)
install.packages("nlme")
library(nlme)
install.packages("AER")
library(AER)
install.packages("foreign")
library(foreign)
install.packages("stargazer")
library(stargazer)
install.packages("nortest")
library(nortest)
install.packages("MASS")
library(MASS)
install.packages("mgcv")
library(mgcv)
install.packages("quantreg")
library(quantreg)
```

```
install.packages("lubridate")
library(lubridate)
install.packages("stats")
library(stats)
install.packages("ggplot2")
library(ggplot2)
install.packages("zoo")
library(zoo)
install.packages("acnr")
library(acnr)
install.packages("R.utils")
library(R.utils)
install.packages("qqplotr")
library(qqplotr)
install.packages("ggpubr")
library(ggpubr)

#The path "~/Desktop" below changes from computer to computer
#it symbolizes your present working directory address
#Present working directory should be configured with the help of setwd() below
getwd()
setwd("~/Desktop")

#df symbolizes data frame
#datafile.csv symbolizes your data file with .csv extension
#Data frame should be composed from .csv file with the help of the code below
df<-read.csv("datafile.csv", header=TRUE, sep=",", stringsAsFactors= TRUE)

#The code below make the data frame present data frame for R
attach(df)

#d1 symbolizes dependent variable 1
#d2 symbolizes dependent variable 2
#d3 symbolizes dependent variable 3
#d4 symbolizes dependent variable 4
#ind1 symbolizes independent variable 1
#ind2 symbolizes independent variable 2
#ind3 symbolizes independent variable 3
#ind4 symbolizes independent variable 4
#ind5 symbolizes independent variable 5
#ind6 symbolizes independent variable 6

#Correlations between variables can be learned with the help of the code below
corro<-cor(df[c("d1","d2","d3","d4","ind1","ind2","ind3","ind4","ind5","ind6")])
round(corro,2)

#femd1 below symbolizes fixed effects model for dependent variable 1
#femwid1 below means fixed effects model with intercept for dependent variable 1
#i1 below symbolizes the year and i2 below symbolizes the firm name
#Fixed effects model with an intercept can be composed with the help of the code below
```

```
femd1<-plm(d1~ind1+ind2+ind3+ind4+ind5+ind6,
data=df , index=c("i1","i2"),model="within")
femwid1<-within_intercept(femd1, return.model=TRUE)
summary(femwid1)

#remd1 below symbolizes random effects model for dependent variable 1
#Random effects model can be composed with the help of the code below
remd1<-plm(d1~ind1+ind2+ind3+ind4+ind5+ind6, data=df,
index=c("i1","i2"),model="random", random.method="amemiya")
summary(remd1)

#pemd1 below symbolizes pooling model for dependent variable 1
#Pooling model can be composed with the help of the code below
pemd1<-plm(d1~ind1+ind2+ind3+ind4+ind5+ind6,
data=df, index=c("i1","i2"), model="pooling")
summary(pemd1)

#F-Test can be conducted with the help of the code below
pFtest(femd1,pemd1) #if p-value < 0.05, prefer femd1 or femwid1 to pemd1,
                    #if not, vice versa

#Lagrange Multiplier Test can be conducted with the help of the code below
plmtest(pemd1,type="bp") #if p-value<0.05, prefer remd1 to pemd1,
                         #if not, vice versa

#Hausman Test can be conducted with the help of the code below
phtest(femwid1,remd1) #if p-value <0.05, prefer femd1or femwid1to remd1,
                      #if not, vice versa

#In this study, these models above was formed
#and these tests above was conducted for each dependent variable
```