WORKING CAPITAL MANAGEMENT AND FINANCIALLY CONSTRAINT FIRMS IN PAKISTAN

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by

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CERTIFICATE

This is to certify that this thesis entitled: **"Working Capital Management and Financially Constraint Firms in Pakistan".** submitted by **Ms. Siddiqa Athar** is accepted in its present form by the PIDE School of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfilment of the degree in Master of Philosophy in Economics and Finance.
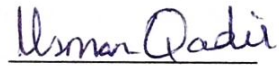
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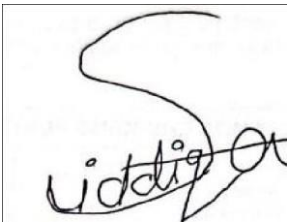Examination Date: November 14, 2024

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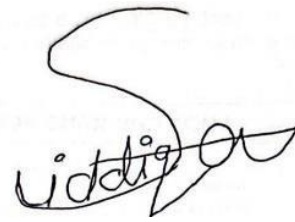Date: Signature of Student:

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DEDICATION

I dedicate this research to my dear parents and my husband, who have been an immense source of inspiration and unwavering support. Their love has been a guiding light throughout my life, especially during my studies at PIDE. Additionally, I dedicate this modest endeavor to my brothers and sisters, whose love, trust, and prayers have left an indelible mark on my heart.

(Siddiqa Athar)

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ABSTRACT

Working capital management is a daily activity crucial for determining the availability of resources for a company. This paper explores the dual impacts of increasing working capital, highlighting both positive and negative effects, as well as the existence of an optimal degree that varies depending on financial conditions. The study aims to assess how non-linear changes in working capital influence firm performance and to investigate the differences in ideal level of working capital between financially constrained and unconstrained firms. This study employed a mixed-methods approach, collecting primary data through questionnaires from board of investment, while secondary data was obtained from the official websites of manufacturing firms listed on the Pakistan Stock Exchange, from their annual financial reports spanning from 2011 to 2022. The sample consists of 238 firms. The empirical analysis employs panel data methodologies including Hausman tests, fixed effects, and random effects models, utilizing the general-to-specific model approach for model selection. Return on asset is used to assess firm performance, which is dependent variable. The independent variables include net trade cycle and its square, indicating working capital management. Control variables are firm size, financial leverage. The empirical study reveals a positive and significant association between net trade cycle and return on asset, and a negative and significant relationship between net trade cycle squared and return on asset. These results clearly indicate that investment in working capital and firm performance have an inverted U-shaped relationship, indicating that there is an ideal level of working capital investment that strikes a balance between costs and benefits in order to maximize a firm's value. The findings suggest that managers should take steps to prevent lost sales, overlooked early payment discounts, or increased financing costs from having a negative effect on the performance of the firm. Additionally, the study investigates whether various financial constraint measures have an impact on the ideal working capital level. The results indicate that firms with higher likelihood of encountering financial constraints have a lower optimal level.

Keywords: financial constraints, firm performance, working capital management

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LIST OF ABBREVIATIONS

ROA   Return On Asset

WCM   Working Capital Management

DFC   Dummy Variable For Financial Constraint Firms

NTC   Net Trade Cycle

FZ   Firm Size

SG   Sales Growth

LEV   Leverage

IR   Interest Rate

IF   Inflation Rate

PSX   Pakistan Stock Exchange

CCC   Cash Conversion Cycle

ROE   Return On Equity

CHAPTER 1

INTRODUCTION

1.1 Introduction

Corporate finance literature examines long-term capital planning, structure, and valuation. Capital structure, budgeting, and long-term asset financing impact yield. However, corporate finance theory uses working capital management (WCM). It entails strategic short-term borrowing and investment decisions for a corporation (Sharma & Kumar, 2011). Firms need long-term and short-term finance for startup and daily operations. Long-term capital is needed to buy production equipment, land, and buildings. Working capital is essential for regular business operations. Cash, receivables, inventory, and marketable securities are used to manage short-term assets. Working capital shows the firm's short-term financial stability and liquidity(Wasiuzzaman, 2015).

Decisions about working capital affect value of firm, profitability, and overall performance. Therefore, firms must invest in current assets to secure their profit. Investment in working capital has two perspectives in WCM literature. According to one viewpoint, investing more in working capital can boost sales, get better upfront payment discounts, and increase the worth of the firms. A substantial investment in working capital offers significant advantages to firms, including the reduction of supply costs, reduction of risks associated with fluctuations in input prices, and the minimization of potential losses resulting from stock-outs (Deloof, 2003). The other opinion is that excessive working capital investment hurts firms. The rising demand for finance raises financing costs. Consequently, the firm's financial demand increases the risk of insolvency (Aktas *et al*., 2015) . These two perspectives suggest that possible pros and cons demonstrate working capital's non-linear connection with firm performance and encourage businesses to invest the proper amount. Optimal working capital strategies can balance risk and efficiency, enhancing firm value.

(Chauhan & Banerjee, 2017). So, we predict that the firm will have the ideal amount of working capital, balancing these expenses and advantages to maximize its worth. It is anticipated that if working capital rises above a certain threshold, firm performance will rise as well. However, it is expected that working capital and performance of firm association will gradually decrease beyond this optimal point (Baños-Caballero *et al*., 2014).

WCM investments are affected by capital expenses, internal finances, and capital market access. Baños-Caballero *et al.*, (2014) examined that financially constrained firms may have lower optimal working capital than financially unconstrained firms the imperfect market hypothesis states that external funding is not a good substitute for internal finance due to higher costs. Financially constrained firms are more sensitive to working capital investments. Financially constrained firms may use accounts payable to increase inventory. They can't take advantage of early payment discounts when buying inventory in cash from suppliers because they have trouble getting external capital. That differs from firms without financial constraints. If they have the cash, customers who buy inventory directly from a supplier get a discount. They can easily get bank loans. These suppliers will offer discounts above the interest rate to encourage cash payments. The ideal working capital for firms with financial constraints differs from those without.

Optimization WCM is of utmost important for firms, particularly in developing countries. Firms in developing economies, face limited access to financial markets and institutional finance for long-term resources, weak corporate governance, information asymmetry, political uncertainty, and debt rationing. Thus, these firms have shorter lifespans and lesser sizes than those in industrialized nations. In developing nations, firms rely on internal investment, including working capital. Small enterprises with limited resources face fierce rivalry from dominant competitors in these economies. Effective and efficient WCM is essential for firms. Given that many of these firms are still in the early stages of their product lifecycles and face many uncertainties, they may not always attain excellent WCM practices. Thus, firms in developing markets may not always aggressively pursue the ideal working capital level due to financial or operational constraints and strategic concerns (Chauhan & Banerjee, 2017).

The main objective of the current study is to analyses the effect of WCM on firm performance of and to determine the optimum level of working capital investment that could effectively improves firms' performance, while simultaneously considering the financial constraints encountered by these firms. By achieving these goals, the study sheds light on the non-linear association between working capital and firm's profitability and improves knowledge of the interactive effects among working capital components. This will be accomplished by analyzing a panel dataset comprising Pakistani manufacturing firms throughout the period from 2011 to 2022.

The study examined the manufacturing industry of Pakistan, which holds the position of being the third-largest economic sector in the country. It accounts for around 12.4% of Pakistan's Gross Domestic Product (GDP) and contributes to 13% of the total labor force, as reported by the Pakistan Bureau of Statistics. Moreover, it plays a substantial role in fostering Pakistan's overall economic expansion and facilitating the advancement of the local community. The ministry of finance in Pakistan's government has identified several sectors that exhibit noteworthy credit availability and capital volume. These sectors include cement, sugar, textile, biotechnology and pharmaceuticals, petroleum and natural gas, autos parts, industrial metals and mining, beverages, technology hardware equipment, food processing, and other related segments (Pakistan Economic Survey, 2021-2022). Manufacturing firms engage in the transformation of raw materials into finished goods that provide value to consumers. The whole progression of the transformation of raw materials into final items necessitates a substantial amount of working capital. Hence, firm performance, profitability, and market value are all directly impacted by any irregularities in working capital.

The subsequent sections of the study are organized as follows. The following parts explores the theoretical foundation of the study and subsequently analyzes the literature review, identifying any gaps in the existing literature and highlighting the value of the study. Next, the study data and research technique are examined and explained. The following section will assess the empirical findings. The subsequent section will address the robustness of the results, while the final portion will provide a summary and conclusion.

1.2 Theoretical Background

There exists a wide array of theories pertaining to corporate performance within the disciplines of economics, management, and organizational studies. These theoretical frameworks aim to comprehend the various determinants that impact a firm's performance in terms of profitability, growth, efficiency, and overall success.

Any business must prioritize improving their WCM efficiency if they want to be successful in terms of their financial management. It comprises overseeing the short-term assets and obligations of a firm in a manner that ensures smooth operations, sufficient liquidity, and profitable outcomes for the business. The theory WCM discusses how working capital should be managed and

highlights the benefits that can accrue to the firm because of doing so. These benefits include greater liquidity, solvency, profitability, and shareholder value. The pertinent theories in the field of WCM encompass the risk and return trade-off theory and the theory of cash conversion cycle (CCC), which will be elaborated upon in the subsequent discussion.

1.2.1 Risk and Return Trade off Theory

The concept of the trade-off between risk and return is a fundamental principle in the field of finance. This theory investigates the link between the potential return on an investment and the level of risk that is involved in making that investment. According to this theory the more risk an investor is willing to take, the more potential return they should anticipate receiving in return for that risk. On the other hand, investors who would prefer to take on less risk should have a lower return expectation for their investments. An efficient method of managing working capital seeks to pinpoint the optimal point at which costs related to maintaining an excessive amount of working capital (referred to as opportunity costs) and costs associated with a shortage of working capital (referred to as shortage costs) can be balanced out (Aminu & Zainudin, 2015).

According to Srinivasan *et al*., (2011) researchers in the fields of business, economics, and finance have devoted significant attention to the intricate connection between risk and return. Moreover, the determination of each investment decision relies on the interrelationship between risk and return (Richard *et al*., 2008). It is always associated with two different viewpoints, which poses a risk in particular, risk-seeking and risk-aversion tendencies. Individuals who exhibit a propensity for risk-taking often engage in decision-making processes that include a heightened probability of financial loss, while concurrently demonstrating a tendency to overestimate their likelihood of achieving success. Individuals who engage in risk-taking behavior are largely motivated by the potential for financial gain. On the contrary, risk-averse individuals have a contrasting disposition to risk-taking individuals, as they tend to magnify potential losses while minimizing the possibility of profits (Teigen *et al*., 1999).

The consideration of the trade-off between profitability and liquidity holds significant importance within the domain of WCM. However, it is imperative to emphasize the importance of the risk and return theory within this discipline. When a firm chooses to prioritize liquidity, it is expected that its profitability will be negatively impacted, and conversely, if a firm prioritizes profitability, its

liquidity may be compromised. Either of these two conflicting options has the potential to result in a surplus or a deficit of the components comprising working capital and current assets for a firm (Aminu & Zainudin, 2015).

1.2.2 Theory of Cash Conversion Cycle (CCC)

According to this theoretical framework, firms exhibit a preference for utilizing internally generated cash flows as a means of financing investments prior to resorting to debt and subsequently equity. The generation of internal funds can be facilitated using efficient WCM practices, hence reducing the need for external financing**.**

The theory was developed by Richards and Laughlin in 1980. The authors came to the realization during their research that a thorough examination of WCM and its various components was necessary. This subject has received less attention from the literature and academic community, even though financial managers allocate a significant amount of their time in decision making concerning current assets and liabilities. Hence, the payables, inventory, and receivables are classified as the constituent elements within the framework of the CCC model. Based on the underlying principles of the CCC, a sequence of activities commences with the disbursement for the procurement of raw materials, progresses using their conversion and the creation of a novel good, and finishes in the collection of accounts receivable from purchasers and potential debtors resulting from the sale of inventory. The allocation of resources exhibits variability in terms of its duration and the rate at which it can be converted into liquid assets. These characteristics are commonly comprehended by financial managers and other professionals in the field of financial analysis (Richards & Laughlin, 1980).

This theory is a comprehensive framework that encompasses various aspects of working capital, including the progression of raw materials to finished goods, inventory levels as a representation of outputs, accounts receivable, and payment processes. Given its coverage of these essential elements, it can be argued that the CCC theory is the foundational theory for explaining working capital (Aminu & Zainudin, 2015).

The ideas and theories provide a robust theoretical foundation for WCM. Firms have the potential to optimize their working capital, strike a balance between liquidity and profitability, and ultimately enhance their financial performance and stability through a thorough understanding and

effective application of these concepts. Firms employ a diverse range of financial ratios and measures, including the current ratio, quick ratio, inventory turnover, and accounts receivable turnover, to assess and appraise the effectiveness of their WCM. These ratios aid in evaluating the efficiency with which a firm is handling its short-term assets and liabilities in accordance with its operational requirements and financial objectives (Anake *et al.*, 2015). The implementation of efficient WCM is crucial for the firm's overall operational and financial well-being. The task involves the careful management of both profitability and liquidity, with the aim of reducing financing costs and enhancing operational efficiency.

1.3 Problem Statement

Working capital is a fundamental component of the firm that holds significant importance in facilitating and enhancing the value of the firm. By implementing WCM strategies, the firm can optimize the allocation of funds towards current assets, resulting in reduced financing costs and potentially enabling greater availability of capital for long-term investments. The appropriate management of working capital is important for maintaining liquidity, sustaining operations, and eventually attaining financial stability. The study will look at whether there exists a functional or nonlinear form of the relationship between investment in working capital and the firm performance. How this aforementioned association is affected by the financial restrictions faced by these firms, as these factors can potentially exert a major impact on it. Several studies have investigated the effect of WCM on a firm's financial performance within the specific context of Pakistan.

(Bagh *et al.*, 2016; Bibi *et al*., 2020; Shabbir *et al.*, 2018). However, previous studies have neglected to examine the non-linear connection that exists between WCM and the firm profitability, as well as the optimum investment level in working capital that increases value of the firm. The current study is significance due to its positive contribution in addressing a highlighted gap in the existing literature in Pakistan and it will also examine the financial constraints faced by these firm while doing investment decision in working capital. Investments in working capital exhibit a higher degree of vulnerability to financial constraints in comparison to fixed capital investment. Given the necessity of financing for maintaining a favorable working capital level, it is anticipated that financially limited firms would have a lower ideal working capital level compared to firms facing fewer financial constraints.

1.4 Research Questions

The current study encompasses 4 main inquiries:

1. How does WCM affect the performance of manufacturing firms in Pakistan?
2. What is that optimal level of investment in working capital that maximize value of manufacturing firms of Pakistan?
3. What financial constraints do these firms encounter when investing in working capital?
4. How do decision makers perceive the influence of investing in working capital on firm performance?

1.5 Research Objectives

The primary aims of the current study are to accomplish the following aims.

1. To examine the effect WCM on the performance of manufacturing firms in Pakistan.
2. To investigate the optimal level of working capital investment that maximize worth of manufacturing firms of Pakistan.
3. To analyze the financial constraint faced by these firms while investing in that optimal level working capital.
4. Evaluate policy makers' perspectives when considering investment in working capital investments and how they affect the performance of the firm.

1.6 Literature Gap

Two distinct viewpoints exist regarding investing in working capital in the literature of WCM. One perspective holds that firms with larger levels of working capital might boost sales and receive significant discounts for making payments on time (Deloof, 2003). Alternatively, higher level of working capital require financing, which raises the cost of financing and raised the probability of bankruptcy (Kieschnick *et al*., 2013). The combined effect of both advantageous and disadvantageous impact of working capital gives rise to the anticipation of a non-linear association between the worth of the firm and working capital investment Even though substantial research has explored the nonlinear relationship between working capital investment and firm performance globally, there is a notable lack of studies addressing this issue specifically within the context of Pakistan. This study differentiates itself by examining the nonlinear connection between firm

working capital investment and overall performance, as previous research in Pakistan has predominantly focused on linear relationships or the impact of working capital management on firm outcomes (Ahmad et al., 2018; Bagh et al., 2016; Bibi et al., 2020; Shabbir et al., 2018; Tahir & Anuar, 2016). This study aims to address this gap by shifting from a linear to a nonlinear analysis of working capital investment and firm performance in Pakistan. Additionally, it provides empirical evidence on how working capital investment levels affect firm value and investigates the potential impact of financial constraints faced by firms.

1.7 Significance of Research

This study contributes to the existing literature on WCM by exploring the nonlinear relationship between WCM and firm performance within the context of Pakistan. The findings suggest that there is an optimal level of working capital at which a firm's value is maximized. At this optimal level, the balance between expenses and benefits is achieved, thereby enhancing firm performance. Consequently, it is crucial for firm executives to meticulously monitor their working capital investments and strive to maintain them at this optimal level whenever possible. This approach will ensure that the firm operates efficiently and effectively, maximizing its overall value and performance.

This study is of great importance for a wide range of stakeholders, such as firms, financial experts, investors, and educators. It offers valuable insights and techniques that can enhance financial performance and add to the prolonged sustainability of firms. The study's findings will be valuable for financially limited firms with a small working capital level, as it may negatively impact their operating performance. The findings will be helpful to researchers working in economically struggling countries with limited financial resources The findings of this study hold importance for both policymakers and firms in guiding their future investment decisions pertaining to working capital. Findings of this paper will provide significant understanding for investors seeking to determine the ideal working capital level investment that allows a firm to maximize its profitability.

1.8 Structure of the Study

The current study is structured into six chapters, each of which is additionally split into subheadings. First chapter of this study provides an overview of study, including the theoretical background, problem statement, research question, and study objective. In Chapter 2, the literature is examined by taking into account all the research objectives. Chapter 3 provides study's methodology and describes the variable used. In addition, the study encompasses Chapter 4, which specifically addressed the conclusive findings and outcomes of the research. Chapter 5 encompass qualitative research, namely involving interviews with pertinent specialists. Chapter 6 ultimately summarize the main findings of the research and provide policy suggestions.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides a thorough examination of both empirical and theoretical research on working capital and its effect on performance of firm, including the financial constraints that firms face when making decisions about investing in working capital. The literature is structured into four main sections. First part of the study examines the correlation between working capital and firm performance. The second section focuses how firms allocate funds to working capital and the financial constraints faced by these firms. The third section analyze the effect of macroeconomic factors on performance of firm. The identification of gaps in the current literature and the importance of the research are covered in the study's fourth and fifth sections.

2.2 Working Capital and Performance of the firm

The profitability, liquidity, and overall performance of a firm are significantly impacted by WCM. (Aktas et al., 2015) . The significance of WCM has grown due to its capacity to enhance shareholder value by effectively balancing profitability and risk. Effective liquidity management, which entails managing current liabilities and asset, is important for reducing the uncertainty of being unable to meet current liabilities while preventing over investment in current assets. The ultimate impact of this management on firm profitability is a determining factor (Wasiuzzaman, 2015). Academic literature presents various conflicting perspectives to elucidate the correlation among firm performance and working capital. Many previous research has found a negative correlation between the two indicators, using data from both developed and developing economies. Alvarez *et al.*, (2021) investigated influence of WCM on financial performance of manufacturing firms in Argentina. The Findings of the paper demonstrate a positive and statistically significant relation among all elements of working capital and profitability. This implies that an increase in any of the factors under investigation will lead to enhanced performance in terms of ROA and ROE. The relationship between profitability and leverage has a statistically significant adverse impact. Lamichhane (2019) employed a comparative and descriptive research technique to investigate the efficacy of WCM and its effect on manufacturing firms profitability in Nepal.

Findings shows that firm profitability rises in response to a decrease in net working capital. This study provides evidence of an inverse association between net trade cycle (NTC) and both asset profitability and sale profitability. In the same year Vijayakumaran (2019), also explored the association between the efficacy WCM and the valuation of firms. The effectiveness of WCM was evaluated by employing the NTC and its constituent elements, while the valuation of the firm was examined through the utilization of Tobin's and Tobin's Q ratio. It has been found that there is a negative link between firm valuations and the NTC. The above mentioned relationship is notably influenced by the duration of time it takes to collect the level of inventories and accounts receivable.

Based on the research that was done by Waqar-ul-Hassan *et al.,* (2017), The objective was to examine how WCM and profitability relate to one another among 125 companies listed on the PSX from 2006 to 2011. Return on asset and gross operating profit were employed as metrics to assess firm performance. The data was analyzed using multiple regression models, revealing a negative correlation between firm profitability and WCM. Lyngstadaas and Berg (2016), examined the impact of WCM on the profitability of by using a two-stage least squares approach using panel data technique and fixed effect estimate. Findings of the paper demonstrate that firm profitability rises when the duration of the CCC decreases and when an aggressive working capital policy is pursued. In the same year Bagh *et al.,* (2016), employed a multiple regression analysis to examined the influence of WCM on the operational effectiveness of non-financial firms in Pakistan. Findings of the paper demonstrate a statistically significant inverse relation between the mean duration of payments, CCC, and inventory turnover, and ROA. Furthermore, the ROA is positively affected by the average collection period, while the average payment period has a substantial detrimental impact on the return on equity (ROE) The impact of inventory turnover on earnings per share is found to be statistically significant, resulting in a negative effect. Conversely, the account collection duration positively impacts earnings per share. Similarly Pais and Gama (2015), analyzed Portuguese SMEs to explore the correlation between WCM and profitability of the firm. They employed instrumental variables and the fixed effect estimation technique with panel data. The study demonstrated that reducing the time it takes to collect payments, manage inventory, and settle debts can increase a firms profitability. Furthermore, it came to the conclusion that firms could increase their profitability by aggressively controlling their working capital. Raheman *et al.*, (2010) studies the effect of WCM on the productivity and efficiency of Pakistani

manufacturing firms. Pearson Correlation coefficient was employed to ascertain the connection among many variables. Findings of the research demonstrated that an increase in the ratio of current to total asset, growth of sale , firm size, and turnover ratio of working capital were all positively associated with the profitability of firms. In contrast, the firm's profitability has a negative correlation with the NTC, inventory turnover, CCC, and ratio of current liabilities to total asset, as well as financial debt.

In contrast to the above studies some previous research have found a direct connection in between working capital and firm performance. Lyngstadaas (2020), examined how WCM lead to higher financial efficiency of listed manufacturing firm in US. Findings of the study demonstrate that effective WCM is linked to improved financial outcomes of these firms. In a similar way Moussa (2018), examined the impact of WCM on 68 Egyptian industrial firms' performance from 2000 to 2010. The findings reveal a favorable correlation between WCM as assessed by the CCC, and firm profitability. Further, he highlights that stock markets in emerging economies fail to achieve the maximum WCM efficiency. Nguyen and Nguyen, (2018) examined the correlation between the WCM and the profitability of Vietnamese firm listed on the stock market from 2008 to 2014. Their findings reveal a favorable connection between WCM and firm performance. Enqvist *et al*., (2014) analyzed the impact of WCM on the profitability of firms in various business cycles, using Finland as a case study from 1990 to 2008. They emphasize that firms could increase their profitability by enhancing the efficiency of their working capital. The initial perspective is justified by the notion that working capital provides firms with the chance to expand through the augmentation of sales and revenues. A study conducted by Martínez-Sola *et al.*, (2013) also proposed that firms can enhance their performance by extending the credit period. This is because it allows them to decrease the buildup of inventory and thus lower storage expenses. Abuzayed (2012), carried out an empirical investigation of listed firm on the Jordanian Amman Stock Exchange. The study used panel data methodology and utilized various estimate approaches such as generalize method of moment (GMM), fixed effect, and random effect. The main objective was to investigate the effect of WCM on outcomes of firm. The study's empirical analysis showed a substantial direct correlation between the CCC and profitability of firm. It also implies that firms that achieve higher returns tend to prioritize the WCM.

Most literature has established a direct relation among working capital and performance of firm. Recently, research has also determined a non-linear concave correlation among investment level

in working capital and firm profitability. It shows that firms maintain an ideal working capital level that increases firm performance. Several research has observed a concave relation among the two variables, mostly focusing on developed economies firms, with some also including sample from emerging European countries or specific sector. Anton & Afloarei Nucu (2021), examined correlation among working capital and firm profitability of 719 publicly traded firms in Poland from 2007 to 2016. This study employs quantitative methodology, utilizing several panel data methodologies such as ordinary least squares and fixed effects. The empirical findings show a quadratic inverted U-shaped association, among working capital and firm profitability. This suggests that, up to a certain degree, or the optimum level, working capital positively affects Polish firms' profitability. The amount of working capital has an adverse effect on the firm's profitability after the break-even point is exceeded. Bibi *et al.*, (2020), also examined the impact of WCM, specifically the duration of inventory turnover, the CCC, and the periods of accounts receivable and payable, on the financial performance of Pakistani cement and ceramics firms. The empirical investigation utilized the fixed-effect model. The findings of this model showed that the duration of the account receivable period (AR) in days, the length turnover inventory (IT) in days, and the length of the CCC are negatively related to the value of firms in the cement and ceramics industry in Pakistan. Nevertheless, there is a direct correlation between the duration of the account payable term and the profitability of the cement and ceramics business in Pakistan. Similarly Laghari and Chengang (2019), conducted a study on the correlation between WCM and firm performance, specifically focusing on financial constraints. The study utilized a sizable panel sample of Chinese listed enterprises from 2005 to 2015. The findings indicate a nonlinear connection between working capital and firm performance, following an inverted U-shape pattern. This association is also observed in financially constraint firms. The results indicate that financially restricted firms have a small optimal working capital level, likely due to the high cost associated with external capital and limitation in accessing debt. Altaf and Shah (2018), explore the association between working capital investment and performance of the firm of a sample of 437 non-financial Indian firms. The results of this study were determined by using two-step generalized method of moment's procedures. The study's findings support the theory that working capital investment and firm performance have an inverse U-shaped connection. The authors additionally found that a high working capital level can be financed by short-term debt for businesses that are generally less financially secure. In a study conducted by Vijayakumaran (2017), an investigation was

undertaken to investigate the link among WCM and the firms profitability. The measurement of WCM is conducted by the analysis of the NTC, utilizing panel data from manufacturing firms listed in Sri Lanka. This analysis demonstrates the existence of an ideal working capital level that increases the value of these firms. The result demonstrated a U-shaped association between working capital investment and performance of the firm.

Baños-Caballero *et al.*, (2014) investigated the connection between firm performance and WCM by analyzing 257 firms of British over a period of 7 years. The result of the study demonstrated a nonlinear association, specifically an inverted U-shape, between performance of the firm and WCM for listed firm on the London Stock Exchange. The finding indicates that firms operating with a working capital level below the optimal threshold might gain advantages from increased sales and incentives for early payments, leading to a favorable influence on their financial performance. Conversely, when the amount of working capital exceeds the optimal level, there is a inverse correlation between WCM and performance of firm.

These positive and negative effects of working capital suggest a trade-off in decisions. Firms are expected to find an optimal working capital level that balances costs and benefits to maximize value. Firm performance should improve with increasing working capital up to a certain point, after which additional working capital may negatively impact performance.

Based on the above discussion the hypothesis is articulated as follows.

H1: working capital influences firm performance in an inverted U shaped manner.

2.3 Working capital investment and financial constraint.

If the results confirm the hypothesis of an inverted U-shaped relationship between working capital and firm performance, we would expect the optimal working capital investment level to vary between firms with different financing constraints. It is crucial to mention that investing in working capital entails both costs and advantages. Nevertheless, the extent of these costs and advantages will vary between different firms. Consequently, we anticipate that the ideal amount of working capital investment will vary among firms that are more or less possible to encounter financing restriction. According to Modigliani and Miller (1958), in a world without friction, firms may always get outside funding without encountering any issues; as a result, their investment is How this aforementioned association is affected by the financial restrictions faced by these firms, as these factors can potentially exert a major impact on it independent of the availability of internal capital.

A substantial body of study has highlighted that a firm's operations particularly fixed capital investment, are significantly impacted by financial limitations based on by information asymmetries and agency issues. According to Jensen and Meckling (1979), capital market inefficiencies such as agency costs and informational asymmetries lead to capital market frictions that raise the cost of external capital compared to funds produced internally. Therefore, external funding is not a perfect replacement for internal funding. Fazzari *et al.*, (1988) indicated that investment of may be contingent upon financial considerations such as internal finance availability, capital market accessibility, or financing costs. Fazzari and Petersen (1993) proposed that the impact of financial restriction is more pronounced on investments in working capital compared to investments in fixed capital.

Therefore, one would anticipate that the ideal working capital level would be less for more financially restricted firms because a positive working capital level requires financing. Empirical research shows that a firm's financing arrangements have an influence on its working capital investment. According to Chauhan and Banerjee (2017), that investment choices are influenced by the limitations and higher costs of external funding compared to a firm's internal capital. Additionally, they deduce that firms in this state decrease financing expenses by minimizing the amount of working capital and increase the supply of inside money for investment initiatives. Furthermore, firms strive to strike a balance between risk and efficiency to optimize their worth. Consequently, firms that have limitations on their financial resources are unable to select the best possible mixture of equity and debt for their capital structure. As a result, they are constrained in their ability to make optimal decisions regarding their operational activities. As a result, firms which are limited by financial constraints may choose to forgo certain valuable investment opportunities due to a lack of internal finances. This can lead to a decrease performance of the firm and disrupt the effective allotment of funds (Chen & Guariglia, 2013).

Jabbouri *et al.*, (2022) explored the influence of WCM on performance of firm and investigates how the degree of financial limitations affects the WCM on firm performance to foster innovation. The GMM is employed to examine a sample of 753 companies that are listed on ten emerging markets in the Middle East and North Africa (MENA) region. Findings show that, despite the possible risks involved, financially constrained firms are forced to take an aggressive method to working capital management to minimize financing costs, reduce working capital investment, and enhance financial outcomes. In contrast, firms that are not limited by financial constraints maintain

a significant investment working capital level to enhance sales and their financial performance. Similarly Laghari and Chengang (2019) examined association between WCM and performance of firm, taking into account the existence of financial restriction. The study employed the GMM method to study a large panel dataset consisting of publicly listed enterprises in China throughout the period from 2005 to 2015. The result of the paper shows that the presence of significant sales and discounts affects the timeliness of payments when working capital is limited, whereas opportunity costs and external financing expenses play a more prominent role when working capital is abundant. The study further demonstrated that financially constrained enterprises maintain a relatively lower optimal amount of working capital due to the presence of high external capital expenses and debt rationing. Aktas *et al*., (2015) focused on the evaluation of the impact of WCM on worth of the firm. The findings recommend that there exists an ideal working capital level, and firms that operate in close proximity to this level, regardless of whether they increase or decrease their working capital investment, exhibit better stock and operational performance.It implies that efficient WCM is highly beneficial, particularly in situations where there are more investment options.

 Baños-Caballero *et al.*, (2014) also explore the influence of financial restriction on the optimal working capital level. The study's result shows that financially limited firms maintain a lower optimal level of working capital compared to firms that are less likely constrained. In the same year in a study conducted by Wasiuzzaman (2014), an examination was undertaken to investigate the connection between the working capital efficiency and the firm's value. Moreover, this paper investigated the effect of financing restriction on the relationship. The research findings indicate that enhanced firm value is associated with improvements in working capital efficiency achieved by decreasing working capital investment. However, the presence of financial limitation has an effect on the link between working capital efficiency and value of firm. Specifically, for financially restricted firms, an improvement in efficiency of working capital is linked to enhance in firms' value. However, for unconstrained firms, this association is neither significant nor beneficial. Kieschnick *et al.,* (2013) studied the empirical association between shareholder wealth and WCM. Specifically, they focused on net working capital investment of firms in the United States. The researchers conducted an investigation into the influence of numerous elements on the impact of more investment in net operating working capital. Furthermore, they examined the relationship between different aspects of a firm's net operating working capital and the value perceived by

shareholders. The findings indicated that, on average, retaining an additional dollar in cash holds greater value compared to investing an additional dollar in operational working capital. The worth of investing in operational working capital is greatly affected by various factors, including sales projections of the firm, level of debt, financial constraints, and risk of insolvancy. Furthermore, allocating an additional dollar towards extending credit to customers has a more substantial impact on shareholders' wealth compared to investing in inventories.

From above discussion we concluded that if there is an inverse U-shaped relationship between working capital and company performance, the optimal working capital level will differ for firms with and without financial constraints. Financially constrained firms face limited access to external funding and rely more on internal funds, which are costlier due to market imperfections. They may have less opportunity to benefit from discounts for early payments, leading to lower optimal working capital. In contrast, financially unconstrained firms can access external funding more easily, use discount facilities, and generally maintain higher working capital.

Based on above discussion the second hypothesis is stated as follows:

H2: Firms facing financial constraints will maintain a lower level of optimal working capital compared to those that are financially unconstrained.

2.4 The inflence of macroeconomic factors on firm performance:

The justification for incorporating macroeconomic issues into the evaluation of firm performance is based on the understanding that firms are not independent entities; rather, they exist within a larger economic context that can greatly impact their activities and results. Macroeconomic considerations encompass the broad economic influences that have a significant impact on the whole economy. These factors can exert both direct and indirect impacts on firms. Macroeconomic factors, including GDP growth, inflation, and interest rates, are fundamental elements of the economic cycle. Gaining insight of the current stage of an economy's cycle can offer valuable insights into the broader economic situation. During periods of economic growth, firms may have heightened demand for their goods and services, and during downturns, they may encounter difficulties.

Many existing studies in boarder literature have examined macroeconomic variables and firm performance. The results of several studies on the connection between macroeconomic variables

and the performance of publicly listed corporations have produced inconsistent results. The influence of macroeconomic factors on firm performance is examined by Mwenda *et al.*, (2023) and discovered that GDP and inflation had substantial direct relation while interest rates had large inverse relation, demonstrating the importance of macroeconomic issues in determining company success. There exist a considerable body of literature on impact of macroeconomic variable and firm performance. Rehman (2016) looked at seven macroeconomic variables and concluded that although rate of inflation was positively connected with firm's outcomes, other parameters like interest rate was inversely correlated with the profitability of firm listed. According to Dewi *et al.*, (2019) the high inflation rate in the nation caused publicly listed enterprises to have decreased income. Ali and Khan (2016) conducted research on macroeconomic variables and how they affected Iranian firms' performance, finding that inflation and interest rates were detrimental to business performance. A recent study by Emir Tuncay and Cengiz (2017) concluded that Turkish practice demonstrates a positive correlation between firm profitability and GDP. Ismail *et al.*, (2018) empirically examine the impact of GDP and interest rate on firm performance. It is observed that GDP and rate of interest have a favorable effect on the Malaysian firm's outcomes. By furthering Innocent *et al.*, (2018) analyses the relationship between firm performance and GDP growth they argue that the firm performance was inversely linked to GDP.

Through the examination of these macroeconomic elements, analysts and decision-makers can acquire a more thorough comprehension of the external influences that are influencing the environment of the firms. This knowledge enables more informed strategic planning, risk management, and decision-making, ultimately leading to a more precise evaluation of a firm's performance and prospects.

CHAPTER 3

DATA DESCRIPTION AND METHODOLOGY

3.1 Introduction

This section present an overview of the research methodology used to examine the impact WCM on the performance of Pakistani manufacturing firms. It also aims to identify the ideal level working capital investment that maximizes performance, considering the financial constraints faced by these firms. The initial step is to describe the research plan and next step is choosing the sample. The subsequent phase emphasizes the methodology employed for data collecting in the investigation. Subsequently, model selection criteria are applied. The variable description includes the main dependent variable, which is Return on Assets (ROA), and the independent variables, which are Net trade cycle (NTC) and the square of NTC. The study adopts the general to specific model and concludes with a brief overview of various econometrics approaches employed.

3.2 Research strategy

This research used a mixed methods approach to determine the ideal working capital level investment that increases firm performance and financial constraints faced by these firm. Mixed approach incorporates both quantitative and qualitative methods. Through the utilization of a mixed method approach, we can discover the complete picture and accomplish the objectives of the study. The present investigation primarily utilized secondary data. Nevertheless, it is imperative to note that interviews were done both before and after the estimating process by the appropriate specialists. These interviews served as a platform to deliberate about the findings and methodology employed in the study. This approach served to assess the dependability of the research. Hence, the chosen methodology encompasses a hybrid technique approach. Data for the Quantitative research were collected from the official website of the Pakistan stock exchange (PSX) and the respective firms.

3.3 Sampling

The annual financial reports of Pakistani manufacturing companies listed on the PSX, spanning the years 2011 through 2022, make up the dataset for this study. The selection of the sample is guided by specific criteria.

➢ Only non-financial firms were included the rationale for excluding financial firms such as insurance companies and banks can be attributed to their unique accounting rules, financial attributes, and allocation of resources towards working capital (Falope & Ajilore, 2009).

➢ Firms needed to provide data for 12 consecutive years. This requirement is essential to have an adequate number of time periods to conduct tests for second-order serial correlation.

➢ Excluded firms that possess incomplete data for a particular variable should be excluded from consideration

The current study focuses on the manufacturing sector of Pakistan as the target population. The industries encompassed within this category consist of vehicle assembly companies, manufacturers of automobile parts and accessories, firms specializing in cable and electrical goods, chemical companies, pharmaceutical companies, textile composite firms, paper and board companies, food and beverage companies, and oil and gas refinery companies. All the firms have been included in the listing of firms on the PSX. The current study utilized various sectors of the manufacturing industry to find the ideal level of working capital investment that maximizes profitability of firm. The rationale behind choosing the manufacturing sector as the focus of this research study is because a large portion of these firms' assets consist of current assets, which are also referred to as working capital. There are approximately total 320 firms in these sectors listed in PSX. The time period from 2011 to 2022, which covers a duration of 12 years, is appropriate for panel data estimate. Within this time frame, it is necessary to examine the annual reports of 320 firms for a period of 12 years, resulting in a cumulative total of 3840 reports.

Previous studies have also conducted similar analyses over 5, 7, and 10-year periods (Ahmad et al., 2018; Anton & Afloarei Nucu, 2021; Bibi et al., 2020; Jabbouri et al., 2022). Furthermore, it is essential to acknowledge that examining an extensive set of accounting data, spanning over a period of 12 years, has the potential to address any doubts regarding the dependability of the accounting data.

Table 3. 1: Total Sample of Firms

Sectors	No. of Firms.
Textile industry	88
Sugar industry	26
Food industry	13
Chemical and Parma industry	31
Cement Sector	15
Motor Vehicles, Trailers & Auto parts	17
Petroleum industry	8
Energy industry	6
Manufacturing industry	27
Paper and Mineral industry	6
Total	238

Financial measures, such as ROA, have been used as a means of evaluating the firm's performance (Tangen, 2003). ROA, which is used to assess the performance of the firm is considered the dependent variable of this study. The ratio of ROA is widely seen in the field of financial analysis as a method to assess performance, as it quantifies the effectiveness of corporate managers in utilizing assets of firm to generate profits (Liargovas & Skandalis, 2010). World Bank Report (2019) identifies GDP, interest rate, and inflation rate as the primary macroeconomic variables that exert significant influence on firm performance.

3.4 Methods of Data Collection

The present study employed both primary and secondary data to investigate the effect of WCM on manufacturing firm's performance listed on the PSX. The primary method of data collecting may consist of questionnaires or interviews conducted by the relevant specialists both before and after the process of estimation takes place. The collection of secondary data involved extracting information from the annual reports of the relevant firms. The data pertaining to firm characteristics utilized in this study were obtained from the yearly firm's financial reports, as well as firm non-financial evaluations directed by the State Bank of Pakistan (SBP). A similar process was followed to collect panel data of macroeconomic variables such as, inflation rate, and interest rate from the yearly reports of the SBP. These macroeconomic factors are crucial in influencing the short-term actions and policies of firms, particularly WCM practices. The impact of unfavorable economic conditions, such as a recession, on firm policies, particularly WCM is significant.

3.5 Model

The goal of this study is to analyze the effect of WCM on Pakistani manufacturing firm outcomes. Additionally, it examines the optimal level working capital investment that maximizes overall performance manufacturing firms listed on the PSX and financial restrictions encountered by these firms while making investments in working capital. The model we have developed follows a generic form, which can be described as:

$$ROA_{i,t} = f(NTC_{i,t})$$

The dependent variable, ROA, indicates firm performance. The independent variable, NTC, show the net trade cycle of firm. The number of years is indicated by t, and I stand in for the cross-sections. In the model, this variable functions as the primary variable.

Model selection criteria

When conducting research, it is necessary to clearly define the criteria for selecting a model. Criteria for selecting models fall into two categories

1) Simplified to Generalized Approach (S2G)

2) Approach from the general to the specific.

General to simple model selection criteria have been used in this study.

3.5.1 General to specific approach

Typically, a specific modelling strategy involves creating a general model based on prior studies and the theoretical foundation of the data variables. This model is referred to as the general unrestricted model (GUM). The generic model will subsequently undergo testing with various economic constraints in order to develop a simplified model that accurately represents the situation. There are numerous methods to convert the general model into a specific one and determine the preferred model. One approach is to eliminate the variables with the greatest p-value, resulting in a model that only includes significant variables. This process involves systematically eliminating each irrelevant variable, retaining just the relevant variables. The modelling approach used here follows the general to specific framework, which is a practical application of the theory of reduction established by Hendry (1995). This approach is commonly referred to as the Hendry methodology. This modelling strategy will effectively address the

problem of multicollinearity in the model. This strategy is favored over an alternative method, such as the straightforward to comprehensive method. The Simplified to generalized technique may result in under-specification of the model due to its reliance on a minimum variable. The issue of under-specification is addressed by the utilization of the general-to-specific modelling approach. In this work, we have employed the general-to-specific methodology. Initially, evaluate the overarching model and thereafter streamline it by eliminating the inconsequential variable. The ultimate particular model is subsequently assessed using the F statistic to determine the validity of the imposed restriction.

$$F = \frac{(SSE_0 - SSE)/m}{SSE/(T - K)}$$

3.6 Model Specification

Two equations Eq (3.1) and Eq (3.2) will be estimated in this study. First investigates the influence of WCM on firm performance. Subsequently, will analyze the financial restriction and determine the ideal working capital level that enhances firm performance.

3.6.1 Effects of WCM on Firm Performance

Working capital and firm performance may not have a monotonic relationship. Therefore, it is anticipated that a concave relationship will be present. To evaluate the suggested functional form, we will do an analysis using a quadratic model. In accordance with the research conducted by Shin and Soenen (1998) the NTC is employed as a metric for assessing the WCM. The goal of the study is to undertake a regression analysis to investigate the correlation between firm performance and the NTC, as well as square of NTC. The performance regression mode included additional variables to account for various factors that may influence the firm's performance. The variables under consideration include firm size, leverage, growth, and macroeconomic indicators such as inflation and rate of interest. Hence, we proceed to estimate the subsequent model.

$$ROA_{i,t} = \beta_0 + \beta_1 NTC_{i,t} + \beta_2 NTC_{i,t}^2 + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SGROWTH_{i,t} + \beta_6 IR_{i,t} + \beta_7 INF_{i,t} + \varepsilon_{i,t} \qquad (3.1)$$

All these variables will influence operating performance and is associated with WCM. $ROA_{i,t}$, is return on asset and the dependent variable the constant term is denoted as β_0, while $\beta_1 NTC_{i,t}$

represents the coefficient for NTC variable. The NTC is used as a measure for WCM, the variable $\beta_2 NTC_{i,t}^2$ represents the square of the NTC, the variable $\beta_3 SIZE_{i,t}$ denotes the firm's size, equivalent to the natural logarithm of its sales. The variable $\beta_4 LEV_{i,t}$ represents the leverage of firms, which is characterized as the proportion of total debt to total assets. The variable $\beta_5 SGROWTH_{i,t}$ is growth of firm measured by the growth of revenues over the previous year. The variable $\beta_6 IR_{i,t}$ denotes interest rate and $\beta_7 INF_{i2}$ represent inflation rate. White noise is considered to be the error term ε, where i and t represent the corresponding time and firm units.

3.6.2 Financial Constraints and Optimal Level of Working Capital

When it has been determined that working capital level improves the firm's performance, our objective is to investigate the potential impact of financing on this level. Inadequate information has adverse effect on the firm's market evaluation and its goals, resulting in an increase in the cost of the firm's for obtaining external financing. Consequently, there is a possibility that this could result in credit restriction and generate a discrepancy in the expenses linked to internal and external funding. It is proposed that firms facing more financial constraints are likely to have a lower ideal working capital level relative to those that are less sensitive. This is because maintaining a higher working capital level would necessitate borrowing, which would incur additional costs. To investigate the potential changes in the ideal working capital level between financially restricted firms and less constrained firms, Equation 1 has been modified by the inclusion of a binary variable that distinguishes firms with a higher likelihood of being financially constrained from those with a lower likelihood. The variable DFC is a binary indicator variable that assumes a value of 1 for firms that demonstrate a high degree of financial restrictions, and 0 for firms that do not demonstrate such limitations. Therefore, we present the subsequent specification:

$$ROA_{i,t} = \beta_0 + (\beta_1 + \delta_1 DFC_{i,t})NTC_{i,t} + (\beta_2 + \delta_2 DFC_{i,t})NTC_{i,t}^2 + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} +$$
$$\beta_5 SGROWTH_{i,t} + \beta_6 IR_{i,t} + \beta_7 INF_{i2} + \varepsilon_{i,t} \qquad (3.2)$$

For less financially constrained firms, the ideal working capital investment level is determined by applying this formula $-\beta_1/2\beta_2$. For firms with higher financial restriction, the ideal working capital investment level is find by applying this formula is $-(\beta_1+\delta_1)/2(\beta_2+\delta_2)$

3.7 Description of Variables

All these variables will impact operating performances and are linked to WCM. Now, let's examine each of these variables individually and thoroughly.

3.7.1 Dependent Variable

ROA is a measure used to assess a firm's performance because it connects profitability to total assets. ROA is a crucial metric that measures the performance of a firm (Afza & Nazir, 2008; Falope & Ajilore, 2009; Şamiloğlu & Demirgüneş, 2008). It is a performance indicator for firms based on accounting. There are several methods to assess the performance of a firm or profitability. Deloof (2003) and Mathuva (2010) have employed net operating income and gross operating income as indicators of profitability. Nevertheless, these procedures are restricted to declarations of revenue. Additional metrics, such as ROA and ROE can be utilized because they encompass a broader range of financial circumstances. By incorporating both income statement and balance sheets, ROA and ROE provide a more comprehensive assessment of a firm's profitability and performance in relation to factors like total assets or total equity. Consequently, ROA offers a more precise depiction of profitability and performance of firm. The study selects ROA as a substitute for performance measurements because it takes into account all resources, such as accounts receivable and inventory, which constitute around 38% of a firm's total assets and are considered significant indications of WCM.

It is calculated by taking net profit and dividing it by total assets.

$$ROA = \frac{Net\,profit}{Total\,asset} \qquad (3.3)$$

3.7.2 Independent Variables

> **NTC (net trade cycle)**

The independent variables in this study consist of the NTC and the square of the NTC. The utilization of NTC will serve as an indicator for the management of working capital. NTC incorporates all three essential aspects of WCM. The duration of a firm's operations can be

determined by either the end of activity or the interval of time between product purchases and accounts receivable collection

$$NTC = (Inventories\ /Sales) * 365 + (Account\ Receivable\ /Sale) * 365 -$$
$$(Accounts\ Payables/Sales)\ * 365 \qquad (3.4)$$

(Soykan & Ulucak.,2016; Baños-Caballero et al.,2014) examined a non-linear connection between WCM-representing NTC and firm's performance. The optimal NTC value maximizes firm performance due to this inverted U-formed (non-linear) relationship among NTC and firm performance. At this moment, costs and benefits are balanced. Increasing working capital level leads to improved firm performance until an optimal point is reached. Once this optimal point is reached, increasing the working capital level leads to decreased firm performance. Firms function efficiently because the shorter NTC makes it possible for them to manage working capital more effectively and reduces their requirement for outside financing.

3.7.3 Control Variables

The study incorporates several control variables, namely the firm's size (SIZE), financial leverage (LEV), and growth (G) with the aim of enhancing the findings and mitigating the possible issues of endogeneity and omitted correlation variable bias. The aforementioned factors function as control variables in the research conducted by (Baños-Caballero et al., 2014; Deloof, 2003; Hill et al., 2010).

I. Size (SIZE)

A positive link has been shown between the amounts of working capital and firm size. Larger firms have the capacity to secure greater amounts of trade credits due to their extensive diversification and enhanced accessibility to capital markets (Niskanen & Niskanen, 2006) . In contrast, small firms have significant financial constraints due to elevated credit expenses, restricted entry to capital markets, and limited avenues for securing funds. (Yang & Chen, 2009) study that the financial institutions tend to provide preferential treatment to larger firms in regarding borrowing costs, a pool of skilled human resources, and. the potential for more strategic diversification, compared to smaller firms. This practice mitigates the likelihood of failure for larger firms and enables them to pursue more lucrative opportunities, hence enhancing their overall profitability. Furthermore, they possess the necessary financial resources to recruit highly capable

individuals to effectively follow their strategic goals. The size indicator (SIZE) in the present study will be determined by employing the natural logarithm of total assets.

$$Firm\ Size\ =\ ln\ (total\ asset) \qquad (3.5)$$

II. Leverage (LEV)

Leverage refers to the ratio of total assets to interest-bearing debt, encompassing both long-term and short-term obligations. Firms that have large levels of debt are subject to paying higher interest rates due to the perception that they carry greater risk, which in turn limits their financial flexibility. (Baños- Caballero et al., 2010) illustrate that enterprises with high levels of leverage strategically reduce their net working capital to minimize their overall interest expenditures. Consequently, it is anticipated that an inverse association will exist between the ratio of debt and CCC, with the aim of assessing the effect of components of the WCM on the firm's profitability.

Mathuva (2010) incorporated financial leverage as a control variable in their study. Findings indicated an inverse correlation between financial leverage and profitability. Samiloglu and Demirgunes (2008) investigated the influence of WCM on profitability of Turkish firm. They used financial leverage and size of the firm as control variables. Findings of the study demonstrated an inverse correlation between financial leverage and profitabilty.

$$Firm\ leverage\ =\ (Total\ Debt)/(Total\ Asset) \qquad (3.6)$$

III. Sales Growth (SGROWTH)

Sales growth is defined as an increase in the firm's generated revenue within a designated timeframe. The factor serves as a crucial measure of a firm's performance and achievement. Positive sales growth is commonly regarded as measure of a firm's market share expansion, customer base growth, or increased sales volume of its products or services.

$$Sales\ Growth = (Current\ Year\ Sales - Previous\ Year\ Sales)\ /$$
$$(Previous\ Year\ Sales)\ *100 \qquad (3.7)$$

3.7.4 Macroeconomic Variables

Different macroeconomic elements have unique theoretical frameworks and importance. Hence, the selection of the suitable macroeconomic parameters is a pivotal phase that requires insight

(Humpe & Macmillan, 2009). To choose the most appropriate macroeconomic components for the research design, an analysis of prior empirical data and pertinent literature was carried out. Macroeconomic considerations typically encompass, inflation, and interest rates. These variables have a direct or indirect impact on firm's investment decisions, ultimately affecting their performance.

I.   Inflation (INF)

Inflation refers to the overall upward trend in the cost levels of products and services within an economy over a specified period. This phenomenon leads to a reduction in the buying power of a given currency, resulting in a diminished ability of each unit of currency to acquire products and services. A higher rate of inflation indicates the purchasing power of the national currency since it requires more nominal money to purchase the same products and services as it did prior to the shift. WCM and financial performance are both significantly impacted by inflation. According to the findings of Lee (2003) and Reinhart *et al*., (2003) inflation can have an impact on the accounting-based performance and cost of capital of firms, which in turn influences subsequent measures of economic performance. Several indices, like the Consumer Price Index (CPI), are often used to measure it. The CPI examines fluctuations in the prices of a basket of widely bought services and goods.

II.   Rate of Interest (IR)

Rate of interest is a quantitative measure, denoted as a percentage that indicates the cost of borrowing or the return on investment. It functions as a form of compensation for lenders or investors in return for supplying capital. This rate represents the cost of borrowing money or the return obtained from investing cash. Interest rate adjustments are a common tool used by central banks in conducting monetary policy to accomplish a variety of economic goals, including stabilizing financial markets, fostering economic growth, and reining in inflation.

The eit parameter in the model will represent a random variable.

3.8. Econometrics Techniques

Before selecting an appropriate econometrics technique, it is necessary to first examine the characteristics of the data. The present investigation exclusively focused on non-financial firms. The study employs the panel data analysis technique to conduct the analysis. Panel data refers to a type of dataset where multiple cross-sectional units are observed over a span of several years.

These units can be combined or pooled together, hence enabling an increase in the overall sample size. However, it is not feasible to do such analysis only based on data of cross sectional and time series. Therefore, the technique of panel data is considered the most suitable approach for estimating both data of cross-sectional and time series simultaneously. Econometric techniques for panel data analysis are specifically developed to address the possible heterogeneity among individual units (cross-sectional dimension) and the interdependence of observations across time (time-series dimension). Considering the utilization of a panel data set in this study it is deemed reasonable to employ fixed and random effect model for estimate purposes. Fixed and random effects models address unobserved heterogeneity and time-specific effects (Bhatia's, & Srivastava, 2016; Nareswari N., & Nurmasari N.D, 2021).

The Hausman test is employed to determine the appropriate selection between model of random and fixed effect for statistical analyses and assessed the exogeneity of the unobserved errors. Descriptive statistics is a statistical technique employed to gain insights into the central tendency, dispersion, and shape of a given dataset's distribution. Below, we provide a description of all the econometrics methodologies utilized in this study.

3.8.1 Descriptive Statistics

The goal of the current study is to assess the effect of WCM on Pakistani manufacturing firm's performance. Panel data will be used for the analysis. Descriptive statistics are essential in panel data analysis as they offer a concise and useful overview of the data's features. It involves the analysis and representation of fundamental characteristics within datasets. As they serve the purpose of summarizing and explaining the fundamental characteristics of datasets. These tools serve as a fundamental basis for the purposes of data exploration, visualization, comparison, and quality assessment. They perform a vital function in facilitating comprehension and interpretation of data, alongside successfully conveying the discovered insights. Empowering researchers to make well-informed choices for subsequent analyses, model selection, and result interpretation. Panel data analysis relies heavily on these vital tools for the exploration, summarization, and visualization of intricate data structures.

3.8.2 Correlation

The relationship between variables is measured and examined using correlation techniques. The quantitative relationship or reliance between two or more variables is referred to as correlation,

and it illustrates the correlation between variations in one variable and the corresponding changes in another. The type of association between the two variables is indicated by the correlation variable's sign.

3.8.3 Fixed Effect model

Other names for the fixed effects model are the individual-specific effects model or the inner estimator, is a statistical approach utilized in econometrics. To exclude the possible impact of serially correlated errors, this study will use the Fixed-effects panel model. It is assumed that during the course of the investigation, the individual-specific effects will remain fixed and consistent. Individual heterogeneity is accounted for in the regression equation through the inclusion of individual-specific dummy variables. The addition of dummy variables in the model allows for the incorporation of time-invariant traits distinct to everyone, hence mitigating the influence of individual-specific effects. The fixed effects model enables the estimation of the variation within groups and might be regarded as calculating the average impact within each individual or group.

$$Y_{i,t} = \alpha + \beta X_{i,t} + \gamma D_i + \mu_{i,t} \qquad (3.8)$$

The variable D_i is a dummy variable that is specific to each individual, denoted by i.

3.8.4 Random Effect Model

The individual-specific effects model or the between estimator are other names for the random effects model, is a statistical approach utilized in several research contexts. It is postulated that the effects particular to everyone are random in nature and exhibit no correlation with the independent variables. The method employed in this study regards the individual-specific effects are considered as random variables and are estimated using the method of moments. The use of the random effects model allows for the calculation of the overall variance among individuals and can be considered as an assessment of the average effect among individuals.

$$Y_{i,t} = \alpha + \beta X_{i,t} + C_i + \mu_{i,t} \qquad (3.9)$$

C_i is the random effect unique to each individual. The assumption is that the random impact C_i is independent of the independent variable X_{it}.

3.8.5 Hausman Test

This test is employed to ascertain the suitability of either the random effects or fixed effects model and assessed the exogeneity of the unobserved errors for the given dataset. The examination involves a comparison of the estimated coefficients derived from the two models, with the aim of evaluating the statistical significance of any observed discrepancies. If the null hypothesis is rejected, thereby signifying the existence of a significant difference, the fixed effects model is deemed more favorable.

CHAPTER 4

RESULTS AND DISCUSSION

This section provides the results of the study, analyzing the effect of WCM on Pakistani manufacturing firm's performance. This section is structured into two primary divisions. The initial segment encompasses pre-estimation examinations, which involve descriptive statistics and correlation analysis. Additionally, it offers a thorough explanation of the procedures and outcomes involved in determining the ideal working capital investment level that maximizes the value of Pakistani manufacturing firms. The second section examines the financial limitations that these firms encounter when making investments in the optimal working capital level. The estimations in this investigation were performed using the software Stata and E-views.

Impact of WCM on firm performance

Section I of this chapter discusses the initial and subsequent goals of the investigation. This study analyses the influence of WCM on the operational efficiency of Pakistani manufacturing firms. It aims to identify the most effective working capital investment level that maximizes the overall value of these organizations. This section comprises preliminary estimation tests, which are subsequently followed by the final estimation results. The particular model is generated using a fixed panel effect technique, displaying all coefficients that are statistically significant.

4.1 Descriptive Analysis

Examining the descriptive analysis of data is crucial as they provide a succinct and comprehensive overview of the key characteristics of a dataset. The dataset has 3,073 observations, and Table 4.1 displays the analysis of descriptive for this dataset. The table presents information on the central tendency, data range, and standard deviation, demonstrating the extent and magnitude of the variables' variation.

Table4. 1: Descriptive analysis

Variables	Mean	Max	Min	STD	N
ROA	5.05	337.91	-119.77	14.34	3073
NTC	40.19	978.34	-945.11	132.94	3073
SIZE	15.37	20.61	10.00	1.63	3073
LEV	0.28	3.66	0	0.25	3073
SG	13.45	933.61	-99.95	67.17	3073
RIR	2.53	7.76	-4.45	3.22	3073
INF	8.79	19.87	2.53	4.46	3073

Note: The dependent variable is ROA (return on assets), NTC (net trade cycle) is independent variable, SIZE the logarithm of total assets, LEV the leverage, SG is the sales growth, RIR the real interest rate, INF the inflation, RGDP.G the real GDP growth. All the values are in "%" except NTC which shows

The table 4.1 displays the statistical characteristics of various important variables in the dataset. The mean ROA is 5.05%, suggesting that, on average, the firms in the sample get a 5.05% return on their assets. The ROA has substantial variability, ranging from a maximum of 337.91 to a minimum of -119.77, with a standard deviation of 14.34. This indicates a notable divergence in the performance of firms within the dataset. The NTC has an average value of -381.57, indicating that the firm typically requires around 40.19 days to convert its investments in trade receivables and inventories into cash, taking into account the time it takes to settle its trade payables. The NTC exhibits significant variation, with values ranging from -945.11 to 978.34. The standard deviation of 134.94 indicates a high level of variability in trade cycle management across different firms.

The variable SIZE, which indicates the size of the firms, has a mean of 15.37. The values of SIZE range from a minimum of 10.00 to a maximum of 20.61. The standard deviation of SIZE is 1.63. The comparatively low standard deviation indicates that the sizes of firms in the sample are very constant. The mean of the leverage (LEV) metric, which quantifies the debt level of firms, is 0.28. This indicates that, on average, firms incorporate 28% debt in their capital structure. The numbers span from 0 (indicating no debt) to 3.66, with a standard deviation of 0.25, indicating a moderate level of variation in leverage across the firms. The mean of Sales Growth (SG) is 13.45, which is the average increase in sales across the firms. Nevertheless, SG exhibits significant variability, ranging from a maximum value of 933.61 to a lowest value of -99.95, with a considerable standard

deviation of 67.17. The substantial standard deviation indicates notable variations in the rates of sales growth among the firms in the sample.

4.2 Correlation

The correlation table 4.2 presents a comprehensive summary of the associations among different financial measures in a dataset consisting of 3,073 observations. The ROA shows a very weak positive correlation with the NTC at 0.01, indicating almost no linear relationship. ROA has a slightly stronger positive correlation with firm size (SIZE) at 0.13, suggesting that larger firms tend to have marginally better ROA. The leverage (LEV) ratio has a negative correlation with ROA at -0.06, implying that higher leverage is associated with slightly lower ROA. Sales growth (SG) has a negligible positive correlation with ROA at 0.01, indicating minimal direct association. NTC displays negligible correlations with SIZE and SG, both at 0.01, and a negative correlation with LEV at -0.11, suggesting that firms with higher leverage may have shorter net trade cycles. SIZE shows a weak negative correlation with LEV at -0.08 and a negligible correlation with SG at -0.01, indicating little to no direct association between firm size, leverage, and sales growth

Table4. 2: Correlation

COR	ROA	NTC	SIZE	LEV	SG	RIR	INF
ROA	1						
NTC	0.01	1					
SIZE	0.13	0.01	1				
LEV	-0.06	-0.11	-0.08	1			
SG	0.01	0.01	-0.01	0.00	1		
RIR	-0.03	0.04	-0.09	0.01	0.01	1	
INF	0.04	-0.04	0.05	0.01	0.02	-0.82	1

Note: Positive values indicate a direct correlation, while negative values indicate an inverse correlation.

4.3 Hausman Test

The Hausman test is a statistical technique employed in econometrics to choose the most appropriate model specification among competing alternatives. Within the scope of this study, the test is employed to determine whether the random effects model or the fixed effects model is more suitable for panel data analysis. This test evaluates the statistical significance of the disparities in

estimated coefficients between the two models. By doing this, it helps to resolve any concerns of endogeneity and ensures the selection of the most suitable model specification for the study. The table below displays the outcomes of the Hausman test.

Table4. 3: Hausman Test

Chi^2	39.23
$Prob < Chi^2$	0.000

Note: P< 0.05, P< 0.01, P< 0.1

The Hausman test produced a chi-square statistic with a probability of 0.000, demonstrating statistical significance at a 5% significance level. Therefore, the null hypothesis of the random effect model is rejected, and we will proceed to analyses the fixed panel model.

4.4 Effects of Working Capital Management on Firm Performance

Table4. 4: Net Trade Cycle (NTC) and Firm Performance

Variable	ROA
NTC	0.267***
	(0.108)
NTC^2	-0.0455***
	(0.0199)
SIZE	-6.245***
	(1.935)
LEV	-0.125***
	(0.0394)
SG	0.0623***
	(0.0238)
RIR	0.246**
	(0.107)
INF	0.261***
	(0.0958)
Constant	17.43***
	(5.352)
Observations	3037
Number of firm	238
R-squared	0.52
F-Statistics	10.29
Prob (F-stat)	0.000

Note: ROA is the dependent variable. NTC is the net trade cycle and NTC^2 is the square of the NTC. SIZE the size. LEV represents the leverage. SG the sales growth. RIR is the real interest rate. INF the inflation. ***, **, * are the 1%, 5%, and 10% level of significance respectively.

The table displays the outcomes of a regression analysis that investigates the influence of different factors on ROA, a crucial metric for assessing firm performance. The variable being measured is the ROA, and the analysis consists of 3,037 observations collected from a sample of 238 firms. The NTC coefficient is 0.277, with a standard error of 0.104. This coefficient is statistically significant at the 1% level. The positive coefficient indicates that a longer net trade cycle is linked to a higher ROA, implying that firm with a longer net trade cycle generally perform better. This could be attributed to improved inventory management and credit policies, resulting in greater efficiency. The coefficient for NTC squared (NTC^2) is -0.0574, with a standard error of 0.0199. It is likewise statistically significant at the 1% level. The results validate the expected outcome by revealing a significant and statistically significant inverse U-shaped association between firm performance and working capital (see Figure 4.1). The positive coefficient ($\beta 1 > 0$) for the NTC variable and the negative coefficient ($\beta 2 < 0$) for its square provide clear evidence of this. Our research indicates that if working capital levels fall below the optimal threshold, the benefits of higher sales and early payment reductions outweigh any drawbacks, leading to enhanced firm performance. Conversely, if the firm's working capital level exceeds the ideal level, the impacts of opportunity cost and financing cost become more pronounced. Consequently, there is a negative correlation between working capital and firm performance.
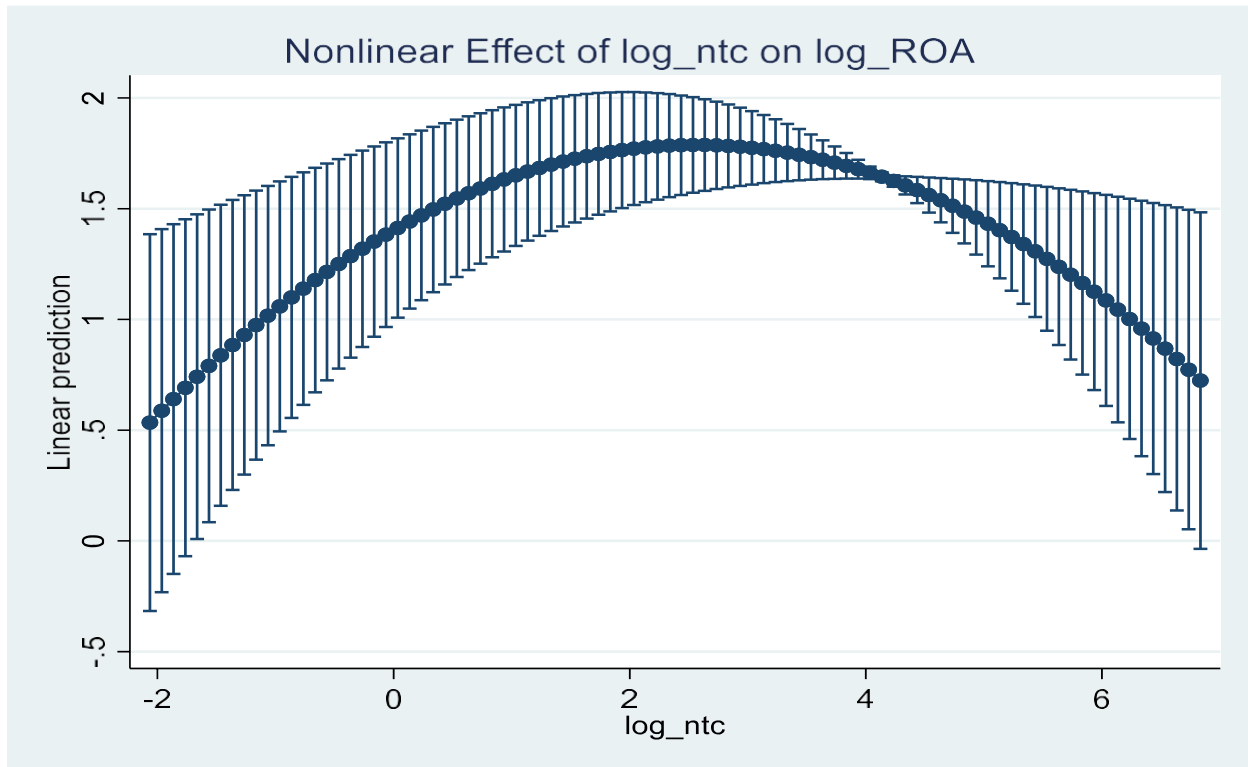
Equation (1) allows for the measurement of the working capital level by identifying the turning point, which is obtained from $-\beta 1/2\beta 2$. The coefficients of NTC variables enable us to identify the critical juncture in the correlation between firm performance and NTC in our sample. More precisely, we have identified a turning point occurring every 293 days. These results are consistent with research like (Nareswari & Nurmasari, 2021). In which the optimal degree of working capital is 271.23 days.

The regression coefficient for company size is -6.245, and it has a standard error of 1.935. This coefficient is statistically significant at the 1% level. This inverse correlation suggests that larger firms generally have a ROA. This could indicate the difficulties that larger firms encounter in sustaining optimal levels of efficiency and profitability, potentially as a result of heightened bureaucratic intricacies and operational inefficiencies. The coefficient for leverage (LEV) is -0.125, with a standard error of 0.0394. It is also statistically significant at the 1% level. The inverse correlation indicates that increased leverage is linked to decreased ROA, implying that firms with larger debt-to-equity ratios tend to have poorer performance, possibly due to heightened financial

risk and interest obligations that diminish profitability. The coefficient for sales growth (SG) is 0.0623 with a standard error of 0.0238, indicating a statistically significant relationship at the 1% level. These findings demonstrate a direct correlation between sales growth and ROA, indicating that firms with higher sales growth are more likely to have higher profitability. This implies that rising sales might be advantageous for firms as they take advantage of growing market prospects. The coefficient of the real rate of interest (RIR) is 0.246, with a standard error of 0.107. This coefficient is statistically significant at the 5% level. The correlation between higher real interest rates and higher ROA suggests that firms may be able to achieve greater returns on their investments in an environment with high interest rates. The coefficient of inflation (INF) is 0.261, with a standard error of 0.0958. This result is statistically significant at the 1% level. The correlation between inflation and ROA implies that as inflation increases, ROA also tends to increase. This could be attributed to the firm's capacity to transfer increased expenses to customers, thereby sustaining or even enhancing profitability.

So, we conclude that the regression analysis shows that the net trade cycle, sales growth, real interest rates, and inflation positively impact firm performance as measured by ROA, while firm size and leverage have a negative impact. The net trade cycle has a nonlinear effect, with an optimal level beyond which its positive impact diminishes. These findings highlight the importance of efficient WCM, growth strategies, and careful leverage management in enhancing firm performance. The model has an R-squared value of 0.52, indicating that approximately 52% of the variation in ROA is explained by the independent variables. The F-statistic is 10.29 with a Prob (F-stat) of 0.000, signifying that the model is statistically significant.

Figure 4.1: Nonlinear Effect of NTC on ROA

4.5 Financially Constraints Firms and NTC-Firm Performance

After determining that firms maintain an ideal amount of working capital that enhances their performance, our goal is to examine how finance can affect this optimal level. Asymmetric information among corporation and the financial market can result in credit rationing and a discrepancy in the expense of inside and outside funding. This phenomenon arises due to a lack of adequate information, which leads to a decrease in the market's assessment of the company and its projects. Consequently, the expense of obtaining outside funding for the firm increases. Hence, given that maintaining a greater level of working capital necessitates funding and entails supplementary costs, it is anticipated that firms that are more prone to encountering financial limitations will maintain a lower ideal working capital level in comparison to those that are less likely to suffer such limits.

In order to examine if there is a distinction in the ideal working capital level between financially restricted firms and less constrained firms, we expand Model (1) by include a dummy variable (DUM). This variable differentiates between firms that are more prone to encountering limitations in obtaining funding and those that are less prone, depending on the aforementioned classifications.

More precisely, the DUM dummy variable has a value of 1 for firms that have higher financial constraints and a value of 0 for firms that have lower financial constraints. The dependent and independent variables remain unchanged from their previous definitions. The equation $-\beta_1/2\beta_2$ represents the ideal amount of working capital investment for firms that have less financial limitation. The ideal working capital level for financially limited firms can be determined via the equation $-(\beta_1 + \delta_1)/2(\beta_2 + \delta_2)$.

By categorizing the sample of firms according to the likelihood that they face restrictions in obtaining external funding, we can ascertain the optimal amount of working capital investment for each company and analyses the effects of these limitations on working capital levels. Consequently, we employ the Z-score technique to classify firms according to the probability of facing financing limitations and insolvency, as firms undergoing financial difficulties are more prone to encountering higher levels of financial restraints. The Z-score approach, created by Professor Edward Altman in 1968, is a financial indicator employed to evaluate the probability of a company experiencing bankruptcy or financial hardship. The method employs many financial ratios to compute a composite score that serves as an indicator of the financial well-being of the company. The Z-score is especially valuable for evaluating the creditworthiness of manufacturing firms and other firms with financial uncertainty. The Z-score is computed by using a weighted aggregation of various financial statistics, each of which represents distinct facets of a firm's financial state.

The Altman Z-score formula is expressed as follows:

$$Zscore = 1.2A + 1.4B + 3.3C + 0.6D + 1.0E \qquad (4.1)$$

A = Working Capital / Total Assets

B = Retained Earnings / Total Assets

C = Earnings before Interest and Taxes / Total Assets

D = Market Value of Equity / Total Liabilities

E = Sales / Total Assets

These values (1.2, 1.4, 3.3, 0.6, 1.0) tells the weights given to each ratio. These weights are determined by statistical study of bankrupt and non-bankrupt enterprises, depending on their prognostic power.

The interpretation of Altman Z-score as follows:

➢ Z-score higher than 2.99 indicates a safe zone, suggesting a minimal likelihood of experiencing financial trouble.

➢ The range of Z-scores between 1.81 and 2.99 indicates a grey area, which implies that caution should be exercised and there may be a risk of financial trouble.

➢ A Z-score below 1.81 indicates a distress zone, which suggests a greater likelihood of experiencing financial trouble or insolvency.

4.6 Hausman Test

Table4. 5: Hausman Test

Chi^2	50.23
$Prob < Chi^2$	0.000

Note: P< 0.05, P< 0.01, P< 0.1

The Hausman test produced a chi-square statistic with a probability of 0.000, demonstrating statistical significance at a 5% significance level. Therefore, the null hypothesis of the random effect model is rejected, and we will proceed to analyses the fixed panel model.

Table4. 6: *Financial Constraints and Net Trade Cycle-Firm Performance Relation*

Variable	ROA
NTC	0.277**
	(0.104)
NTC^2	-0.0574**
	(0.0199)
NTC*DUM	0.273*
	(0.150)
NTC^2 *DUM	-0.0627*
	(0.0343)
SIZE	-6.443***
	(1.612)
LEV	-0.129***
	(0.0426)
SG	0.0917***
	(0.0301)

RIR	0.233***
	(0.0896)
INF	0.239**
	(0.0928)
Constant	0.267**
	(0.108)
Observations	3037
Number of firm code	238
R-squared	0.56
F-Statistics	9.53
Prob (F-stat)	0.000

Note: The dependent variable in this study is the firm's performance, specifically measured by the return on assets (ROA). The net trade cycle (NTC) refers to the time it takes for a company to convert its inventory into sales and then receive payment from customers. NTC2 is just the square of NTC. Determine the dimensions of the object. LEV is an abbreviation for leverage. SG refers to the increase in sales. RIR stands for the real interest rate. INF is an abbreviation for inflation. The variable "DUM" is a binary indicator that takes the value of 1 for enterprises that are expected to have financial constraints, and 0 for firms that are not. The estimations contain time and industry variables, however these variables are not disclosed. The levels of significance 1%, 5%, and 10% are denoted as ***, **, and *, respectively.

The table displays the outcomes of a regression analysis that investigates the correlation between financial restrictions, NTC, and firm performance, as shown by ROA. The NTC coefficient is 0.267, with a standard error of 0.108. This coefficient is statistically significant at the 5% level. The positive coefficient suggests that an initial increase in the net trade cycle is linked to a subsequent increase in the ROA. The coefficient for (NTC2) is -0.0455, with a standard error of 0.0215. It is likewise statistically significant at the 5% level. The presence of a negative coefficient indicates the occurrence of a diminishing return effect. This implies that initially, an increase in the NTC enhances the ROA. However, above a certain threshold, additional increases in the net trade cycle have a detrimental effect on ROA. Efficiently managing the net trade cycle can improve a company's performance, but excessively prolonging it can have negative effects such as increased costs or inefficiencies.

The interaction terms NTC*DUM *and* NTC^2 *DUM, with coefficients of 0.273 (standard error of 0.150) and -0.0627 (standard error of 0.0343) respectively, are significant at the 10% level. These terms indicate that the effect of the net trade cycle on ROA varies based on the existence of financial restriction. The positive coefficient for NTC*DUM suggests that financially constrained firms experience a stronger initial positive impact of the NTC on ROA. However, the negative coefficient for NTC^2 *DUM indicates a more pronounced diminishing return effect for these firms,

highlighting the importance of optimizing the net trade cycle for financially constrained firms to maximize benefits and minimize inefficiencies.

The regression analysis reveals a nonlinear connection between working capital and firm performance that are classified as either more or less financially limited. Specifically, the relationship is concave for less financially constrained enterprises. Nevertheless, the most advantageous allocation of working capital investment is determined by the financial limitations encountered by these firms. When evaluating financial limitation, the findings indicate that firms that experienced more financial restrictions maintain a lower working capital level. The primary reason for this is the elevated finance expenses and increased capital constraints faced by these firms reducing working capital investment decreases the requirement for outside finance. Our study shows that firms with greater financial limitations maintain a lower inflection point, which supports our theory that the ideal working capital level depends on the extent of financial constraint. More financially limited firms maintain a lower ideal working capital level due to their higher financing expense and increased capital rationing. It is crucial to acknowledge that financially limited firms reach their break-even point at around 249 days. Therefore, it may be inferred that the performance of these firms begins to decline after 249 days. Furthermore, the break-even point remains constant for all specifications, which indicates the strength and reliability of the results.

The coefficient for firm size is -6.443, with a standard error of 1.612. This coefficient is statistically significant at the 1% level. The inverse correlation implies that as firm increase in size, their ROA tends to decrease. This could be attributed to declining returns to scale, elevated operating expenses, or bureaucratic inefficiencies that hinder profitability. The leverage coefficient is -0.129, with a standard error of 0.0426. It is statistically significant at the 1% level, suggesting that higher leverage is linked to worse ROA. This is consistent with the economic understanding that increasing levels of debt lead to increased interest payments and financial risk, which in turn decreases profitability. The coefficient for sales growth is 0.0917, with a standard error of 0.0301. This coefficient is statistically significant at the 1% level, indicating that firms with stronger sales growth tend to have higher ROA. An increase in sales frequently results in greater revenue and profitability, indicating improved performance of the firm. The coefficient of the real interest rate is 0.233, with a standard error of 0.0896. This coefficient is statistically significant at the 1% level,

suggesting that there is a positive association between higher rate of interest and higher ROA. These findings imply that firms may get larger returns on their financial assets, or that only firma with strong performance can afford to pay higher borrowing prices. The correlation coefficient between inflation and ROA is 0.239, with a standard error of 0.0928. This correlation is statistically significant at the 5% level, indicating that greater inflation rates are linked to higher ROA. This may indicate the capacity of firms to transfer increased expenses to consumers in an inflationary setting, thereby preserving or improving their profitability.

The model demonstrates statistical significance with an F-statistic of 9.53 and a p-value of 0.000, based on 3,037 data and 238 business codes. The R-squared value of 0.56 signifies that 56% of the variation in ROA can be accounted for by the model. The regression analysis indicates that the net trade cycle has a noteworthy nonlinear influence on firm performance. Initially, it has a favorable effect on ROA, but this effect reduces after reaching a specific threshold. Constrained firms, due to financial limitations, receive more significant initial advantages but also encounter higher risks associated with prolonged trade cycles. The size of a corporation and its level of debt have a negative effect on its ROA, but the growth of sales, real interest rates, and inflation have direct influence on firm performance. This thorough examination highlights the significance of effectively controlling the net trade cycle, financial structure, and external economic factors in order to maximize business profitability.

CHAPTER 5

QUALITATIVE RESEARCH

5.1 Interviews of Policy Makers and Experts

This section is based on qualitative method of research. This study conducts qualitative studies to assess the viewpoints of policymakers and relevant experts regarding working capital investment. It also examines the effect of such investments on a firm's performance and the financial limitations that firms have when investing in working capital. The information is derived from interviews conducted with ten experts from Pakistan's Board of Investment. All participants were specifically requested to provide policy recommendations on this subject. These interviews not only feature personal perspectives but also incorporate insights from academic studies and published literature to enhance our understanding of the underlying dynamics.

5.2 impact of WCM on firm performance

A questionnaire was designed to gather the opinions of individuals on investment in working capital, the performance of Pakistani manufacturing firm, and the financial constraints encountered by these firms in Pakistan. The first question pertains to the impact of WCM on the performance of manufacturing firms in Pakistan. The respondent from board of investment explained in detail that that WCM is of utmost importance in the success of manufacturing firms in Pakistan, just as it is in firms worldwide. Efficiently managing working capital can have a direct effect on the overall profitability of a firm. Efficiently managing receivables, payables, and inventories allows firms to save costs related to excessive inventory or financing short-term debt, therefore enhancing their financial performance. He added that implementing effective WCM strategies helps to reduce the risks connected with liquidity shortages and financial difficulties. In Pakistan, where economic and political uncertainty can impair corporate operations, having enough working capital buffers can act as a cushion against unforeseen disruptions.

The respondent elucidated that an efficient WCM strategy allows for the allocation of resources to be redirected towards lucrative growth prospects, such as expanding manufacturing capabilities, updating technological infrastructure, or venturing into new markets. For manufacturing firms in Pakistan striving to maintain competitiveness in the global market, this is of utmost importance. Ensuring optimal working capital ratios improves a firm's creditworthiness. This is especially

crucial in Pakistan, where the availability of external funding may be restricted or costly. An effective WCM strategy can enhance relationships with creditors and suppliers, resulting in advantageous terms and circumstances. Efficient management of working capital enables firms to effectively adapt to market demand, price variations, and economic situations. Flexibility is crucial in the ever-changing corporate landscape of Pakistan. Efficient WCM boosts the trust and assurance of stakeholders, including as shareholders, lenders, and suppliers. It showcases effective financial management strategies and a dedication to both sustainability and expansion. WCM has a complex impact on manufacturing firms in Pakistan, affecting various aspects such as profitability, liquidity, risk exposure, growth potential, and stakeholder relationships. Adopting strong WCM techniques that are specifically designed for the local economic conditions can greatly improve a firm's profitability and ability to withstand difficulties. The justifications and details offered by these respondents align with research that indicate that actions related to WCM have an impact on the performance, value, risk, and profitability of the firm. Strategies for implementing sound working capital management policies are critical to any firm, particularly those operating in emerging economies (Chauhan and Banerjee, 2018)

5.3 Optimal level of investment in working capital that maximize firm performance

The second query I posed to the respondent concerned the ideal amount of working capital investment to maximize business value. The answer elucidated that the process of selecting the ideal amount of working capital investment for manufacturing firms in Pakistan, or any other country, necessitates the careful consideration and balancing of multiple elements so as to enhance firm worth. The tradeoff between liquidity and profitability involves finding the ideal working capital level that ensures enough liquidity to satisfy short-term obligations, such as wages and raw material purchases, without having excessive idle cash that could be invested more effectively elsewhere. Furthermore, the cost of capital refers to the expenses associated with funding the working capital, including the interest on short-term loans and the opportunity cost of utilizing equity. These factors have an impact on determining the most advantageous level of capital. Thirdly, stakeholders such as investors, creditors, and suppliers hold certain expectations regarding a firm's liquidity and financial well-being. Ensuring a sufficient amount of working capital that fulfils these expectations improves confidence and credibility

The ideal amount of working capital is not fixed and can change depending on economic circumstances, industry patterns, and firm-specific elements. It is essential to continuously

monitor, analyses potential scenarios, and make adjustments to working capital regulations so as to efficiently enhance the firm worth. Pakistani manufacturing firm, just like those in other countries, should aim to achieve a harmonious equilibrium between liquidity, profitability, and growth in order to establish the most advantageous amount of working capital investment. This equilibrium guarantees that firms are strategically positioned to optimize shareholder value while effectively managing the obstacles and opportunities in their operational context. In conclusion, while proper investment in working capital is essential for maintaining operational stability and supporting growth, it must be managed carefully to balance liquidity needs with profitability and efficiency goals. This ensures that the positive effects outweigh any potential negative effect on a firm's financial outcomes and sustainability.

5.5 financial constraint faced by these firms.

The subsequent question posed to respondents concerned the financial constraints experienced by Pakistani manufacturing firms when investing in working capital. The respondent said that Pakistani manufacturing firms face several financial constraints when investing in working capital, which can hinder their operational efficiency and growth prospects. Some key constraints include Limited Access to Financing many Pakistani firms struggle to obtain affordable financing options for working capital due to high interest rates, stringent lending criteria, and limited availability of credit from banks and financial institutions. This restricts their ability to maintain adequate liquidity and manage cash flow effectively. Second currency volatility and exchange rate risks which include fluctuations in the Pakistani rupee exchange rate can impact the cost of imported raw materials and components, which are critical for manufacturing operations. This volatility adds uncertainty to budgeting and planning for working capital needs. Third high cost of borrowing even when financing is available, the high cost of borrowing in Pakistan can deter firms from taking on additional debt for working capital purposes. This is particularly challenging for small and medium-sized enterprises that may not have access to cheaper financing options. The next is delayed payments and receivables Pakistani manufacturing firms often face delays in receiving payments from customers, which can strain their working capital cycle. This delay in accounts receivable collection can create cash flow gaps and liquidity challenges, impacting their ability to pay suppliers and meet other short-term obligations. The respondent also highlighted about the government limited support and infrastructure to words the business. The infrastructure and regulatory environment in Pakistan may not fully support efficient supply chain management and

logistics, further complicating working capital management. Inconsistent policies and bureaucratic hurdles can also hinder firms' ability to optimize their working capital. Further added that the Political instability and economic uncertainties in Pakistan can create a challenging business environment, affecting investor confidence and exacerbating financial constraints. This can lead to reduced access to external financing and increased risk aversion among lenders and investors.

It was concluded that addressing these financial constraints requires a combination of effective financial management practices, access to diversified funding sources, improvements in infrastructure and regulatory frameworks, and policies that support economic stability and growth in Pakistan's manufacturing sector. By overcoming these challenges, Pakistani manufacturing firms can enhance their resilience, competitiveness, and sustainable growth in the global market.

CHAPTER 6

CONCLUSION AND POLICY RECOMMENDATION

6.1 Conclusion

The aim of this study was to analyses the correlation between investment in working capital and the overall performance of a firm. This study deviated from earlier literature by examining the functional form of the connection among variables in the setting of Pakistani manufacturing firms. The analysis was conducted using panel data models, specifically fixed and random effects models. The findings demonstrate a nonlinear association between working capital and firm performance, characterized by an Inverted-U shape. This implies that there exists an ideal amount of working capital investment that maximizes the performance of a firm by effectively managing the trade-off between expenses and advantages. Moreover, this study enhances the existing body of knowledge by examining the influence of financial limitations on this relationship. The results suggest that, on average, the most favorable timeframe for a firm to complete its net trade cycle (NTC) is 249 days. In addition, firms that have greater financial limitations tend to maintain a lower working capital level, with their ideal Net Trade Cycle averaging 293 days. The findings show evidence that managers tend to raise their working capital investment level when it falls below the ideal level in order to enhance the firm performance. Nevertheless, exceeding the ideal level of investment can have negative consequences and elevate the likelihood of encountering credit problems. Managers should aim to keep their working capital at the ideal level and avoid any deviations that exceed or fall below it. We conducted an analysis to see if limitations on financing affect the most advantageous amount of investment in working capital. The study suggests that there is a consistent inverse link between working capital and firm performance. However, we have found that financially limited firm tend to have a lower optimal level of working capital relative to firms that are less constrained. Furthermore, this outcome remains consistent and reliable when using other indicators to measure financial limitations. Previous studies have highlighted on the significance of internally produced cash and accessibility to external funding in influencing a firm's decisions on working capital investment.

Moreover, the findings demonstrate that working capital investment are highly responsive to financial limitations. For financially limited firms, the lower ideal quantity of working capital

highlights the importance of internally produced money and access to capital markets in working capital investment decisions

6.2 Policy Recommendation

This study proposes policy recommendations based on its findings. These policy ideas will benefit businesses, policymakers, and enhance firm performance. As it offers significant practical and managerial insights for investment and financing decisions within the Pakistani manufacturing sector to improve performance. While most study on working capital investment has centered on its impact on profitability, this study uniquely examines how working capital investment contributes to firm value, particularly under financial restrictions in case of Pakistan a critical area that has received limited attention in developing market corporate financing and investment literature.

The study recommends that maintaining an ideal working capital level is crucial for maximizing firm value. It reveals that financially limited firms tend to have a lower ideal working capital level. Therefore, the findings underscore the importance of investors viewing working capital investment as pivotal in finding firm value, often preferring it to be minimized where feasible. Furthermore, the study highlights the non-monotonic connection between WCM and firm performance resulting from varying investments in working capital. Managers must therefore carefully consider the ramifications of their policies in order to preserve the best possible balance between costs and benefits and improve business performance

Empirical evidence supports the recommendation that firms, particularly those with restricted access to financial markets, volatile cash flows, and high bankruptcy risk, should strategically manage their working capital to enhance firm performance and shareholder worth. Thus, working capital investment significantly influences firm performance. Given these findings, it is imperative for investors and managers to thoroughly examine firms working capital policies alongside dividend, leverage, and capital budgeting policies before making investment decisions. This holistic approach ensures a comprehensive assessment of a company's financial health and potential for value creation.

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