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IMPACT OF WORKING CAPITAL MANAGEMENT ON MARKET RISK OF FIRMS: EVIDENCE FROM THE CEMENT SECTOR OF PAKISTAN

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Abstract

In this research, the degree of correlation between working capital management (WCM) and market risk in the cement sector in Pakistan, one of the most crucial industries to the national infrastructure and economic growth, is examined. In identifying a research gap in the role of WCM to market risk, especially in emerging economies, the study will attempt to empirically determine the consequences of net trade cycle, liquidity ratios, leverage and firm size to stock returns volatility. The analysis was performed to create a panel least squares estimation of 10 listed companies in the Pakistan Stock Exchange (20202024). It is observed that market risk is significantly reduced by efficient working capital practices, especially short net trade cycles. The size of a firm and the stability of macroeconomics, through GDP, are negatively related to the market risk, implying that large companies and stable economies are less exposed to financial risk. On the other hand, inventories' holding periods are related to more market risk if they are higher. Nonetheless, neither liquidity nor leverage indicators had any statistically significant effect. These findings suggest that companies may reduce the impacts of market turbulence by improving their financial activities, especially in the management of inventories and cash cycles. The recommended practice for financial managers is to have strong WCM strategies and correlate them with the macroeconomic trend. The best practice policymakers can do in relation to WCM efficiency includes encouraging industry benchmarks that would improve financial stability and investor confidence in the sector. The research adds empirical data to risk-informed financial planning in underdeveloped economies.

Keywords: Working Capital Management, Market Risk, Net Trade Cycle, Leverage, Financial Ratios.

Introduction

The cement industry in Pakistan is one of the prime movers of the economy. It plays a primary role in infrastructure and construction, which is one of the pillars of urbanization and industrial development. Pakistan ranks among the top 20 in cement production worldwide, with an annual capacity of more than 70 million tons. More than 20 listed companies run the industry, with major contributors like Lucky Cement, Pioneer Cement, Fauji Cement and Kohat Cement.

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Pakistan's cement industry is divided between the North and South Zones. The North Zone is mainly comprised of Punjab and Khyber Pakhtunkhwa and accounts largely for both production and consumption due to the heavy population and development activities.

This study has an important role in the Pakistani economy, representing about 7.5 percent of its large-scale manufacturing sector while also generating related activities within steel, chemicals, and wood. Presently, there are 24 factories operational in the country, with a cumulative production capacity of 49.4 million tons annually. There are two categories of industrial zones, namely Northern and Southern, of which the Northern Zone accounts for about 80 percent of total production capacity and sales. For South Zone manufacturers, however, the opportunities for revenue diversification through access to a broader spectrum of export markets via the sea are higher compared to their counterparts in the North. Northern Zone manufacturers, on the other hand, have limited export potential with only Afghanistan and India as their markets.

The elementary feature of corporate finance is working capital management (WCM), a company’s profitability and liquidity are particularly affected by it through managing current assets and liabilities. It can be defined as the difference between current assets and current liabilities. WCM happens to be very vital for the financial managers of an organization. This is because, in most cases, current assets will constitute a bulk share of the total assets. In the typical case, this amounts to more than fifty percent for manufacturing companies and is even greater for commercial distribution companies.

The exploration of working capital has been approached through various studies, including the magnitude of WCM and its components with firms' risk. To reduce the gap between short-term assets and liabilities, the study involves cash, inventories, accounts receivable, and accounts payable as its these foundations (Wang et al., 2020). Managing any of these components involves the strategic decision to engage in short-term financial operations (Ching et al., 2011). For instance, cash management relates to making sure there is enough liquidity for daily operations while keeping costs low; inventory management focuses on avoiding excessive costs for inventory holding, product expiration, and insurance (Wang et al., 2020; Petersen & Rajan, 1997). Moreover, the accounts receivable turnover (ART) measures the time interval between sales and cash collection. In contrast, accounts payable turnover (APT) measures the time gap between buying goods and paying for them (Arcuri & Pisani, 2021). The management of each component is important for working capital improvement, where the efficiency of working capital requires managers' attention (Akbar et al., 2021).

The art of efficiently managing working capital refers to the balancing of short-term assets and liabilities to ensure prompt settlement of the obligations while favorably viewing long-term investments (Akbar et al., 2020a). Properly, meaning enhanced profitability from its implementation, it smoothed operational workflows as well (Elbadry, 2018). However, too much risk may, in fact, have an adverse effect on corporate performance (Kassi et al., 2019). WCM, therefore, must be part of the decision-makers' focus, as it affects profits and operational stability (Gill et al., 2010). Other difficulties facing the organization include deteriorating credit terms and interest

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hikes, as well as inventory buildup due to slow product turnover- all of which warrant a very fine balance between liquidity and profitability. Too much liquidity can make funds short for long-term investments, and inadequate liquidity can disrupt daily operational activities.

Financial reporting is often delayed by firms prone to lower liquidity and profitability (Lukason & Camacho-Miñano, 2019). WCM is now an operative necessity in this competitive aviation, involving firms from all over the globe (Michaelas et al., 1998). Decisions about working capital relate to the profitability and performance of the firm; an efficient WCM increases both profit and performance.

Numerous studies have been conducted in both developing and developed countries on WCM and its effect on profitability and firm performance. Liquidity measures, such as the current and quick ratios, have been referred to in many analyses. Evolutionists, such as Emery (1984) and Kamath (1989), believe that management of liquidity should be ongoing, depending on incoming operating cash flow. There have been a few studies on the relationship between WCM and the operating and market risk of Pakistani listed firms (Prasad et al., 2019). Most studies conducted earlier in Pakistan have concentrated on the WCM-profitability relationship, while some emerging trends, such as WCM-risk-return, have not yet been empirically investigated.

Aggressive WCM policies are potentially risk-inducing because of price fluctuations combined with possible stock-out situations. Conservative policies will reduce risk but lead to lower profitability by binding unnecessary funds in inventory and receivables (Gounopoulos et al., 2017). Nazir and Afza (2009) stated that investors in Pakistan prefer firms that undertake aggressive current liability management; however, conservative policies could diminish risk but, conversely, constitute a disadvantage for a firm's performance.

This study empirically investigates the effect of WCM on operating and market risks in Pakistani firms, advancing prospective research by Caballero et al. (2014). This study analyzes the existence of an optimal level of working capital to demonstrate that excess working capital accumulations lead to lower levels of share price volatility, indicating a preference by shareholders in Pakistan for conservative policies. Conversely, higher working capital levels and longer net trade cycles are related to higher levels of operating income volatility, indicating the dual-edged nature of WCM's effects on corporate performance.

This study fills the gaps in the literature by addressing the impact of WCM on corporate risk in Pakistan, which is marked by inefficient working capital. It also produces some insights valuable for comparing developed and developing nations.

Rationale of Study

Working Capital Management (WCM) plays a vital role in a firm's financial health, especially in emerging economies like Pakistan, where businesses often face market volatility and operational challenges. Despite its importance, most studies in Pakistan have focused on WCM's impact on profitability, while limited research has been done on market risk. The cement

sector is a major pillar of Pakistan's economy, contributing significantly to infrastructure development and employment. However, it also faces challenges like demand fluctuations, interest rate volatility, and supply chain inefficiencies. These conditions make it important to examine how internal financial strategies, like WCM, can help reduce exposure to market risk. This study addresses a clear gap in the literature by investigating the effect of various WCM components, such as net trade cycle, liquidity ratios, leverage, and firm size, on market risk in the context of Pakistan's cement industry. This research provides fresh empirical evidence that can guide financial managers, policymakers, and investors in designing strategies that balance liquidity, operational efficiency, and risk management.

Problem Statement

Working Capital Management (WCM) plays a key role in ensuring liquidity and operational efficiency. Still, most studies in Pakistan have focused on its impact on firm profitability rather than its relationship with market risk. In Pakistan's cement industry, where efficient use of current assets is essential for both stability and growth, the connection between WCM practices and market risk remains underexplored. Financial managers still lack clear data on how factors like the net trade cycle, liquidity ratios, or firm size can significantly influence their firm's exposure to market volatility. This gap in understanding limits the ability of firms to build financial strategies that effectively manage risk.

Research Question

1. What will be the impact of WCM variables on the market risk of firms listed in Pakistan's cement sector?

Research Objective

The objective of this study is to investigate the relationship between working capital management (WCM) indicators and market risk among listed firms in Pakistan's cement sector and determine which components of WCM significantly influence market risk.

Significance of Study

This study is significant because it provides new empirical evidence on how working capital management (WCM) affects market risk in the context of Pakistan's cement sector. Most previous research in Pakistan has focused on the profitability effects of WCM, leaving a gap in understanding its role in managing risk, especially systematic market risk reflected in stock price volatility. By focusing on a major industry and examining the link between internal financial efficiency and external market risk, this study supports smarter financial planning and risk-aware management in uncertain economic conditions.

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Literature Review

Theoretical Framework

Working capital management encompasses three basic strategies: conservative, aggressive, and moderate (Nwankwo, 2005). The discussion below shows that each strategy's impact on financial health varies.

Conservative Approach

This strategy revolves around long-term financing of permanent asset requirements and part or all of the seasonal fluctuations in working capital. The general approach maintains high levels of current assets compared to the total assets of the firm. Stated, conservative approaches feature strong liquidity and little financial risk but lower expected profitability. Hence, the company would be relying more on costly long-term financing than on cheaper short-term funds. Despite the firm's avoidance of liquidity crises because of the stable long-term funds, its investments in other productive areas may be restrained. In essence, this approach is safety-oriented rather than profit-oriented because almost all permanent current assets marked for long-term financing resort quite minimally to short-term financing.

Aggressive Approach

On the contrary, the aggressive strategy finances fixed assets with long-term funds and, in this case, some of its permanent current assets are financed by short-term loans (Van Horne, 1980). Under this approach, these companies maintain a relatively smaller proportion of current assets. The increased profitability comes from lower financing costs, but increased financial risks are associated with this strategy. Heavy reliance on short-term financing creates liquidity problems when the funding is lost or becomes available on unfavorable conditions. Thus, while the aggressive approach tries to maximize returns, it also exhibits a higher risk profile.

The maintenance of adequate working capital is of critical importance. Just as blood must circulate continuously throughout the body for human life, funds should circulate continuously for business operations. Poor cash flow poses a threat to the business's sustainability. In fact, most of the time, inadequate working capital is cited as a major cause of failure for many small businesses in both developed and developing countries (Rafuse, 1996). Thus, for any firm to thrive, it should generate more income than cash outflows. The cash flow faced by small businesses is mainly due to poor financial planning and failure to project their cash needs accurately (Jarvis et al., 1996).

Even though small businesses' performance records can be associated with management factors like production, marketing, or operations, working capital management is one area that also nurtures the life and longevity of small businesses (Kargar & Blumenthal, 1994). Therefore, effective working capital management is an important factor in the financial well-being of businesses, regardless of their size.

Molina and Preve (2008) explain that firms within concentrated industries tighten their credit policy during times of financial distress compared to firms in competitive markets. Financially distressed firms have little flexibility and cash flow

generation. Therefore, they tend to reduce investments in working capital by aggressive collection of receivables, stringent credit policies, liquidation of inventory, and extended payment period to suppliers. Evidently, these firms held significantly lower credit terms in trade, which proves an inverse relationship between financial distress and working capital requirements.

Teruel and Solano (2005) argued that profitability may be improved by reducing days accounts receivable and inventory levels. In their study, Howorth and Westhead (2003) found that small firms tend to look at certain areas of working capital management where marginal gains may be achieved. Deloof (2003) considered the period between 1992 and 1996 in Belgium and showed how the reduction of receivables and inventory was profit-enhancing. Sathyamoorthi (2002) suggested that working capital management can cause superior short-term financial gains, even if this is not as glamorous as fixed asset investments.

Weinraub and Visscher (1998) said that the industries adopt distinct and rather stable working capital policies over time. They identified a strong negative correlation between an aggressive approach toward asset management and a conservative approach toward financing.

Shin and Soenen (1998) showed that an optimal reduction of current assets increases profitability. Similarly, Pandey and Parera (1997) found that most Sri Lankan firms have informal working capital policies. They also showed that the size of the firm affects whether a conservative, moderate, or aggressive approach is preferred, while profitability affects working capital planning and control methods.

Jose (1996), on the other hand, used the cash-conversion cycle (CCC) to measure working capital efficiency and found a substantial negative relationship between the lengths of CCC and profitability; hence, an aggressive working capital policy resulted in higher profits.

In his investigations into the nature of small firms' working capital adjustment to changes in the economy, using various ratios and economic indicators, Lamberson (1995) found weak support for the hypothesis that economic variables affect working capital.

Johnson and Carpenter (1983) found no statistically significant linear relationship between the levels of current assets and their exposure to systematic risk. However, it was indicated that there may be a non-linear relationship.

Empirical Evidence of Current Ratio on Market Risk

A few empirical studies have attempted to investigate the relationship between liquidity measures and market risk. For example, Chavali and Rosario (2019) reported a negative relationship between the current ratio and beta, implying that companies in better liquidity positions enjoy lower systematic risk. This is often justified on the grounds that high liquidity puts firms on the safe side during the economic recession, making their earnings and stock performance less volatile.

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On the other hand, some studies emphasize a non-linear or even an insignificant sort of link. A study conducted by Salehi et al. (2020) found that several Iranian firms listed on the stock market showed that in some industries, whilst there is a significant inverse relationship being observed, in some others, the relationship between the current ratio and market risk is very little, if at all. So, this indicates that liquidity in relation to market risk might also be an industry-specific determinant or could be moderated by other variables like firm size, capital obligations, etc.

Delen, Kuzey, and Uyar (2013) argued that investors may not always view high liquidity positively, particularly if it indicates underutilization of resources or underinvestment in productive assets. In such cases, firms with a high current ratio might be perceived as riskier due to lower growth potential.

Empirical Evidence of Quick Ratio on Market Risk

The quick ratio tests the firm's liquidity position with a fair degree of stringency. This is pertinent in a volatile economic environment with firms where inventory may turn illiquid or devalued (Eljelly, 2004). Firms that faced higher macroeconomic risks (e.g., inflation and exchange rate fluctuations) adjusted their liquidity strategies by increasing cash reserves, which impacted the quick ratio (Raheman & Nasr, 2007).

The empirical findings regarding the relationship between the quick ratio and market risk are inconsistent. Some studies show inverse relationships that suggest that companies with superior liquidity positions bear less market risk. For example, Chavali and Rosario (2019) studied Indian firms. They found that higher quick ratios were linked to lower beta coefficients, indicating that liquidity can serve as a cushion against market fluctuations.

The studies reveal that this could be the exception rather than the rule. Salehi et al. (2020) found a direct relationship between firms listed on the Tehran Stock Exchange. They argued that this would indicate investor perception that firms with high liquid reserves are using their assets inefficiently, given an environment with low investment opportunities. Such inefficiencies could raise the level of uncertainty about future performance, with that rising perceived risk.

Empirical Evidence of Net Trade Cycle on Market Risk

The Net Trade Cycle (NTC), also called Cash Conversion Cycle (CCC), is an important parameter of working capital management that assesses the delay in cash outflow in making purchases and cash inflow from sales. Though the NTC is ever changing and thus, a measure of operating efficiency and liquidity, the measure has gained considerable attention in financial literature regarding its association with market risk, primarily, systematic risk represented by beta.

Soenen (1993) provided one of the early empirical studies addressing the relationship between NTC and ROA in U.S. firms. The results revealed an inverse relationship, showing that shorter trade cycles were associated with higher returns. This indicates that working capital management directly influences profitability and reduces systematic risk by reducing the firm's overall exposure to market volatility.

In a similar study, Jose (1996) used CCC as a proxy for working capital aggressiveness and investigated its association with market risk. The study concluded that firms with shorter CCCs, denoting aggressiveness and efficiency in working capital strategies, tended to exhibit lower beta values. This confirms that shorter, efficient working capital cycles enhance corporate resilience to market fluctuations, thereby making earnings more predictable and less sensitive to broader economic changes.

However, not all studies yield the same results. Industry-specific characteristics usually moderate the effect of working capital management on market risk. Soenen (1993) observed that the strength and direction of the relationship between NTC and market risk differ by industry, further signaling the inadequacy of a one-size-fits-all interpretation of the phenomenon.

Firms with long net trade cycles may also be perceived to be at greater risk from uncertain economic conditions, especially if long delays follow the collection of receivables and high inventory levels pose liquidity issues. In that case, long trade cycles would imply greater perceived risk, which might be translated to higher beta values and lower investor confidence.

Empirical Evidence of Leverage on Market Risk

Due to its vital significance with respect to capital structure decisions and firm valuation, the link between market risk and leverage has practical importance for empirical work in corporate finance literature. Thus, the relevance of leverage as the use of debt to get financing for a firm's operations directly impacts a firm's risk profile. Systematic risk is an important aspect in the minds of investors or managers when making decisions about capital structure and is usually measured by beta.

Empirical studies indicate that market risk helps to push firms towards more conservative debt management. Thus, according to Booth et al. (2001), firms in countries where demand and supply are volatile keep low debt levels to minimize the costs of financial distress. This behavior can be justified in that increased market risk raises earnings volatility and the actual chances of default with increased leverage. Thus, firms would conserve financial flexibility in equity financing during such a high-risk period.

On the contrary, the reverse happens as some researchers believe that firms might increase leverage as a confidence signal for future cash flow in a risky environment. Myers and Majluf (1984) suggest that firms with asymmetric information may prefer debt to equity to avoid signalling negative information to the market. In this scenario, the market risk may not delay the leverage decisions, particularly for firms with stable internal cash flows or firms financing growth opportunities.

Different studies give nonconforming views on leverage and its relation to market risk. Bhaduri (2002) noticed that in emerging markets, the effect of market risk on leverage is somehow stronger. This inverse relationship between beta and debt ratio is notably strong among firms, thus showing the heightened effect of investor sentiment and capital market volatility in cases where access to external financing is either limited or costly.

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Moreover, findings in Titman and Wessels (1988) support that the nature of the risk in question (operational vs. financial) also moderates the leverage-risk relationship. Firms exposed to high operational risk would try to avoid taking on any further financial risk through debt, suggesting that total risk exposure, rather than just the market risk, might guide leverage decisions.

Empirical Evidence of Firm Size on Market Risk

Given the relationship of market risk with size, quite a lot of studies have been done on market risk in the case of firm size. Market risk refers to the sensitivity of a given firm to movements in economy-wide variables, such as shocks, ideally assessed by estimating the firm's beta. The size of the firm, defined by such proxies as total assets, sales revenues, or market capitalization, plays a very strong role in determining how a business responds to risks.

Several studies suggest diverse benefits as well as consistent cash flows, which reduce reliance and often restrict access to financial resources. In the twin studies of Fama and French in 1992 on the creation of the three-factor model, a firm-size effect was significantly established in the direction opposite to standard risk-adjusted earnings, indicating that smaller firms carry a higher systematic risk. Larger firms generally benefit from economies of scale and broader product or geographic diversification, which cushion them against market fluctuations.

This is evidenced by Chavali and Rosario (2019), who interestingly reported that firm size correlates negatively with beta, which means that a large company results in a low beta. It may have happened due to the large negotiating power of large firms in financing terms, investment in risk management systems, or the leverage of market power to gain the upper hand from economic fluctuations.

Notwithstanding the observations made up until now, several studies reflect more subtle positions. According to Banz (1981), smaller firms might have higher average returns, probably due to higher risk premiums. However, the relation between firm size and risk is not totally consistent across industries. In industries that change and disrupt technologies fast, large firms can also show very high levels of market risk. This suggests that industry characteristics can moderate the size-risk relationship in conjunction with market dynamics.

Aggarwal and Kyaw (2010) suggested that firm-specific financial strategies also modify how size impacts risk exposure. For example, a large firm with high leverage may have a heightened market risk profile compared with a much smaller firm well-financed through equity. Thus, the interplay between leverage, asset tangibility, and liquidity assumes a mediating importance along the path that specifies the association of size with risk.

From the theoretical standpoint, portfolio theory proposes that larger firms will have less risky exposures for the investor's portfolio due to their diversified revenue streams. Correspondingly, the resource-based view asserts that larger firms with access to strategic resources and capabilities are in a better position to lessen environmental uncertainties, which in turn reduces their beta.

He further said that larger firms may have wider analyst coverage and institutional ownership, thereby reducing their destruction of information and perceived market risk. Empirical studies have shown that they are usually more vulnerable to information asymmetries, speculation, and greater return volatility than small firms.

Empirical Evidence of GDP on Market Risk

Empirical evidence strongly supports the inverse relationship between GDP growth and market risk. One of the foundational studies in this area is by Chen, Roll, and Ross (1986), who found that macroeconomic variables, particularly real GDP growth, significantly affect expected stock returns and their associated risk. Their research concluded that stronger economic performance contributes to greater market stability, thereby reducing systematic risk. Similarly, Ferson and Harvey (1991) demonstrated that economic conditions, especially GDP growth, influence time-varying risk premiums in asset pricing models. When GDP is expanding, investors perceive lower uncertainty, leading to reduced volatility in stock returns. Further supporting this relationship, Bernanke and Kuttner (2005) noted that strong GDP figures tend to calm investor sentiment and lead to more stable equity markets, even in the context of monetary policy announcements.

Empirical Evidence of Interest Coverage Ratio on Market Risk

Empirical studies indicate that the Interest Coverage Ratio (ICR) - a measure of a firm's ability to meet its interest obligations - has a significant inverse relationship with market risk. A higher ICR typically reflects stronger financial health, which leads to lower perceived risk by investors. For example, Altman (1968) in his development of the Z-score model highlighted interest coverage as a critical component in assessing a firm's creditworthiness and default risk. Firms with higher ICRs were found to have reduced bankruptcy risk, which in turn contributes to more stable stock returns.

Further reinforcing this view, Kaplan and Urwitz (1979) found that ICR was a strong predictor of bond ratings, indicating that market participants view a firm's ability to cover interest expenses as a key indicator of risk exposure. In equity markets, Chandra and Thenmozhi (2014) examined the relationship between financial ratios and stock return volatility in Indian firms. They found that companies with stronger interest coverage ratios exhibited significantly lower market risk. This is because a high ICR suggests reliable earnings, better debt management, and reduced likelihood of financial distress - all factors that decrease uncertainty for investors.

Similar results have been observed in emerging economies like Pakistan. Malik and Ehsan (2014) found that firms in capital-intensive industries with higher interest coverage ratios faced lower levels of stock price volatility, as they were better positioned to withstand economic shocks and downturns. These findings confirm that ICR is not only a key measure of solvency but also a reliable predictor of market risk, with higher ratios corresponding to increased investor confidence and financial stability.

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Hypothesis of Research

The following hypothesis is developed by reviewing related literature, and it will be statistically tested to obtain the answer to the research objective.

H_1 There is a significant association between working capital management indicators and a firm's market risk.

Research Methodology

Variable Description, Methodology, and Sample

According to Vashishtha and Armstrong (2012), the annualized standard deviation of a firm's monthly returns is assumed to represent firm risk exposure. The primary explanatory variable, NTC, is used in the study to evaluate working capital management policies for firms in Pakistan.

Explanation of Variables

Table 01 Variable Description and Calculations

Variable	Description	Calculation	Expected Sign
MR	Market Risk	The standard deviation of the means of annualized stock returns.	Neutral / Mixed
CR	Current Ratio	Current assets/Current liabilities	Negative
QR	Quick Ratio	(Cash + receivables + Short-term investments)/Current liabilities	Negative
NTC	Net Trade Cycle	Days account receivable + Days inventory—Days account payables	Negative
DAR	Days Account Receivable	(Accounts receivable/sales) × 365	Positive
DI	Days Inventory	(Inventory/Sales) × 365	Positive
DAP	Days Account Payables	(Account payables/sales) × 365	Negative
CATS	Current Assets to Sales Ratio	Current assets/sales	Negative
CTCA	Cash to Current Assets Ratio	Cash/Current Assets	Negative
CTS	Cash to Sales Ratio	Cash/Sales	Negative
Lev	Leverage	Total debt/total assets	Positive
Size	Size of the Company	Natural log of total assets	Negative
ICR	Interest in Coverage Ratio	EBIT/Interest	Negative
GDP	Gross Domestic Product of the Pakistani Economy	Current year's GDP minus previous year's GDP divided by previous year's GDP	Negative

Market Risk (Dependent Variable)

Market Risk is basically the market-induced volatility or uncertainty in the firm's stock returns. Therefore, it depicts the firm's exposure to systematic risk, which is not diversifiable. Market risk increases the return required by the investor and, in turn, determines the value of the firm. As for the working capital scenario, too much or too little working capital may indicate inefficiency or liquidity problems, thus

increasing perceived market risk. It can be measured as the standard deviation of the means of annualized stock returns.

Indicators (Independent Variables)

Net Trade Cycle

Net Trade Cycle (NTC) or Cash Conversion Cycle (CCC) is the measure of time in the days that it takes to keep cash locked up in an enterprise's operations until it gets converted back into cash by way of sales. It also indicates the effectiveness of an entity in the management of its working capital. An NTC longer indicates that liquidity is tied to accounts receivable and inventory for a longer period. It could pose less risk in terms of liquidity, but at the same time, it could show inefficient usage of resources. However, a shorter NTC has better working capital turnover but might increase the risk of liquidity if it is aggressive.

NTC = Days Accounts Receivable + Days Inventory − Days Accounts Payable

Size of the Firm

Firm size means scale and resource capacity within which a company's operations may be affected in terms of risk profile and financial stability. Generally, larger firms are more diversified, have access to a greater amount of capital, and enjoy more stable cash flow, which, in turn, results in reduced operational risk and market risk. Firm size is usually measured as the natural logarithm of total assets to normalize the data and reduce skewness. The calculation is as follows.

Natural log of total assets (Ln Total Assets).

Leverage

It indicates the firm's reliance on debt financing for its operations and assets. A high leverage ratio indicates that the financial obligations are higher, and it increases the exposure of the firm to default risk and amplifies the earnings volatility. It is generally due to this reason that more leveraged firms are riskier in the eyes of investors because of the increased market risk and, in all probability, increased stock return volatility. It is calculated as

Total Debt / Total Assets

Days Account Receivable

Days Accounts Receivable refers to the average number of days taken by a firm to realize its amounts due after selling its goods or services, since in many companies it is a very important determinant of the credit policy and the effectiveness of receivables management of the company. An increase in the value of this indicator normally brings suggestions that it is an ineffectively implemented approach for collection or the possible existence of bad debt that can lower the level of cash inflow certainly, as well as elevate operating and market risk.

(Accounts Receivable / Sales) × 365

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Days' Account Payables

Days Accounts Payable is the average time taken by a company to pay its suppliers. It measures the short-term liquidity management of an organization and its negotiating power. Higher DAP means that a firm keeps cash for a longer time, which can then increase liquidity and decrease short-term financing needs. Therefore, a higher-than-average DAP is usually associated with a lower perceived risk of liquidity crunch. However, higher DAP might prove to be damaging to supplier relationships if not managed properly.

(Accounts Payable / Sales) × 365

Days Inventory

Days Inventory (DI) measures a company's average days of inventory holding before sale. It indicates how efficiently inventories are managed and the firm's ability to convert stocks into revenues. Higher DI indicates that the inventory stays longer unsold, implying overstocking, slow-moving goods, or weaker demand. Holding costs are increased, coupled with risks of obsolescence and price fluctuation, which increase operational risks and market risk.

(Inventory/Sales) × 365

Current Ratio

The Current Ratio, also called CR, is an indicator of the short-term liquidity of an organization or the ability of an organization to pay its current liabilities using current assets. A higher CR illustrates whether the company has sufficient resources to cover its obligations without that ratio putting a company at risk for liquidity shortages and financial distress. Therefore, a strong current ratio is generally associated with lower operational and market risk. However, excessively high values may imply inefficient use of assets or inordinate idleness of resources.

Current Assets / Current Liabilities

Quick Ratio

Quick Ratio, also referred to as Acid-Test Ratio, measures a company's ability to meet its short-term liabilities using its most liquid assets, excluding inventory. It represents a stricter measure of liquidity than the current ratio. A high quick ratio implies that this company can promptly meet its short-term obligations without relying on the sometimes-questionable liquidating ability of its inventory. Therefore, it is necessary to maintain adequate levels of quick assets to ensure uninterrupted operations and limit the risk of financial distress.

(Cash + Receivables + Short-term Investments) / Current Liabilities

Current Assets to Sales Ratio

It measures how efficiently a firm uses its current assets to generate sales. It is measured as

CATS= Current Assets / Sales

A higher CATS indicates that the firm holds more current assets compared to its sales, which generally suggests lower operating and market risk, as the company is more liquid and better equipped to handle short-term obligations.

Cash to Current Assets Ratio

It measures the proportion of a firm's current assets held in cash. It is measured as

CTCA Cash / Current Assets

A higher CTCA indicates greater financial stability and better liquidity, meaning the firm is well-prepared to cover sudden expenses or emergencies without relying on asset liquidation.

Cash to Sales Ratio

It measures how much cash a company holds relative to its total sales. It is calculated as

CTS= Cash / Sales

A higher CTS often indicates excess idle cash, which may not be efficiently reinvested. This can signal underutilized resources, and thus, a negative relationship with firm risk is typically expected. More idle cash may reflect lower operational efficiency.

Interest Coverage Ratio

The Interest Coverage Ratio (ICR) measures a company's ability to meet its interest payment obligations using its earnings before interest and taxes (EBIT). It is calculated as

ICR = EBIT / Interest Expense

This ratio indicates how many times a company can meet its interest payments using its operating income. A higher ICR signifies stronger financial health and a lower risk of default, as the firm generates sufficient earnings to comfortably pay its interest expenses. In contrast, a lower ICR suggests greater financial stress and a higher risk of insolvency.

Research Methodology

Research Design

A quantitative approach is used in this research to examine the relationship between working capital management (WCM) and the market risk of firms listed in Pakistan’s cement industry. The objective is to determine whether specific WCM indicators significantly influence the level of market risk (measured as stock return

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volatility) among listed cement firms by using secondary financial and market data. A panel regression model is run to test the above hypothesis over the period from 2020 to 2024. Cross-sectional and time series data can be conveniently analyzed through panel data analysis. The Ordinary Least Squares (OLS) method was applied to the model. This empirical approach allows the researcher to assess cross-sectional and time-series variations in firm behavior simultaneously. EVIEWS software is used in this research paper.

The following table mentions the independent and control variables the study selected for this study model, which was then subjected to regression analysis.

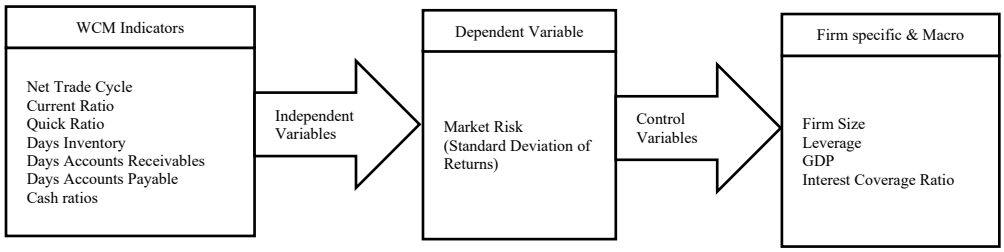


Figure 01: Research Framework

Sample Size and Selection of Sample

In this research, 10 firms were selected from the 20 cement sector companies listed on the Pakistan Stock Exchange (PSX). The companies below represent more than 70% of the market capitalization, which is a significant figure for analyzing the data (Yasir & Hijazi, 2006). A purposive sampling method was used to select firms based on data availability and completeness of financial and stock market data during the period under review.

Data Collection

This research is based on secondary data collected from the following sources

- Annual reports and financial statements of listed cement firms in Pakistan
- Stock price data from the Pakistan Stock Exchange to compute market risk
- Macroeconomic indicators, such as GDP, obtained from the State Bank of Pakistan and the Pakistan Bureau of Statistics.

Table 02: Sample Size	
S. No.	**Company Name**
1	Power Cement Ltd.
2	D.G. Khan Cement Ltd.
3	Kohat Cement Company Ltd.
4	Lucky Cement Ltd.
5	Cherat Cement Company Ltd.
6	Maple Leaf Cement Factory Ltd.
7	Pioneer Cement Ltd.
8	Fauji Cement Company Ltd.
9	Fecto Cement Ltd.
10	Gharibwal Cement Ltd.

Analyses and Interpretations

Descriptive Statistics

Table 3 presents the descriptive statistics and the results of regression analysis. The descriptive statistics table provides a summary of ten variables, including market risk and key financial ratios. The average market risk is 0.125 with a right-skewed, leptokurtic distribution, indicating a concentration of low-risk values with a few high outliers. Variables such as leverage, interest coverage ratio (ICR), and current assets to sales (CATS) exhibit significant skewness and kurtosis, suggesting the presence of extreme values and non-normal distributions, as confirmed by their Jarque-Bera test p-values. In contrast, variables like firm size and the net trade cycle show more stable and symmetric distributions, with normal assumptions largely satisfied. Overall, the table reveals high variability and distributional differences across the dataset, which has implications for regression modeling and statistical inference.

Table 03: Descriptive Analysis										
Statistic	MR	NTC	CR	DI	ICR	LEV	SIZE	QR	CATS	GDP
Mean	0.13	16.18	1.25	71.06	6.63	2.64	7.76	0.62	0.52	347.80
Median	0.11	17.00	1.28	68.75	3.85	0.45	7.69	0.52	0.48	349.00
Maximum	0.32	96.57	2.91	175.00	48.00	41.03	8.82	2.23	1.73	375.00
Minimum	0.04	-75.00	0.36	15.00	-35.20	0.02	6.68	0.15	0.23	301.00
Std. Dev.	0.05	40.94	0.54	43.45	12.05	7.86	0.47	0.39	0.25	27.40
Skewness	1.69	-0.25	0.65	0.59	0.89	4.35	-0.01	1.73	2.54	-0.65
Kurtosis	7.03	2.83	3.61	2.44	8.48	20.84	3.43	7.17	12.06	2.15
Jarque-Bera	57.49	0.59	4.36	3.56	69.11	820.84	0.39	61.23	224.73	5.03
Probability	0.00	0.74	0.11	0.17	0.00	0.00	0.82	0.00	0.00	e
Sum	6.25	809.23	62.55	3552.84	331.39	131.94	387.79	30.84	26.25	17390.00
Sum Sq. Dev.	0.13	82143.64	14.37	92515.74	7116.32	3025.77	10.93	7.63	3.13	36788.00
Observations	50	50	50	50	50	50	50	50	50	50

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Correlation Matrix

The following table shows the correlation matrix's result. The result indicates that multicollinearity does not exist in the data, as all variable values are less than 0.8. Kennedy (2008) revealed that multicollinearity is not present when the correlation value is less than 0.8.

Table 04: Correlation Analysis

	MR	CATS	CTCA	CTS	CR	DAP	DAR	DI	GDP	ICR	LEV	NTC	QR	SIZE
MR	1													
CATS	0.20	1												
CTCA	-0.06	-0.05	1											
CTS	0.0105	0.35	0.10	1										
CR	-0.07	-0.03	0.02	-0.00	1									
DAP	0.21	0.47	0.36	0.56	-0.46	1								
DAR	-0.13	0.39	0.22	0.36	-0.12	0.23	1							
DI	0.22	0.63	-0.08	0.15	-0.27	0.61	-0.04	1						
GDP	-0.40	-0.39	-0.09	-0.25	0.22	-0.20	-0.36	-0.13	1					
ICR	-0.31	-0.08	0.25	0.22	0.27	0.14	0.18	-0.12	0.36	1				
LEV	0.00	-0.01	0.27	0.17	-0.04	-0.16	0.05	0.08	-0.17	-0.01	1			
NTC	-0.06	0.14	-0.51	-0.48	0.27	-0.57	-0.14	0.30	0.04	-0.27	0.30	1		
QR	-0.24	0.03	0.06	0.08	0.68	-0.27	0.10	-0.25	0.17	0.50	0.04	0.10	1	
SIZE	-0.36	0.09	0.26	0.31	-0.26	0.51	0.40	0.23	0.11	0.46	-0.12	-0.33	0.14	1

Regression Model

This study employs a multiple linear regression model using panel data to empirically investigate the relationship between working capital management (WCM) and market risk in Pakistan's cement sector. The goal is to determine how various WCM indicators, along with firm-specific and macroeconomic controls, explain variations in market risk, measured as the annualized standard deviation of monthly stock returns**.**

Model Specification

The general functional form of the regression model is as follows

$$MR_{it}=\beta_0+\beta_1 NTC_{it}+\beta_2 CR_{it}+\beta_3 DI_{it}+\beta_4 ICR_{it}+\beta_5 LEV_{it}+\beta_6 SIZE_{it}+\beta_7 QR_{it}+\beta_8 CATS_{it}+\beta_9 GDP_t+\varepsilon_{it}$$

Where,

- MR_{it} = Market Risk of firm *i* in year *t*
- NTC_{it} = Net Trade Cycle
- CR_{it} = Current Ratio
- DI_{it} = Days Inventory
- ICR_{it} = Interest Coverage Ratio

- LEV_{it} = Leverage (Total Debt / Total Assets)
- $SIZE_{it}$ = Natural log of Total Assets
- QR_{it} = Quick Ratio
- $CATS_{it}$ = Current Assets to Sales Ratio
- GDP_t = Annual GDP (macroeconomic control)
- ε_{it} = Error term

Regression Analysis

The regression analysis was conducted using the least squares method to examine the determinants of market risk among firms. The model includes a range of firm-level financial indicators alongside a macroeconomic variable (GDP), with market risk as the dependent variable. The R-squared value of 0.4219 indicates that approximately 42% of the variation in market risk is explained by the independent variables. The F-statistics are significant ($p = 0.0048$), confirming the overall fitness of the model and the joint significance of the predictors.

Among the independent variables, these were found to have statistically significant relationships with market risk. The Net Trade Cycle (NTC) displays a negative and significant coefficient ($p = 0.0325$), suggesting that a more extended trade cycle implies better management of receivables, payables, and inventory, thus reducing exposure to market risk. The results are in line with Shin and Soenen's (1998) analysis of U.S. firms, which showed that firms with well-managed working capital, specifically, longer yet efficient trade cycles, tend to perform better and exhibit lower risk exposure. They argue that effective management of the trade cycle enhances liquidity and stabilizes operational cash flow, thus reducing return volatility and perceived market risk.

Similarly, firm size exhibits a significant inverse relationship with market risk ($p = 0.0053$), suggesting that larger firms typically face lower risk due to greater diversification and access to financial resources. This finding is like the previous studies, such as those done by Fama and French (1992), who showed that larger firms generally face lower systematic risk compared to smaller firms. This is primarily attributed to the fact that larger firms are more diversified, have greater access to capital markets and tend to have more stable earnings and cash flows, which investors perceive as lower risk.

In contrast, Days Inventory is positively and significantly associated with market risk ($p = 0.0121$), indicating that longer inventory holding periods may signal inefficiency or vulnerability to market fluctuations. The results are in line with Deloof (2003), who found that longer inventory periods are associated with lower profitability, implying inefficient inventory management. Although his focus was on profitability, the implications extend to risk exposure. Inefficient inventory handling can tie up capital, increase holding costs, and raise the firm's vulnerability to sudden market changes, thus increasing market risk.

The macroeconomic variable, GDP, also demonstrates a significant negative effect ($p = 0.0301$), implying that macroeconomic growth contributes to lowering firm-

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specific risk, potentially due to increased market stability and consumer confidence. These results are in line with the findings of Chen, Roll, and Ross (1986), who found that GDP growth is inversely related to stock market risk, as stronger economic conditions lead to more predictable cash flows, higher earnings, and reduced uncertainty about future firm performance.

Other variables, including the current ratio, quick ratio, interest coverage ratio (ICR), leverage, and current assets to sales ratio (CATS), were not statistically significant, as their p-values exceeded conventional thresholds. These results suggest that while liquidity and leverage metrics may affect firm performance in other contexts, they do not have a direct or consistent impact on market risk within this sample.

Additionally, the Durbin-Watson statistic of 1.98 suggests that the residuals are not serially correlated, enhancing the credibility of the regression estimates. Overall, the findings highlight that both internal efficiency (e.g., trade cycle, inventory management) and external conditions (e.g., economic growth) are critical factors in determining market risk.

Table 05: Regression Analysis of Market Risk

Dependent Variable MARKET_RISK				
Method Least Squares				
Sample 1 50				
Included observations 50				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NTC	-0.000	0.000	-2.215	0.033
CURRENT_RATIO	0.011	0.019	0.580	0.565
DAYS_INVENTORY	0.001	0.000	2.627	0.012
ICR	-0.000	0.001	-0.166	0.869
LEVERAGE	-0.000	0.001	-0.370	0.714
SIZE	-0.055	0.019	-2.946	0.005
QUICK_RATIO	-0.001	0.026	-0.041	0.968
CATS	-0.033	0.037	-0.873	0.388
GDP	-0.001	0.000	-2.248	0.030
C (Constant)	0.741	0.177	4.194	0.000
R-squared	0.422	Mean dependent var		0.125
Adjusted R-squared	0.292	S.D. dependent var		0.051
S.E. of regression	0.043	Akaike info criterion		-3.280
Sum squared residuals	0.074	Schwarz criterion		-2.898
Log likelihood	91.999	Hannan-Quinn criterion		-3.134
F-statistic	3.243	Durbin-Watson stat		1.979
Prob(F-statistic)	0.005			

Discussion

The research results can be considered as an important factor, considering the impact of working capital management (WCM) on the market risk of the cement

industry in Pakistan. The high negative correlation value between the Net Trade Cycle (NTC) and the market risk substantiates the fact that a company with sound management of its receivables, inventory, and payables is not subject to risky market fluctuations. The findings are like those of other literature, indicating that shorter cash conversion cycles reduce levels of risk because they stabilize cash inflows as well as enhance liquidity (Shin & Soenen, 1998; Bainos-Caballero et. al., 2014).

Additionally, there was a great negative correlation between firm size and market risk, which is also consistent with the asset pricing model presented by Fama and French (1992), because small firms have higher systematic risk than large firms since they are characterized by a comparable amount of diversification of their operations, financial flexibility and more access to capital. The same can be noticed in emerging markets where the size of the firm is typically considered a proxy of the firm's financial stability and market resilience (Chavali & Rosario, 2019).

On the other hand, higher Days Inventory (DI) would be positively related to market risk, which implies that firms that hold too much inventory expose themselves to inefficiencies in the operations process and risks in the demand process. Deloof (2003) provides such evidence, stating that a poorly managed inventory level may limit liquidity and is an indicator of poor operational planning.

Interestingly, the liquidity parameters, such as the current and quick ratios, along with leverage and interest cover ratio, recorded no statistically significant effect on market risk. Although such indicators are typically considered to be fundamental to the determination of firm solvency, recent research points to the fact that their effects on the risk arising in market settings may depend on industry factors and the economic scenarios (Salehi et al., 2020). This may be since in heavy cap-intensive industries such as cement, the cycles of the investments involved are so long-term that long-term measures of liquidity may not provide accurate measures of the blood pulse of a market.

This large negative influence of GDP on market risk shows that macroeconomic stability helps provide investors' confidence and predictability of the market, which lowers the risk level of individual firms. This observation corresponds to the arbitrage pricing theory stated by Chen, Roll and Ross (1986). This theory considers the GDP growth rate to be an important factor thatцi measures systematic risks. Emerging markets are characterized by good economic performances that tend to increase the consistency of the demand and low uncertainty (Ferson & Harvey, 1991; Bernanke & Kuttner, 2005).

The findings as a whole support the idea that WCM, mostly inventory and receivable management, plays a central role in the determination of firm-level market risk, especially in turbulent economies. Being efficient in operations, working capital is an advantage that managers should consider since it not only ensures that the entity is liquid but also reduces the level of exposure of the entity to the uncertainty of the larger market.

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Conclusion

This paper discusses the association between working capital management (WCM) and market risk in the Pakistani cement industry based on the results of 10 listed companies in the country from 2020 to 2024. It was found that some of the main elements of WCM, namely Net Trade Cycle (NTC), Days Inventory (DI), and the size of a firm, play an important role in determining a firm's risk exposure. The fewer the number of days covered by an NTC and the firm size, the less the exposure to the market risk, and as a firm increases the number of days in holding, the risk exposure heightens. Besides, macroeconomic stability, which can be measured in terms of GDP growth, was another cause of firm market volatility reduction. However, these market risk numbers were not greatly affected by the traditional measures of liquidity ratios and leverage values. Such results indicate that proper control of working capital may be critical in minimizing risk and increasing financial stability, particularly in capital-intensive industries and emerging markets. The study's contribution to the literature is that it raises the importance of internal financial decisions in affecting external risk factors.

Recommendation

The results indicate that to lower market risk, financial managers in the cement industry should concentrate on managing working capital components, especially inventory turnover and the net trade cycle. Lean inventory techniques and improved policies for payables and receivables could increase liquidity and reduce return volatility. While smaller businesses should look for methods to diversify and stabilize operations, larger businesses are advised to keep using their scale to reduce risk. To encourage financial discipline across industries, policymakers might think about creating industry-specific benchmarks and norms for WCM efficiency. To improve sectoral resilience in unpredictable economic settings, authorities should also promote the adoption of financial risk management frameworks that are in line with macroeconomic data.

Limitations of the Study

Although this study provides valuable insights into the relationship between working capital management (WCM) and market risk in Pakistan's cement sector, it has some limitations.

- **Limited Sample Size** The study includes only 10 cement firms listed on the Pakistan Stock Exchange. Although these firms represent a significant portion of the sector, the findings may not fully capture the diversity of practices across the entire industry.

- **Sector-Specific Focus:** The research is limited to the cement sector. Therefore, the results may not be generalizable to other sectors with different operational and financial dynamics.

- **Time Frame Restriction:** The data covers a specific period from 2020 to 2024. Market conditions during this time, including the impact of COVID-19 and economic instability, may have influenced the results.

- **Exclusion of Qualitative Factors** Non-financial factors such as management quality, operational risks, or market sentiment are not included in the analysis, though they can also affect market risk.

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