

Working Capital Management Efficiency and Performance: Evidence from an Emerging Market

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Abstract

This paper aims to evaluate the influence of working capital management policies on the profitability of Brazilian manufacturing companies. To test our research hypotheses, we analysed a sample of 264 companies selected with a stratified random method. The data were collected through a structured questionnaire. The response rate to the questionnaire was satisfactory. Methodologically, we used the individual determinants of working capital (DSO, DSI, DPO and CCC) as independent variables, while EBITDA was the dependent variable. Financial leverage was used as a control variable. The analysis was based on a statistical methodology based on dynamic panel data. This approach is widely shared in the literature and is more reliable. The results showed a negative relationship between the main components of working capital (DPO, DSI, CCC) and the profitability of companies.

Keywords: Working Capital, Management, Leverage, Inventory, Emerging Market

1. INTRODUCTION

Over the last few decades, business economics literature has reevaluated the importance of short-term financial decisions, underlining their importance for company performance (Kim & Chung, 1990; Carmona & Martinez, 2024; Suarez & Serra, 2024, among others).

This relevance of financial decisions, important for businesses of any size, plays an even more decisive role for small and medium-sized businesses. These companies, in fact, have greater financial constraints and, very often, only two methods of financing: the shareholders and the bank (Chalmers et al., 2014; Chen et al., 2014; Fernandez et al., 2014; Mannetta et al., 2014; Sensini, 2014; Della Porta et al., 2016; Sanchez & Sensini, 2017; Shan et al., 2019; Hernandez et al., 2021; Vazquez et al., 2022).

This circumstance strongly limits the supply of financial resources, causing indebtedness that is inconsistent with investment and financing needs in terms of quality and quantity.

Indebtedness is often mainly composed of the supply of short-term financial resources that are difficult to match with actual financial needs (Chalmers et al., 2014; Chen & Sensini, 2014; Enow and Brijlal, 2014; Della Porta et al., 2016; Chalmers et al., 2018; Diaz & Vazquez, 2019; Chen et al., 2020).

In some cases, the highlighted limitations are amplified by the lack of managerial skills and adequately specialised human resources. The prevailing literature highlights these circumstances as risks leading SMEs to a strategic approach inconsistent with the dynamism of the competitive context (Chen et al., 2014; Campos et al., 2014; Sensini, 2020; Chalmers et al., 2020; Sensini, Vazquez, 2021; Alvarez et al., 2021).

In the context briefly outlined, the efficient management of working capital assumes fundamental importance for business continuity and for limiting the risks of financial distress (Howorth & Westhead, 2003; Sanchez & Sensini, 2013; Campos et al., 2014; Chen et al., 2014; Sensini, 2015; Chalmers et al., 2020; Mueller & Sensini, 2021; Amendola et al., 2023; Alvarez et al., 2023).

The latest economic-financial crises and the recent health emergency have accentuated the importance of controlling a key variable, such as working capital, and highlighted the need to monitor financial performance carefully (Della Porta et al., 2016; Diaz & Vazquez 2018; Amendola et al., 2020; Sensini, 2020; Amendola et al., 2023).

This general situation can have even more serious effects in emerging countries, where economies are more unstable and the financial needs of businesses are satisfied to a large extent by the banking system (Hughes et al., 2013; Campos et al., 2014; Parisi et al., 2014; Chen et al., 2021; Diaz & Xavi, 2023).

Given the above, the main objective of this paper is to study the relationships between working capital management policies and the performance of Brazilian manufacturing companies. With this in mind, we analysed a sample of 264 companies over a 7-year period (2014-2020), using a dynamic panel data methodology.

This study is important as it can help entrepreneurs and managers better understand financial dynamics and implement appropriate policies for managing working capital. The results enrich the existing literature by providing empirical evidence from an emerging economy.

This paper is organized as follows: The second section reviews the relevant literature, while the following section describes the research data, variables, and hypotheses. The fourth section illustrates the methodology

used for the analysis, and the following section analyses the research results. The last section contains the concluding considerations.

2. LITERATURE REVIEW

Working capital management concerns short-term financial decisions regarding current assets and current liabilities. As anticipated, over the last 20 years, empirical research that has studied the relationship between WCM and profitability has multiplied, as can easily be deduced from the extensive literature that has developed on the topic (Khoury et al., 1999; Deloof 2003; Howorth and Westhead, 2003; Raheman and Nasr, 2007; Abbasi & Bosra, 2012; Abuzayed, 2012; Baños-Caballero et al., 2012; Chen & Sensini, 2014; Aktas et al., 2015; Sensini, 2020; Alvarez et al., 2021; among others)

Some scholars have suggested a series of indicators to measure performance and efficiency in working capital management, such as return on assets (ROA), return on invested capital (ROIC), return on equity (ROE), I earnings before interest and taxes (EBIT) or before interest, taxes, depreciation and amortisation (EBITDA), the gross operating margin (GOP) or net operating margin (NOP). Furthermore, Tobin's Q ratio has been widely used as a proxy to measure profitability, while the Cash Conversion Cycle (CCC) and Net Trade Cycle (NTC) have been widely used to measure efficiency in working capital management (Wang, 2002; Lazaridis and Tryfonidis, 2009; Gill et al., 2010; Aktas et al., 2015).

The diffusion of empirical studies on the relationship between working capital and profitability initially concerned large companies or companies listed on the stock exchange. This circumstance is also linked to the greater availability of data for this type of company (Gachira et al., 2014; Marobbe, 2014; Iqbal and Zhuquan, 2015; Alvarez et al., 2023; among others).

In recent years, however, the greater availability of data, also linked to the widespread diffusion of databases, has made it possible to conduct empirical studies even on smaller companies. Such businesses, in most of the world's economies, represent the backbone of the country's economy. This is even more true for emerging economies, where greater political and economic instability, the modest development of financial markets, and the uncertainty that characterizes the reference context make companies' investment and financing decisions riskier (Ling et al., 2008; McCann and Ortega, 2016; Chalmers et al., 2020; Sensini & Vazquez, 2021; Diaz & Contreras, 2021; Della Porta et al., 2022).

In the context briefly outlined, the strong instability and volatility of purchase and sales prices make working capital management very complex for all companies and, in our study, for companies in the manufacturing sector.

In the context outlined, this paper uses the variables Accounts Receivable (AR), Accounts Payable (AP), Inventories (I) and Cash Conversion Cycle (CCC) to evaluate the impact of each working capital variable on efficiency and profitability. In line with the prevailing literature, further in the paper, we have developed our research hypotheses for each component of working capital.

3. THE VARIABLES ANALYSED AND THE RESEARCH HYPOTHESES

3.1 Accounts Receivable

The commercial dimension mainly concerns the credit policy connected to turnover development. From this perspective, the company can expand or restrict the extensions to customers, determining, respectively, an increase or decrease in turnover. An aggressive policy based on an extension of the extension period can lead to an increase in customers and a growth in turnover, but it also leads to greater investments in working capital. Furthermore, this policy can increase the risk of customers' non-payment (Alvarez et al., 2020; Diaz & Vazquez, 2019). From this perspective, the business economics literature suggests a negative relationship between days payable outstanding (DPO) and profitability (Deloof, 2003; Lazaridis and Tryfonidis 2006; Rahman and Nasr, 2007; Karaduman et al., 2010; Alvarez et al., 2023). As a result, we established the following hypothesis: *H1) There is a negative relationship between DPO and profitability.*

3.2 Accounts Payable

Still, within the scope of trade policy, another fundamental aspect is represented by purchasing production factors, measured based on the payment period or days of payment outstanding (DPO).

In this regard, some scholars support a positive relationship between DPO and profitability (Mathuva, 2010; Mannetta et al., 2014; Alvarez et al, 2023), highlighting that deferred payments allow the company to finance itself more economically and flexibly compared to bank debt (Mannetta et al., 2014). This circumstance is even more critical in development economies, where the financial system is more rigid, and companies have more significant financial constraints (Deloof, 2003).

On the contrary, other scholars have suggested a negative relationship between DPO and profitability (Raheman and Nasr, 2007; Gul et al., 2013), highlighting that payment deferrals lead to the loss of discounts and the incurrence of implicit financial costs (Deloof, 2003; Sensini, 2020; Vazquez et al., 2022).

Following the literature, our research hypotheses are the following:

H2) There is a positive relationship between DPO and profitability.

H3) There is a negative relationship between DPO and profitability.

3.3 Inventories

Inventory represents the link between production and sales (Sensini, 2020) and indicates the average time between procuring production factors and selling products (DSI).

Empirical research on this topic has achieved conflicting or non-significant results. This circumstance is also linked to the characteristics of the business sector and the company's inventory management policy (Abbasi and Bosra, 2012).

Some literature argues that high inventory levels lead to increased costs and risks, with negative consequences on company profitability (Falope & Ajilore, 2009; Vahid et al., 2012; Gul et al., 2013).

On the contrary, other authors have highlighted that investing in inventories reduces the risk of interruption of production and sales and allows for better management of any price fluctuations (Mathuva, 2010; López-Pérez et al., 2018). From this perspective, investment in inventories has a positive effect on profitability.

Finally, other authors have highlighted that increasing inventories positively affects profitability until an optimal level is reached. Beyond this optimal level, the investment negatively affects profitability, leading to increased costs (Chalmers et al., 2014; Diaz and Vazquez, 2019; Mannetta et al., 2020).

Considering what has been highlighted by the literature, our hypotheses are the following:

H4) There is a negative relationship between DSI and profitability.

H5) There is a positive relationship between DSI and profitability.

H6) There is an inverted U-shaped relationship between DSI and profitability.

3.4 Cash Conversion Cycle

The Cash Conversion Cycle (CCC) represents the time between the outflow of financial resources for purchases (SDI, DPO) and the inflow of financial resources for sales (DSO). Considering the variables that contribute to its determination, this proxy can express efficiency in the management of working capital (Jose et al. 1996).

Empirical research carried out in recent decades has shown conflicting results regarding the relationship between CCC and profitability, identifying negative (Enow and Brijlal, 2014; Musau, 2015; Mathuva, 2010; Arcos and Benavides, 2006) and positive relationships. Finally, some scholars suggest a positive relationship until an optimal level of CCC is reached (Baños-Caballero et al., 2014; Suarez & Blanco, 2021).

Therefore, our research hypotheses are the following:

H7) There is a negative relationship between CCC and profitability.

H8) There is an inverted U-shaped relationship between CCC and profitability.

4. METHODOLOGY

Our study analyses Brazilian manufacturing companies in the province of Sao Paulo. The companies used to form the population from which the sample is drawn fall into the SME classification. We chose this geographic area because this area is among the most important in the country. To improve the efficiency of the estimates and the significance of the subsequent analyses, the sampling was conducted probabilistically, using a stratified random approach based on an economic criterion (Amendola et al., 2020). The introduction of the economic discriminant (total assets, turnover, number of employees, etc.) made it possible to select several companies adequately representative of the reference population.

For data collection, we used a two-part structured questionnaire. The first aimed to collect general information regarding the company (Governance, Employees, Production Processes, etc.). Differently, the second aimed to collect financial statement data that would help reconstruct the variables analysed in this paper.

The sample size was set at 600 units, with the aim of ensuring an error $|d| \leq 0.055$ and a probability of 0.95, as shown below:

$$n = \frac{n_0}{1 + \frac{n_0}{N}}$$

where N is the population size and n_0 is given by:

$$n_0 = \frac{z^2(0.975)p(1-p)}{\varepsilon^2}$$

The maximum level of variability was fixed assuming a $p = 0.5$.

To increase the response rate, we contacted all companies in the sample directly. By the deadline for closing the data collection phase, 31 March 2020, 264 manufacturing companies completed the questionnaire. The response rate was, therefore, 44%.

Adhering to established research methods, the individual working capital variables (DSO, DSI, DPO and CCC) were considered independent, while financial leverage was used as a control variable, as suggested by the

prevailing literature (Chalmers et al, 2020; Suarez & Blanco, 2021; Alvarez et al., 2023) .

We used EBITDA to measure the dependent variable, the company's profitability, which is in line with the literature (Parisi et al., 2014).

Table 1 summarises all variables used and calculation methods.

Table 1- Variables of interest and computation methods

	Variables	Computation Methods
Dependent Independent	Firm Profitability (P)	EBITDA/Total Assets
	Days Sales Outstanding (DSO)	(Accounts Receivable/Sales) * 365
	Days Sales Inventory (DSI)	(1/Stock Turnover) * 365
Control	Days Payable Outstanding (DPO)	Accounts Payable/Cost of Goods
	Leverage (LEV)	Total Debts/Total Assets

We used the dynamic panel data methodology to verify the impact of individual working capital elements on company profitability. This methodology has the advantage of controlling for unobservable effects that can influence profitability and endogeneity issues.

Consequently, we put the following regression model to the test, which has practical implications for understanding the impact of individual determinants on corporate profitability:

$$P_{it} = \beta_0 + \beta_1 P_{it} + \beta_2 X_{it} + \beta_3 X_{it}^2 + \beta_4 LEV_{it} + \beta_5 LEV_{it}^2 + \alpha_{it} + \lambda_t + \varepsilon_{it} \tag{1}$$

where X_{it} represents the set of independent variables relating to the management of working capital and α_{it} indicates the unobservable heterogeneity. The λ_t indicator represents the uncontrollable variable capable of influencing the profitability of companies and, finally, ε_{it} is the random disturbance.

All explanatory variables of the model are considered endogenous. Furthermore, we have inserted the quadratic relation to test the validity of the hypotheses H6) and H8) and verify the possible presence of an inflexion point.

4. EMPIRICAL RESULTS AND DISCUSSION

We used the GMM estimator (Arellano & Bond, 2001) to test the research hypotheses and our regression model. We built four different models to evaluate the effect of each component on the company's profitability. For hypotheses predicting an inverted U-shaped relationship, we developed one model to test the linear relationship (A) and a second model to test the quadratic relationship (B).

As part of our meticulous research process, we conducted a comprehensive error check on our models. We employed Hansen's J statistic and the AR index (Arellano and Bond, 1991), two widely accepted tools in the field, to ensure the accuracy and reliability of our results.

Table 2- GMM estimations

	Model A				Model B	
	H1	H2	H3	H4	H2c	H4b
P	0.129 (0.14)	0.08 (0.12)	0.133 (0.13)	0.089 (0.13)	0.063 (0.12)	(0.093) (0.12)
DSO	-0.009 (0.01)					
DSI		-0.047** (0.02)				
DSI ²					-0.067^ (0.02)	
DPO			-0.033^ (0.02)			
CCC				-0.023^ (0.02)		
CCC ²						-0.006 (0.01)
LEV	-0.069^ (0.02)	-0.087* (0.03)	-0.059 (0.06)	-0.077 (0.04)	-0.056 (0.05)	-0.061 (0.05)
LEV ²	0.021 (0.01)	0.015 (0.01)	0.019 (0.02)	0.021 (0.01)	0.012 (0.02)	0.016 (0.01)
F test	1.14	48.39***	41.39***	1.61**	1.69**	43.27***
Hansen J	124.31	103.2	134.57*	112.4	131.2	125.16
AR 1 test	-2.31**	-2.25**	-2.35**	-2.29**	-2.39**	-2.27**
AR 2 test	0.78	0.83	0.84	0.79	0.77	0.71

***, **, *, and ^ denote a p value of .001, .01, .05, and .1, respectively.

The research findings are significant as they challenge the existing literature. The results indicate that credit policy (DSO) does not significantly impact the profitability of companies. This empirical evidence leads to the rejection of the first research hypothesis (H1), which is in contrast to the literature reviewed.

Obtaining more excellent extensions from suppliers (DPO) highlights a negative relationship with the company's profitability, confirming the hypothesis (H3).

The negative relationship between inventory management policy and profitability is a key finding. It confirms hypothesis (H4) and suggests that companies need to carefully balance their inventory levels to maintain profitability.

Finally, in line with the prevailing literature, the Cash Conversion Cycle shows a negative relationship with company profitability, confirming hypothesis H7.

Finally, in some developed models, financial leverage negatively correlates with company profitability.

To evaluate the reliability and robustness of the results, we used fixed effects and random effects estimators, verifying that fixed effects estimators are preferable, as is evident from Table 4.

Table 4- Robustness Check

	Model A		Model B			
	H1	H2	H3	H4	H2c	H4b
DSO	-0.017** (0.01)					
DSI		-0.034** (0.02)				
DSI ²					-0.070*** (0.02)	
DPO			-0.018** (0.01)			
CCC				-0.023*** (0.02)		
CCC ²						0.005* (0.00)
LEV	-0.041^ (0.02)	-0.046* (0.02)	-0.045* (0.02)	-0.044^ (0.01)	-0.043* (0.02)	-0.062** (0.01)
LEV ²	0.043*** (0.00)	0.041*** (0.00)	0.043*** (0.00)	0.044*** (0.00)	0.043*** (0.00)	0.042*** (0.00)
R ²	0.062	0.068	0.072	0.071	0.074	0.071

***, **, *, and ^ denote a p value of .001, .01, .05, and .1, respectively.

5. CONCLUDING REMARKS

This paper aimed to evaluate the influence of working capital management policies on the profitability of Brazilian manufacturing companies. The sample companies were selected in the province of Sao Paulo, a particularly significant area of the country. We used a stratified random sampling technique based on an economic criterion to improve the quality and reliability of the estimates. The data was collected using a structured questionnaire divided into two sections: purely qualitative and quantitative.

We used the individual determinants of working capital (DSO, DSI, DPO and CCC) as independent variables, while EBITDA represented the dependent variable. Financial leverage was used as a control variable.

We used dynamic panel data methodology to evaluate the impact of individual determinants on corporate profitability.

The results enrich the empirical research on the relationship investigated, adding further elements for reflection.

In particular, granting more excellent customer extensions (DSO) does not influence profitability.

In line with previous empirical research, the results of the other variables (DSI, DPO, and CCC) showed a negative relationship with company profitability, suggesting that investing in inventories and requesting an increase in deferrals from suppliers incur additional costs that exceed the benefits.

This paper can help entrepreneurs and managers of manufacturing SMEs better define their working capital management policies. Furthermore, this article's results show the results of an emerging economy, providing further empirical evidence of the relationship between WCM and profitability.

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