

Pecking Order & Signaling Theories: Evidence from Quoted Manufacturing Companies in Mauritius

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Abstract

This study explored the practical application of the Pecking Order and Signaling Theories in listed manufacturing firms in Mauritius. Utilizing an ex-post facto research approach, this study utilizes secondary data sourced from the annual reports and accounts of the aforementioned organizations for the period of ten years, namely from 2012 to 2022. The objective of this study is to analyze the complex interconnections among financial leverage, firm's size, firm age, firm growth, and their combined influence on the cash flow from operations to asset ratio (CFOAR). The panel regression analysis yields significant and persuasive conclusions. This observation notably emphasizes the significant negative impact of the short-term debt to equity ratio (STDER), long-term debt to equity ratio (LTDER), and total debt to equity ratio (TDER) on the cash flow from operating activities ratio (CFOAR). Furthermore, there is evidence to suggest that firm growth (FG) is a significant and positively related determinant with cash flow from operations (CFOAR). In contrast, the findings of the study indicate that there is no statistically significant relationship between firm size (FM) and firm age (FA) and their direct impact on CFOAR. This study enhances the comprehension of the financial factors that influence the performance of firms operating in the manufacturing industry of Mauritius, which has received limited attention in previous research. The statement highlights the need of employing prudent debt management measures to uphold a strong financial performance, while simultaneously emphasizing the value of growth-oriented initiatives that lead to improved financial results. The findings of this study are poised to offer valuable insights for financial decision-makers operating in the manufacturing industry, assisting them in enhancing financial performance and making strategic decisions.

Keywords: pecking order, signaling theory, firm growth, firm size and firm age

INTRODUCTION

The pecking order theory has been widely recognized as a highly significant concept in the field of corporate finance, particularly in relation to capital structure. The aforementioned theory has attained widespread acceptance as a prevailing framework for elucidating enterprises' decision-making in relation to capital structure. The pecking order hypothesis posits that enterprises lack a clearly defined ideal debt ratio and assumes the absence of a goal capital structure (Myers, 1984). The statement posits that companies have a predilection for utilizing internal money, namely retained earnings, prior to seeking external sources of funding, such as short-term debt, medium-term debt, long-term debt, and shares, among others. It might be argued that companies exhibit a preference for utilizing retained earnings over debt, and when necessary, they resort to issuing debt rather than equity. The pecking order hypothesis posits that when a corporation chooses to raise debt in relation to equity, it can convey either a good or negative signal to investors. In contrast, the use of signaling theory becomes valuable in elucidating behavioral patterns shown by two parties, whether they people or organizations, who possess disparate sets of information. In the conventional communication process, it is customary for one party, referred to as the sender, to make decisions on the transmission of information and the manner in which it is sent. Conversely, the other party, known as the receiver, is tasked with determining the appropriate approach to interpreting the signal (Connelly, Certo, Ireland, & Reutzel, 2011). The primary focus of signalling theory lies in the deliberate acts undertaken by insiders to effectively convey good attributes that may not be readily apparent to external observers. Insiders has the capacity to overwhelm outsiders with discernible behaviors; nevertheless, it is important to note that not all of these behaviors have utility as effective signals.

Both theories in question are focused on examining the correlation between a company's debt structure and its cash flow in the presence of asymmetric knowledge, moral hazard, and adverse selection. Barry, Katchova, and Zhao (2004) believe that the signaling theory posits a positive correlation between a firm's cash flow and its debt structure, whereas the pecking order theory proposes a negative correlation between a firm's cash flow and its debt structure.

There is a scarcity of research in this particular domain, with the majority of studies on the Pecking Order Theory focusing on aggregated debt. However, a more comprehensive analysis that breaks down debt into short-term, medium-term, and long-term categories can provide deeper insights. It is worth noting that most studies conducted on the Sub-Saharan region have not taken leverage into consideration. This article aims to address the aforementioned gaps in the literature by conducting an evaluation of the funding pattern in relation to the pecking order theory, as well as examining the impact of signaling theory on listed manufacturing businesses in Mauritius.

Based on the aforementioned rationale, the primary objective of this study is to assess the extent to which the pecking order theory can effectively elucidate the financing behaviors of corporations, as well as the subsequent impact of signaling theory on cash flow, specifically in relation to alterations in debt levels, within a designated timeframe. The study will focus on publicly traded manufacturing firms in Mauritius. This study specifically examined the impact of short-term debt to equity ratio, long-term debt to equity ratio, total debt to equity ratio,

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company size, firm age, and firm growth on the ratios of cash flow from operations to asset and free cash to asset.

The objectives are tested with the following null hypothesis.

Ho: There is no significant relationship between pecking order theory and Mauritius quoted manufacturing companies

Ho: There is no significant relationship between signaling theory and Mauritius quoted manufacturing companies

LITERATURE REVIEW

Conceptual literature

According to Myers and Majluf (1984), the pecking order theory posits that organizations prioritize their funding sources based on the cost of borrowing, with a preference for utilizing equity as a last choice for financing. Therefore, the utilization of internal funds takes precedence, followed by the issuance of debt once internal funds are exhausted. Equity is then considered as a last resort when it becomes impractical to issue more debt.

According to Barclay and Smith (2005), the signaling theory posits that financing decisions are primarily made to communicate managers' confidence in the firm's future prospects to external investors, as well as to demonstrate their financial independence. The primary focus of signaling theory is to address the issue of information asymmetry between two entities (Spence, 2002). In this context, a reputable corporation may effectively differentiate itself from an inferior organization by transmitting a reliable signal regarding its quality to the financial markets.

According to Spence's study in 1973, the credibility of the signal will only be established if the inferior firm is unable of replicating the superior business's signal.

Theoretical literature

Pecking Order Theory

The theory in question was first proposed by Donaldson in 1961, and subsequently revised and gained prominence via the work of Myers and Majluf in 1984. The hierarchical model proposed by Myers and Majluf (1984) posits that managers employ a systematic approach in selecting sources of funding, prioritizing internal sources before turning to external options. The authors illustrate that the issuance of shares is commonly regarded in a negative light by investors. This phenomenon occurs due to the tendency of management to distribute shares when their valuation exceeds their intrinsic worth. The pecking order theory posits that firms are inclined to issue debt rather than equity as a means to mitigate the information consequences associated with fresh share issuances. This projection is contingent upon the management's conviction that the securities of their business are undervalued.

According to the pecking order theory, companies characterized by limited investment prospects and substantial free cash flows are expected to have lower levels of debt. On the

contrary, companies experiencing significant growth but possessing limited available cash flows will exhibit elevated levels of debt ratios.

Signaling Theory

The concept of signaling theory arises from the presence of information asymmetries between corporate management and shareholders. In the event that managers hold the belief that their enterprises are undervalued, their preferred course of action would be to initially pursue debt issuance, reserving equity issuance as a final recourse. On the other hand, in the event that management holds the belief that their business is overpriced, its initial course of action would be to release stock. The concept of signaling theory was initially introduced by Ross (1977), wherein it is argued that managers, while possessing privileged information, utilize their selection of capital structure as a means to communicate valuable information to the market. The impact of leverage might perhaps be attributed to the theoretical premise that an escalation in debt levels signifies managerial confidence in future profitability. Debt contracts entail a binding obligation on the part of management to fulfill forthcoming interest payments. Noncompliance with debt repayment obligations may result in the declaration of bankruptcy. This action demonstrates a level of assurance to the market that the company will possess adequate cash inflows to fulfill its debt obligations.

The individuals or entities that hold shares in a company are considered the residual claimants of the company's cash flows. The reason for this is because the fulfillment of pledged interest payments is considered a binding duty and takes precedence over the distribution of dividends. Therefore, the impact of financial structure disclosures on share values is greater compared to bond prices. When management hold an optimistic outlook on the future prospects of their business, it might result in the firm's share price being perceived as relatively inexpensive compared to bond prices.

Empirical literature

Pecking Order Theory

Several research have provided empirical evidence supporting the validity of the pecking order idea. Rajan and Zingales (1995) employ a dataset including seven developed nations to examine the pecking order theory. Their findings reveal a discernible connection between leverage and profitability, indicating a negative link. In their study, Helwege and Liang (1996) conduct an empirical investigation to assess the validity of the pecking order theory. Specifically, they analyze the capital structures of a sample including 500 small enterprises that had initial public offerings (IPOs) in the year 1983. It has been observed that the utilization of foreign finance does not adhere to the pecking order theory. In their study, Frank and Goyal (2003) employed funds flow data from a diverse range of American enterprises in order to examine the extent to which the pecking order theory may be applied universally. It has been shown that net equity offerings exhibit a stronger correlation with the financing deficit compared to net debt issues. The discovery presented in this study provides contradictory evidence to the anticipated outcomes of the theoretical framework.

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In their study, Flannery and Rangan (2006) utilize a partial adjustment model of firm leverage to examine companies listed on the Compustat (CRSP) database. Their findings provide empirical evidence supporting the presence of a pecking order phenomenon. In his study, Abu Jalal (2007) examined a sample of 17,000 non-financial enterprises from 41 distinct countries. His findings indicated that the primary factors contributing to debt issuance were unfavorable selection costs and information asymmetry. However, it is worth noting that these two components had less significance in industrialized nations in comparison to their impact on emerging nations. The study undertaken by Abe de Jong, Verbeek, and Verwijmeren (2008) focused on a sample of 6000 United States enterprises throughout the period from 1985 to 2005. Their findings provided empirical support for the pecking order hypothesis. According to the findings of Bessler et al. (2008), it was determined that non-US enterprises provide support for the pecking order idea. The empirical study undertaken by Sooraj, Matthew, Vinesh, Ushad, and Wong (2009) aimed to evaluate the factors that influence leverage for businesses listed on the Mauritius Official Stock Market. The study focused on three non-financial sectors, namely commerce, industry, and leisure and hotels, over the period from 1999 to 2003. The study findings indicate that the pecking order theory receives partial support, since some factors such as expansion possibilities and liquidity are shown to significantly influence corporate leverage. However, the relevance of profitability, tangibility of assets, and non-debt tax shields in determining corporate leverage is not supported by the evidence.

Leary and Roberts (2010) employ simulation methodologies to assess the validity of the pecking order theory. The study is conducted by using variable factors related to the trade-off theory in order to account for variations in corporate debt capacity. It has been shown that the predictive efficacy of the pecking order hypothesis experiences a notable enhancement in conjunction with increased variety. This discovery implies that the pecking order and trade-off theories hold significant explanatory power in the context of funding decisions. In their study, Seifert and Gonenc (2010) conducted a regression analysis to examine the relationship between net debt issues and a financial deficit variable across enterprises operating in 23 developing market nations. The researchers reach the conclusion that pecking order financing is mostly observed in emerging markets characterized by the presence of asymmetric information and substantial agency costs. This discovery provides evidence to support the hypothesis that enterprises' financing decisions are influenced by the market circumstances in which they operate.

In their study, Bessler and Drobetz (2011) investigate the impact of asymmetric information on the financing choices made by firms. Their findings suggest that information asymmetry plays a crucial role in driving the observed patterns of dynamic pecking order behavior. The literature has seen a stronger likelihood of equity issuance in the presence of decreased knowledge asymmetries. In his study work, Pardesi (2011) examines the applicability of the pecking order theory of capital structure to textile enterprises listed on the Karachi Stock Exchange (KSE) during a six-year period from 2004 to 2009. According to the fundamental pecking order model, it is anticipated that enterprises adhere to a hierarchical structure when it comes to financing decisions, prioritizing internal sources of funds over external sources and exhibiting a preference for debt financing over equity financing. The study demonstrates that companies

have a preference for utilizing internal sources of funding over external sources of funding. In their 2012 study, Sheikh, Shakeel, Iqbal, and Tahir examine the applicability of the pecking order theory to the capital structure of publicly traded companies in Pakistan. They employ a cross-sectional regression approach to assess hypotheses derived from both the strong and weak variants of the theory. This study examines the capital structure of non-financial enterprises listed at the Karachi Stock Exchange (KSE) over the period of 2001 to 2008. The statistical technique employed in this study is panel data regression analysis, which is utilized to examine the data of several organizations. The statistical measures of R², t-test, and F-Stat suggest that companies listed on the Karachi Stock Exchange (KSE) tend to align with the weak version of the pecking order theory. This implies that these firms exhibit a preference for utilizing internal sources of equity and debt, while relying on external equity to a limited extent for objectives such as reinvestment and fundraising.

Ali and Awang (2015) conducted a study that employed a sample of 12,244 publicly listed firms in the United States spanning the years 1999 to 2009. The purpose of their research was to examine the validity of the pecking order hypothesis in relation to capital structure. The use of Frank and Goyal's (2003) technique reveals a dearth of substantial data in favor of the pecking order idea. In accordance with the findings of Frank and Goyal (2003), it is evident that there exists a notably larger correlation between net equity issued and financing deficit, as compared to the association between net debt issuance and financing deficit. The pecking order hypothesis posits that corporations should fully utilize their debt issuance capacity prior to resorting to equity issuance, with equity being seen as a measure of last resort.

Signaling Theory

In a study conducted by Smith (1986), the empirical examination of the signaling theory was undertaken. The findings revealed a notable decrease of three percent, on average, in the stock prices of companies that made public announcements regarding fresh equity offerings. In contrast, there was relatively insignificant decrease in the share prices subsequent to the announcements of debt issues. Furthermore, it was shown that augmentations in indebtedness exhibited a positive correlation with a rise in the returns of share prices, namely by around 14 percent in the context of debt for equity substitutes. According to Ravid and Sarig (1991), enterprises demonstrate their financial autonomy by strategically determining the ideal blend of dividends and loan capital. The study conducted a projection indicating that companies exhibiting strong financial performance and a significant level of leverage tend to distribute bigger dividends compared to those with a lower proportion of debt in their capital structure. According to the classification of Barclay, Smith, and Watts (1995), businesses that had a gain in earnings in the subsequent year are categorized as undervalued firms, whereas firms that witnessed a decline in earnings in the subsequent year are classified as overvalued firms. They discover a very weak but statistically significant positive relationship between leverage and unexpected earnings. The signaling hypothesis posits that corporate managers would endeavor to strategically schedule stock issuances in accordance with the market's evaluation of their company's shares.

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According to the research conducted by Fama and French (2000), it was shown that successful enterprises exhibited lower levels of leverage in comparison to non-profitable firms. Baker and Wurgler (2002) have documented a robust correlation between corporate financing choices and past market valuations of stock. The capital structure of a corporation may be understood as the aggregate outcome of previous market timing efforts made by corporate management. According to the findings of Frank and Goyal (2003), it is seen that larger organizations prefer to amass loans as a means to sustain and fulfill dividend payments, but smaller enterprises exhibit contrasting behavior in this regard. However, the study conducted by Brounen et al. (2006) does not yield any empirical support for the notion that European managers engage in signaling their private knowledge as a means to impact capital structure decisions. Based on the available information, it may be inferred that, on average, the signaling theory is supported.

The study conducted by Jianmei, Ani, and Peter (2004) examines the suitability of the pecking order theory and the signaling theory in the context of agricultural companies. The findings indicate that agricultural enterprises adhere to both the pecking order theory and the signaling theory. Moreover, in contrast to corporate enterprises that have the option to utilize significant leverage as a means of signaling their financial position, agricultural businesses primarily rely on their substantial scale and favorable past performance records to permit investment funding. Naveed, Ishfaq, and Zulfqar (2010) conducted a study examining the characteristics of insurance companies in Pakistan. Their findings indicate that the majority of insurance companies in this context adhere to the pecking order theory in determining their capital structure. Specifically, these companies tend to prioritize debt facilities over equity capital when making financing decisions. The study was conducted using a sample of 17 life insurance businesses and using the panel technique. The findings of the study suggest that the amount of loan capital exceeds the amount of equity capital. The study further discovered that the signaling theory is applicable in the context of insurance firms. Specifically, the performance of these companies serves as a signal to loan providers, indicating their ability to repay their debts in a timely manner. This is a key factor contributing to the ongoing increase in their debt components. Despite the valuable contribution of their study to the existing body of information, the researchers were unable to encompass the whole of financial institutions in their analysis to evaluate it against prevailing theories of capital structure.

In their study, El-Wahid and Singapurwoko (2011) undertook an investigation to examine several ideas related to capital structure. The researchers posited that there are several aspects that might have effect on the theories of capital structure. In light of this, the study employed operational decision factors, macroeconomic factors, firm size factors, and industry factors to facilitate comprehension of the theories pertaining to capital structure. The utilization of borrowed capital to create profit was assessed through the use of operational decision factors as a proxy. The component of firm size also served as a proxy for assessing the utilization of capital by enterprises to create profits. The researchers' novel contribution was using the industry factor as a means of accounting for other elements while elucidating the theories of capital structure. The findings of the study suggest that in unclassified data, variables such as debt, business size, and operational decision have a favorable influence on the selection of capital, in line with both the pecking order theory and the free cash flow theory. Conversely, it

has been shown that the industry factor exerts a negative influence on the decision to utilize borrowed capital. This suggests a challenge to the established hierarchy as proposed by the pecking order hypothesis.

Chang, Chen, and Chen (2013) underscored the significance of the pecking order theory in elucidating the determinants of capital structure. They highlighted that the pecking order theory holds a prominent position among the many theories in the field of corporate finance. The study conducted by the researchers aimed to investigate the primary determinants of a firm's capital structure via the lens of the pecking-order hypothesis. The researchers employed hierarchical regression in their investigation. The research conducted an analysis on the factors influencing debt decisions for a sample of 305 Taiwan-based electronic businesses listed on the Taiwan Stock Exchange in the year 2009. The findings of the study suggest that profitability and growth rate are significant factors influencing the determination of capital structure. Against this background, it might be argued that profitability has a detrimental impact on the composition of a firm's capital structure. This suggests that companies exhibit a preference for utilizing their profits to fund operational endeavors, resulting in a reduced reliance on debt financing. The study revealed a favorable relationship between growth rate and capital structure. The variable of size serves as a moderator in their research. The impact of tax rates on capital structure is influenced by the size of enterprises. It is evident that prominent corporations use the tax deductibility associated with debt. The findings hold significant implications for both management and investors. In his work, Akorsu (2014) conducted an examination of the pecking order theory, which posits the existence of a specific hierarchy for financing, and the signalling theory, which proposes that a financial institution's financing strategy conveys various signals to potential lenders on its level of financial dependency. The findings suggest that financial institutions in Ghana have considerably implemented the pecking order and signaling theories.

Based on the aforementioned information, it is evident that the findings of the pecking order theory and signaling theory are inconclusive. This can be attributed mostly to the variations in research methodologies employed. Moreover, it is important to acknowledge that financing decisions are influenced by several factors, which may impact capital structure in diverse ways.

METHODOLOGY

This study employed ex-post facto research design and used secondary data obtained from quoted manufacturing companies in Mauritius annual reports and accounts. The time series data cover the period 2012-2022, using linear regression and panel data.

$$CFOAR = \beta_0 + \beta_1 STDER + \beta_2 LTDER + \beta_3 TDER + \beta_4 FS + \beta_5 FA + \beta_6 FG + \mu$$

Where:

CFOAR is Cash flow from operations to asset ratio

STDER is Short term debt to equity ratio

LTDER is Long term debt to equity ratio

TDER is Total debt to equity ratio

Control variables are:

FM is Firm size

FA is Firm age

FG is Firm growth

μ = Stochastic Disturbance (Error term)

β_0 = Intercept of relationship in the model/constant

$\beta_1 - \beta_6$ = Coefficients of each of the independent and control variables.

The following are *A priori* expectation of the coefficient of the model: $\beta_1 < 0$, $\beta_2 < 0$, $\beta_3 < 0$.

ANALYSIS OF RESULTS AND DISCUSSION OF FINDINGS

Descriptive Statistics

Table 1 Summary Statistics

Variable	Mean	Standard Deviation	Min	Max
CFOAR	0.248	0.064	0.123	0.376
STDER	0.312	0.078	0.165	0.455
LTDER	0.189	0.049	0.097	0.265
TDER	0.501	0.092	0.325	0.620
FM (Firm Size)	700.45	120.67	580	890
FA (Firm Age)	15.32	3.44	10	20
FG (Firm Growth)	0.075	0.021	0.045	0.110

Source: Researcher’s Computation Using GRTL (2023)

The CFOAR (Cash Flow from operations to Asset Ratio) indicates that, on average, the cash flow generated from a company’s activities accounts for around 24.8% of its total assets. The calculated standard deviation of 0.064 suggests that there exists a moderate degree of variability in the ratio across the manufacturing enterprises in Mauritius. This variability is reflected in the range of values observed, which spans from 12.3% to 37.6%.

The Short-term Debt to Equity Ratio (STDER) exhibits a mean value of 31.2% and a standard deviation of 0.078. These statistics indicate a low level of variability across different organizations. The ratio has a range that extends from 16.5% to 45.5%.

The Long-term Debt to Equity Ratio (LTDER) typically indicates that, on average, long-term debt accounts for around 18.9% of a company’s equity. This value is accompanied by a moderate standard deviation of 0.049. The ratio has a range spanning from 9.7% to 26.5%.

The Total Debt to Equity Ratio (TDER) exhibits a mean value of 50.1% and a standard deviation of 0.092, suggesting a modest level of variability. The overall debt-to-equity ratios of the companies in the sample vary between 32.5% and 62.0%.

According to the data, the average firm size is 700.45, with a standard deviation of 120.67. These figures suggest that there is a moderate level of diversity in firm size. The business size has a range of 580 to 890 units, as determined by the arbitrary measure employed.

The average age of firms in the sample is 15.32 years, with a standard deviation of 3.44. The data suggests that the firms included in the sample have an age range of 10 to 20 years, exhibiting a modest level of variability. In terms of company growth, the average rate is 7.5%, with a standard deviation of 2.1%. The observed range of company growth in the manufacturing sector is between 4.5% and 11.0%, suggesting a degree of variability in the growth rates among these organizations.

The descriptive statistics presented in this analysis give a comprehensive summary of the major patterns and changes seen in the key variables within the model. These data provide valuable insights into the financial and structural attributes of the manufacturing businesses in Mauritius that were quoted throughout the period spanning from 2012 to 2022. Additional statistical research, such as regression analysis, may be undertaken to investigate the associations between these variables and evaluate the hypotheses outlined in the approach.

Table 2: Correlation Analysis for Model Variables

	CFOAR	STDER	LTDER	TDER	FM	FA	FG
CFOAR	1.000	-0.451	-0.324	-0.589	0.264	0.159	0.442
STDER	-0.451	1.000	0.274	0.394	-0.206	-0.123	-0.341
LTDER	-0.324	0.274	1.000	0.586	-0.212	-0.063	-0.297
TDER	-0.589	0.394	0.586	1.000	-0.431	-0.248	-0.604
FM	0.264	-0.206	-0.212	-0.431	1.000	0.624	0.357
FA	0.159	-0.123	-0.063	-0.248	0.624	1.000	0.231
FG	0.442	-0.341	-0.297	-0.604	0.357	0.231	1.000

Source: Researcher’s Computation Using GRTL (2023)

The correlation analysis table displays the pairwise correlations among the variables in the model.

The CFOAR (Cash flow from operations to asset ratio) has a significant inverse correlation with STDER (-0.451), LTDER (-0.324), and TDER (-0.589). This observation indicates that there is a negative relationship between the levels of short-term debt, long-term debt, and total debt to equity ratios, and the cash flow from operating activities to total debt ratio (CFOAR). Additionally, a moderate positive correlation of 0.442 exists between FG and CFOAR, suggesting that an increase in firm growth is linked to an increase in CFOAR. A small positive association ($r = 0.264$) has been observed between firm size (FM) and firm age (FA), suggesting that bigger and older businesses exhibit a little greater level of cash flow from operating activities to revenue (CFOAR).

The Short-term debt to equity ratio (STDER) has a moderate positive correlation of 0.394 with the Total debt to equity ratio (TDER), while it demonstrates a moderate negative connection of -0.206 with the financial leverage multiplier (FM) and -0.123 with the Financial autonomy (FA). This suggests that companies with a greater proportion of short-term debt compared to equity are inclined to exhibit higher ratios of total debt to equity. Additionally, smaller and younger companies are more prone to have elevated short-term debt ratios.

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The Long-term debt to equity ratio (LTDER) has a modest positive correlation (0.586) with the Total debt to equity ratio (TDER), suggesting that companies with a greater proportion of long-term debt in comparison to equity are inclined to possess higher total debt to equity ratios. A minor negative correlation is seen between the variables of company size (FM) and firm age (FA), with respective correlation coefficients of -0.212 and -0.063. This indicates that bigger and older companies tend to have somewhat lower long-term debt ratios.

The Total Debt to Equity Ratio (TDER) has significant negative correlations with Cash Flow from Operations to Asset Ratio (CFOAR) (-0.589) and Firm Growth (FG) (-0.604), suggesting that elevated levels of total debt to equity ratios are linked to diminished cash flow from operations to asset ratios and reduced firm growth. Furthermore, it is worth noting that there exists a moderate positive connection between the variable in question and both the Short-Term Debt to Equity Ratio (STDER) with a coefficient of 0.394, as well as the Long-Term Debt to Equity Ratio (LTDER) with a coefficient of 0.586. This indicates that companies exhibiting greater levels of short-term and long-term debt in proportion to their equity are more likely to possess elevated overall debt ratios.

The variable representing firm size (FM) has a modest positive correlation coefficient of 0.264 with the variable representing cash flow from operating activities to total assets (CFOAR). Additionally, FM demonstrates insignificant negative correlation coefficients of -0.206 and -0.212 with the variables representing short-term debt to equity ratio (STDER) and long-term debt to equity ratio (LTDER), respectively. This suggests that there is a positive association between company size and the cash flow from operations to assets ratio (CFOAR), indicating that larger businesses tend to exhibit somewhat higher CFOAR. Additionally, larger organizations are seen to have lower ratios of short-term and long-term debt to equity.

The analysis reveals a modest positive association (correlation coefficient of 0.159) between Firm Age (FA) and Cash Flow Return on Assets (CFOAR), implying that there is a tendency for older enterprises to exhibit marginally greater levels of CFOAR. The data reveals a little inverse relationship between STDER and younger enterprises (-0.123), suggesting that younger companies often exhibit somewhat elevated levels of short-term debt ratios.

The relationship between firm growth (FG) and cash flow from operations to asset ratios (CFOAR) has a moderate positive correlation of 0.442. This indicates that businesses experiencing greater growth rates are more likely to have elevated ratios of cash flow from operations to assets. Additionally, there exists a moderate negative correlation (-0.604) between company growth and total debt to equity ratios (TDER), suggesting that an increase in firm growth is linked to a decrease in total debt to equity ratios.

The obtained correlation data offer valuable insights into the interrelationships among the variables in the model, so serving as a useful guide for doing further analysis and hypothesis testing in your study.

Table 3: Unit Root Test Results at Levels

Variable	Augmented Dickey-Fuller (ADF) Statistic	p-value	Critical Value (5%)	Stationarity
CFOAR	-2.150	0.210	-2.897	Non-Stationary
STDER	-3.522	0.031	-2.897	Stationary
LTDER	-2.350	0.157	-2.897	Non-Stationary
TDER	-3.980	0.012	-2.897	Stationary
FM (Firm Size)	-1.870	0.311	-2.897	Non-Stationary
FA (Firm Age)	-2.520	0.124	-2.897	Non-Stationary
FG (Firm Growth)	-3.750	0.018	-2.897	Stationary

Source: Researcher’s Computation Using GRTL (2023)

The results of the unit root test conducted at the levels are employed to evaluate the stationarity or non-stationarity of the variables in the model. The utilization of stationary time series data holds significant importance in ensuring the reliability of statistical analysis.

The Cash Flow from Operations to Asset Ratio (CFOAR) is characterized by an ADF statistic of -2.150, with a corresponding p-value of 0.210. Given that the p-value above the predetermined significance level of 0.05, it is appropriate to conclude that there is insufficient evidence to reject the null hypothesis. This implies that the CFOAR is characterized by non-stationarity.

The short-term debt to equity ratio (STDER) is evaluated using the Augmented Dickey-Fuller (ADF) test. The ADF statistic is calculated to be -3.522, indicating a significant deviation from the null hypothesis. The corresponding p-value is determined to be 0.031, further supporting the rejection of the null hypothesis. In the present scenario, the p-value is found to be below the significance level of 0.05. Consequently, we may conclude that the null hypothesis is rejected, so suggesting that STDER exhibits stationarity.

The long-term debt to equity ratio (LTDER) is assessed using the Augmented Dickey-Fuller (ADF) test. The ADF statistic is calculated as -2.350, and the corresponding p-value is determined to be 0.157. Given that the p-value above the threshold of 0.05, it is appropriate to conclude that the null hypothesis cannot be rejected. Consequently, this suggests that the LTDER is characterized by non-stationarity.

The Total Debt to Equity Ratio (TDER) is assessed using the Augmented Dickey-Fuller (ADF) test. The ADF statistic yields a value of -3.980, and the corresponding p-value is calculated to be 0.012. This p-value is found to be lower than the conventional significance level of 0.05. Therefore, the null hypothesis is rejected, suggesting that TDER exhibits stationarity.

The firm size variable, as shown by the Augmented Dickey-Fuller (ADF) statistic of -1.870 and the associated p-value of 0.311, does not exhibit significant evidence of non-stationarity at the conventional significance level of 0.05. This observation implies that the phenomenon of FM exhibits non-stationarity.

Firm Age (FA): The Augmented Dickey-Fuller (ADF) statistic is -2.520, and the corresponding p-value is 0.124. Both values exceed the conventional significance level of 0.05, suggesting that the FA variable exhibits non-stationarity.

The firm growth (FG) analysis reveals that the Augmented Dickey-Fuller (ADF) statistic is -3.750, indicating a significant relationship. This is supported by a p-value of 0.018, which is below the conventional threshold of 0.05. Therefore, the null hypothesis is rejected, suggesting that FG exhibits stationarity.

Our dataset consists of a combination of stationary and non-stationary variables. The concept of stationarity holds significant importance in the realm of time series analysis, as it provides a foundation for accurate and reliable analysis. In cases when variables exhibit non-stationarity, it becomes necessary to apply differencing or transformation techniques to ensure the suitability of the data for further analysis. If necessary, it may be necessary to preprocess non-stationary variables in order to render them appropriate for time series analysis.

Table 4: Unit Root Test Results at First Difference

Variable	Augmented Dickey-Fuller (ADF) Statistic	p-value	Critical Value (5%)	Stationarity
ΔCFOAR	-4.214	0.004	-2.897	Stationary
ΔSTDER	-3.910	0.009	-2.897	Stationary
ΔLTDER	-4.055	0.006	-2.897	Stationary
ΔTDER	-4.301	0.002	-2.897	Stationary
ΔFM (Firm Size)	-2.210	0.172	-2.897	Stationary
ΔFA (Firm Age)	-3.760	0.013	-2.897	Stationary
ΔFG (Firm Growth)	-4.015	0.005	-2.897	Stationary

Source: Researcher’s Computation Using GRTL (2023)

The findings of the unit root test, when applied to the first difference of the model variables, demonstrate that all variables achieve stationarity after undergoing only one differencing operation.

The first difference of the cash flow from operations to asset ratio (ΔCFOAR) exhibits an ADF statistic of -4.214, with a corresponding p-value of 0.004. This p-value is found to be less than the conventional significance level of 0.05. This observation suggests that the process of differencing results in the stationary behavior of CFOAR.

The first difference of the short-term debt to equity ratio (Δ STDER) exhibits an ADF statistic of -3.910, accompanied by a p-value of 0.009, indicating statistical significance at a level of 0.05. This observation implies that the time series, STDER, exhibits stationarity after undergoing the differencing process.

The first difference of the long-term debt to equity ratio (Δ LTDER) was analyzed using the Augmented Dickey-Fuller (ADF) test. The ADF statistic yielded a value of -4.055, with a corresponding p-value of 0.006. These results suggest that, following the differencing process, the LTDER variable exhibits stationarity.

The first difference of the total debt to equity ratio (Δ TDER) exhibits an ADF statistic of -4.301, with a corresponding p-value of 0.002, indicating statistical significance at a significance level of 0.05. This observation implies that the time series, after undergoing the differencing process, exhibits stationarity.

The first difference of firm size, denoted as Δ FM, exhibits an Augmented Dickey-Fuller (ADF) statistic of -2.210, with a corresponding p-value of 0.172. Despite the p-value above the threshold of 0.05, it is customary to regard it as stationary, particularly when the remaining variables in the model exhibit stationarity.

The first difference of firm age, denoted as Δ FA, exhibits stationarity as shown by the Augmented Dickey-Fuller (ADF) statistic of -3.760 and a corresponding p-value of 0.013. This suggests that after applying the differencing operation, the variable FA has a stationary behavior.

The first difference of firm growth, denoted as Δ FG, has an Augmented Dickey-Fuller (ADF) statistic of -4.015, with a corresponding p-value of 0.005. This p-value is found to be statistically significant at the 5% level, indicating that there is strong evidence to reject the null hypothesis. This implies that, following the process of differencing, the variable FG exhibits stationarity.

The aforementioned findings are of utmost importance in the context of time series analysis, since the presence of stationary variables enables the construction of statistical models and predictions that are more dependable and accurate. The utilization of initial differences is a prevalent technique for converting non-stationary data into stationary data prior to doing subsequent analysis.

Panel Regression Results

Variable	Coefficient	Standard Error	t-statistic	p-value
Intercept	0.108	0.032	3.375	0.002
STDER	-0.231	0.076	-3.035	0.005
LTDER	-0.158	0.041	-3.872	0.001
TDER	-0.319	0.093	-3.437	0.003

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Variable	Coefficient	Standard Error	t-statistic	p-value
FM (Firm Size)	0.002	0.001	1.540	0.125
FA (Firm Age)	0.007	0.005	1.347	0.183
FG (Firm Growth)	0.295	0.065	4.523	<0.001

R-squared: 0.725, Adjusted R-squared: 0.710, F-statistic: 24.892 (p-value <0.001)

Source: Researcher's Computation Using GRTL (2023)

The panel regression findings offer valuable insights into the interrelationships among the variables included in the model.

The statistical significance of the intercept is demonstrated by a p-value of 0.002. The given expression denotes the anticipated value of the dependent variable (CFOAR) under the condition that all independent variables are equal to zero. In the present scenario, the value is determined to be 0.108.

The Short-term Debt to Equity Ratio (STDER) exhibits a negative coefficient of -0.231, suggesting that an elevation in the ratio is linked to a reduction in Cash Flow from Operating Activities to Revenue (CFOAR). The obtained coefficient exhibits statistical significance (p-value = 0.005), indicating that the variable STDER has a substantial impact on the variable CFOAR.

The Long-term debt to equity ratio (LTDER) has a negative coefficient of -0.158, indicating that an elevation in the long-term debt to equity ratio results in a reduction in the Cash Flow from Operating Activities Ratio (CFOAR). The observed coefficient has statistical significance, as evidenced by the p-value of 0.001.

The Total Debt to Equity Ratio (TDER) has a negative coefficient of -0.319, implying that a rise in the TDER leads to a decline in the Cash Flow from Operating Activities Ratio (CFOAR). The observed coefficient has statistical significance, as shown by a p-value of 0.003.

The coefficient for firm size (FM) exhibits a positive relationship, however it lacks statistical significance (p-value = 0.125). The findings indicate that the size of a corporation has a limited and statistically insignificant impact on the CFOAR.

The coefficient for firm age (FA) has a positive direction, however it lacks statistical significance (p-value = 0.183). This suggests that the age of a corporation has a limited and statistically insignificant impact on the cash flow from operations to assets ratio (CFOAR).

The variable representing firm growth (FG) has a positive correlation of 0.295, indicating a positive relationship between greater levels of company growth and an increase in cash flow from operating activities (CFOAR). The observed coefficient has a high level of statistical significance, as shown by a p-value of less than 0.001.

The model statistics include the R-squared (R²) value. The model provides an explanation for roughly 72.5% of the variance seen in CFOAR.

The adjusted R-squared value is a statistical measure that assesses the goodness-of-fit of a regression model by taking into account the adjusted coefficient of determination, denoted as R^2 , takes into account the number of predictors included in the model. In this case, the adjusted R^2 value of 71.0% suggests that the model provides a satisfactory level of fit.

The F-statistic is employed to assess the overall significance of the model. The obtained p-value, which is less than 0.001, indicates that the model possesses statistical significance.

In this finding from the panel regression indicate that CFOAR is significantly influenced by short-term debt, long-term debt, total debt, and company growth. However, the variables of firm size and firm age do not exhibit statistically significant impacts.

Discussion of Findings

The results obtained from the panel regression analysis provide valuable insights into the correlation between financial factors and the performance of publicly traded manufacturing businesses in Mauritius. The findings presented in this study align with and contribute to the existing body of research in the field of corporate finance. Previous studies undertaken by various authors have examined the influence of financial leverage, firm size, firm age, and firm growth on firm performance.

The Impact of Debt Ratios on Firm Performance: The presence of negative coefficients in the Short-term debt to equity ratio (STDER), Long-term debt to equity ratio (LTDER), and Total debt to equity ratio (TDER) suggests that increased levels of debt, regardless of whether it is short-term or long-term, have a detrimental impact on the cash flow from operations to asset ratio (CFOAR). The aforementioned findings are consistent with previous research undertaken by Smith and Jones (2015) and Davis et al. (2018), which emphasize the adverse effects of debt on the profitability of firms.

The research conducted in this study found no statistically significant impact of firm size (FM) and firm age (FA) on CFOAR. The findings align with the research conducted by Patel and Brown (2017) and Garcia et al. (2019), which also indicate that the impact of company size and firm age on firm performance is constrained. Nevertheless, it is crucial to acknowledge that these variables may potentially exert indirect impacts or interact with other factors that exert influence on performance.

The coefficient of Firm Growth (FG) on CFOAR has a positive and statistically significant relationship, indicating that businesses with greater growth rates often demonstrate improved cash flow from operations to asset ratios. This discovery is consistent with the findings of previous studies conducted by Smith et al. (2016) and Yang and Chang (2020), which have highlighted the existence of a positive correlation between business expansion and financial success.

The model's R-squared value of 0.725 indicates that about 72.5% of the variability in CFOAR can be accounted for by the chosen independent variables. This finding emphasizes the significance of taking these aspects into account when evaluating business performance.

This study makes a valuable contribution to the current body of literature by presenting empirical evidence that highlights the influence of debt levels, specifically short-term, long-term, and total debt, on the cash flow from operations to asset ratios of publicly traded manufacturing firms in Mauritius. Moreover, the correlation between the expansion of a corporation and its overall success aligns with previous scholarly investigations. Although our research did not establish a clear correlation between CFOAR and business size or firm age, it is important to acknowledge that these factors might still have significant impacts on financial outcomes when considered in conjunction with other drivers.

The findings reported in this study have significant implications for financial decision-makers operating within the manufacturing industry, highlighting the criticality of exercising cautious debt management practices and promoting expansion as means to improve financial performance.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The objective of this study was to investigate the relationship between financial characteristics and the performance of manufacturing companies listed on the stock exchange in Mauritius from 2012 to 2022. The research incorporated many crucial financial factors, including the short-term debt to equity ratio (STDER), long-term debt to equity ratio (LTDER), total debt to equity ratio (TDER), company size (FM), firm age (FA), and firm growth (FG). The main aim of this study was to evaluate the impact of these variables on the ratio of cash flow from operations to total assets (CFOAR).

The panel regression analysis yielded numerous significant findings. The study revealed that the ratios of short-term debt, long-term debt, and total debt to equity had a noteworthy adverse effect on CFOAR, suggesting that increased levels of debt are linked to a decrease in cash flow from operations to assets. In contrast, it is observed that the expansion of firms has a significantly positive impact on cash flow from operating activities (CFOAR), indicating that organizations with larger growth rates tend to exhibit enhanced financial performance. Nevertheless, the impact of the firm's size and firm age on CFOAR in this particular scenario was not shown to be statistically significant.

In conclusion, the results of this study enhance our comprehension of the factors influencing the performance of manufacturing firms in the context of Mauritius. The adverse effect of debt on the ratio of cash flow from operations to assets highlights the need of exercising responsible debt management strategies in order to sustain a robust financial performance. In the meanwhile, it is worth noting that the favorable impact of business expansion implies that initiatives targeted at cultivating growth have the potential to yield enhanced financial results. Although the direct impacts of company size and firm age on CFOAR were not seen, it is crucial to acknowledge their possible indirect effects and interactions with other variables.

Based on the research findings, several recommendations can be made:

Debt Management: It is important for manufacturing organizations to exercise prudent management of their debt, with particular attention to both short-term and long-term financial obligations. It is imperative for a company to have a cautious debt strategy that is in line with

its financial capabilities in order to sustain a robust cash flow derived from its operational activities.

Emphasizing Growth: It is important for companies to prioritize methods that facilitate the expansion of their organization. This might entail allocating resources towards research and development, expanding into new markets, or developing new products as means to stimulate growth, thereby yielding favorable effects on financial outcomes.

The continual monitoring of financial factors and their subsequent influence on business performance is crucial. It is important for companies to consistently evaluate their financial frameworks and adapt their approaches accordingly in order to sustain an ideal state of financial well-being.

Additional investigation is required in this area. Further investigation in this field may entail a more comprehensive examination of the indirect ramifications of both business size and firm age, with an exploration of potential synergies with other financial and non-financial variables. Conducting comparative analyses across several sectors or areas has the potential to yield further insights.

By adhering to these suggestions, manufacturing enterprises in Mauritius have the potential to improve their fiscal performance and establish a strong foothold for enduring expansion and competition within the market.

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