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THE EFFECT OF MACRO-ECONOMIC AND FIRM-SPECIFIC FACTORS ON THE CAPITAL STRUCTURE OF ETHIOPIA MANUFACTURING COMPANIES

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Abstract
This study explores macroeconomics and how firm-specific variables affect large Ethiopian manufacturing companies' capital structures from 2013/14 to 2022/23. Total, long-term, and short-term debt was dependent, and asset turnover, profitability, company size, firm age, growth potential, non-debt tax shield, asset tangibility, earnings volatility, gross domestic product, and inflation rate were explanatory variables. The study selected 51 large Ethiopian manufacturing enterprises using purposive sampling. The estimation method was panel regression. This study found that all firm-specific and macroeconomic variables positively and significantly affect the leverages (short-term, long-term, and total debt) of large manufacturing companies in Ethiopia, except profitability, non-debt tax shield, and growth opportunity. Profitability negatively affects capital structure (short-term, long-term, and overall debt). Growth opportunities negatively and insignificantly affect large Ethiopian manufacturing companies' long-term and total debt capital structures. Policymakers and manufacturing enterprises in Ethiopia should collaborate to establish a more favorable climate for sustainable economic expansion and efficient use of resources.

Keywords: Capital structure, short-term debt, long-term debt, total debt, Ethiopian manufacturing company

1. Introduction Financial organization managers must make a crucial decision about selecting fund sources for their operations and investing activities. Managers make decisions regarding the financing of their company's operations and investments. These decisions may involve issuing debt, raising new capital by issuing more equity shares, or retaining capital generated from operations. The manager's choice of these securities aims to enhance the organization's profitability.

A capital structure study is an analysis that aims to elucidate the combination of different forms of equity and debt capital that a company maintains due to its financing choices Myers (2001). Financing is essential for conducting business operations. Financial resources are critical for businesses to sustain their fixed assets and meet working capital requirements. The capital structure decision is crucial in all elements of capital investment decisions as it directly impacts the profitability of an organization. Hence, it is imperative to exercise caution and attentiveness when judging capital structure.

They revised their previous stance, Modigliani & Miller (1958), by including tax advantages as factors influencing the financial composition of companies. An essential aspect of taxation is that interest can deducted as an expense. When a company pays taxes, it benefits from a "tax shield" that partially offsets the interest it pays, resulting in cheaper taxes. Therefore, Modigliani and Miller (1963) suggested utilizing a significant amount of loan capital to enhance profitability and optimize the value of enterprises. At the same time, their Agency cost model Simultaneously, according to the Agency cost model proposed by (Jensen & Meckling 1976), maintaining an optimal capital structure is essential for organizations to achieve higher profitability. The determination of this position will require balancing the impact of business and personal taxes, bankruptcy costs, and agency fees.

According to the pecking order theory, companies should prefer internal sources of finance over any other type of financial resource. They should only resort to debt if internal sources are insufficient to meet the firm's investment needs. This theory also states that information asymmetry among agents influences capital structure because insiders know more about the firm than outsiders. The tradeoff theory suggests that the decision regarding the capital structure is influenced by the tradeoff between the advantages and disadvantages of using debt vs equity financing Myers, (1984). On one side, a greater amount of debt leads to increased cash flow because of the tax benefits from deducting interest expenditures, which enhances the firm's value. On the other hand, it also raises the risks and potential costs associated with financial difficulties, decreasing value. Therefore, managers of firms strive to determine the most advantageous level of debt to maximize value Colombo et al.,(2023).

In Ethiopia, manufacturing enterprises require capital to acquire machinery for their facilities, obtain raw materials domestically or internationally, and transport them to their processing units. In addition, they need storage infrastructure for raw materials and completed goods and effective marketing and transportation systems to distribute their products to local or international markets. Additional funding is required to cover personnel remuneration and achieve other monetary commitments. Industries must strategically select an appropriate capital structure to sustain operations, enhance competitiveness, and maximize investment returns(Hailu, 2010).

Several studies have been conducted in the financial sector, such as the one by (Ghani et al., 2023), which focuses on the factors influencing the capital structure of SAARC. Examining empirical research conducted in Ethiopia, the majority of empirical studies gather data from banks and microfinance institutions, employing unbalanced panel data regression methods with limited sample sizes. Notable examples include (Yitayaw, 2021), (Shibru, 2019), and (Asefa, 2017), who examine the determinants of capital structure in medium and large-sized enterprises (Mengistu. et al., 2020). This study is remarkable since it advances knowledge. First, this study examined large manufacturing companies. Second, the study improved panel data observation and sample size. Third, with financial performance parameters like variable Total debt, Long-term debt, and Short-term debt (STD), This leverage measure is underrepresented empirically. Fourth, instead of using basic ordinary least squares (OLS) based on relevant diagnostic tests, this study used a fixed and

random effect panel model to assess the effect of firm-specific and macroeconomic factors on the capital structure of manufacturing companies.

This research aims to enhance comprehension regarding the effect of macro-economic and firm-specific factors on Ethiopian manufacturing companies' capital structure. It also provides further evidence of the tradeoff, pecking order, agency cost, market timing, information signaling theory of capital structure, and their adverse effect on leverage. This study elucidates the abovementioned relationship, explicitly focusing on Ethiopian manufacturing enterprises. This study also considered wider industrial subsectors with a larger sample size, incorporated various capital structures and metrics of leverage performance, and employed fixed and random effect models using a panel data approach. The study provides valuable insights to stakeholders, including financial management and government, by sharing empirically validated knowledge. The main aim of this study was to analyze how macroeconomic and firm-specific factors influence the capital structure of large manufacturing companies in Ethiopia.

1. Literature Reviews

Using SPSS software, Abdul Mohsen Al Afeef (2023) examines how variables affected the capital structure of the Amman Stock Exchange's industrial sector from 2012 to 2021. The researcher chose physical assets, risk, profitability, and tax. The study sampled 62 industrial firms. The variables were calculated using financial analysis, and the hypotheses were tested. The study found several main things: First, the independent factors statistically affected capital structure. Second, physical assets, risk, and profitability independently affected capital structure statistically. The tax has no statistically significant influence on capital structure. The model accounted for 20% of capital structure fluctuations, while other factors accounted for 80%.

Based on the generalized method of moments (GMM), Farooq et al. (2023) examine how macroeconomic variables affect corporate investment. This study uses firm-level data from six GCC nations from 2007 to 2020. The empirical analysis uses a system of economic growth, financial development, and inflation rate, which positively affect firm investment decisions, whereas foreign direct investment negatively impacts them. Due to market competition, foreign direct investment might hinder domestic industrial growth. However, economic expansion, financial development, and inflation rates boost investment by increasing demand for industrial products, providing low-cost financing, and improving output through price appreciation. The findings suggest company managers should consider investment's economic sensitivity. The study's distinctiveness is examining how different financial circumstances affect business investment decisions, notably in GCC countries.

According to Ugochukwu et al., 2023) found that internal and external variables influence the capital structures of Nigerian public businesses. Secondary data was obtained from the Central Bank of Nigeria's Statistical Bulletin, the Stock Exchange Factbook, and NSC-listed firm annual reports. Equity and debt capital compared to profitability, company size, retained earnings, growth, liquidity, financial sector development, real GDP, and inflation. The data was examined by OLS regression. Business size, retained earnings, liquidity, financial sector development, real GDP, and inflation rate have a positive and statistically significant effect on equity capital.

Profitability and expansion potential deplete equity capital. Company size, retained earnings, growth potential, financial sector development, real GDP, and inflation impact debt capital: profitability and liquidity lower debt levels. The study demonstrates that internal and external factors influence public firm capital structures. System operators and business leaders should look for solutions to alleviate these concerns' capital structure consequences.

Various studies empirically examined The impact of profitability on capital structure, which is statistically significant and negative. For example, Kanbiro Orkaido Deyganto (2021) studied the capital structure of selected microfinance organizations in Ethiopia to uncover microfinance institution-specific factors. The researcher utilized a quantitative research methodology with an explanatory research design. The study examines the influence of five explanatory variables, namely microfinance institution growth, profitability, size, earning volatility, and asset tangibility, on one dependent variable: capital structure. The study focuses on eight microfinance organizations selected from 2012 to 2019 GC. The regression study revealed that growth, profitability, company size, age, and asset tangibility positively and statistically significantly impact the leverage ratio.

The financial composition of PSX-listed non-financial enterprises from 2004 to 2020 was examined by Raza et al. (2021)**.** Panel regression research confirmed that industry and firm-specific factors strongly influence capital structure decisions of the selected firms. The analysis demonstrates that industrial sectors differ in key firm-specific characteristics. The study contained eight leverage ratio explanations. Three of four industry variables significantly affected leverage ratio variation, and all four business variables strongly affected leverage ratio variation. The investigation supports the tradeoff theory's tangibility implications. The findings corroborate agency theory, especially regarding growth. The size factor confirms the tradeoff theory, while the Tobin Q and M/B ratio supports the agency theory.

Shahzad et al.(2021) investigate SAARC enterprises' capital structures. This study fills a gap by examining how firm- and country-specific factors affect SAARC enterprises' capital structures. Additionally, it contrasts local nations. The study employed explanatory research. The researcher used secondary financial data from the Lanka-Bangla Financial Portal, including Colombo, Bombay, and Dhaka stock exchange companies. Public audited reports for 2009–2014 provided data. The independent variables in the study were firm-specific factor variables like asset tangibility, profitability, liquidity, and business size and macroeconomic factors like stock market development and economic growth. The dependent variables are STD, LTD, and TD. Conventional least squares regression was applied to the data. Leverage is affected by firm-specific and macroeconomic factors such as tangibility, profitability, liquidity, business size, stock market development, and economic growth. Tangibility is negatively correlated with short-term debt (STD) but favourably associated with long-term debt. The pecking order theory suggests that organizations with more significant physical assets have lower short-term debt (STD). These companies also have higher unpaid long-term debt (LTD), which follows capital structure theory.

The two-stage least squares (2SLS), generalized method of moments (GMM), and generalized autoregressive conditional heteroskedasticity estimation methods show that macroeconomic

conditions affect corporate borrowing in Nigeria across 17 industries and examine how macroeconomic variables affect Nigerian public company capital structures. Paseda & Obademi, (2020). Market leverage is increased by debt market access and GDP growth. In contrast to the economy, the book business uses borrowed capital less when stock market conditions, the difference in short-term and long-term bond interest rates, and inflation rates fall. Unemployment, monetary policy, and government borrowing do not affect business borrowing. Due to the macroeconomic context, Nigerian listed companies use conservative debt, and certain firms have low leverage. The report recommends prudent debt use to reduce organizational risk and ensure long-term stability.

Shibru (2019**)** analyzed the elements of Ethiopia's public and private commercial banks' capital structure. This study regressed profitability, size, age, tax shield, dividend, GDP growth, and inflation on the debt-to-debt-equity ratio. A mixed research methodology analyzed eight privately held commercial banks and one publicly owned bank (CBE). Thus, a fixed effect multivariate regression analysis was performed using 2006–2015 financial data, and according to the study, profit, size, age, tax shield, growth, and inflation significantly affected public bank capital structures. Profitability, size, age, tax shield, GDP, and inflation have significantly affected private bank capital structure, and public bank debt-to-equity ratio (DER) negatively correlated with profitability, growth, size, tax shield, and GDP. Age and DER inflation were positively correlated. Profitability, growth, age, and dividend distribution negatively correlated in private banks. However, size, tax shield, GDP, and inflation positively correlated with the debt-to-equity ratio. Public and private commercial banks should prioritize three key factors when choosing a capital structure. Bank management should encourage equity capital purchases to build their branch network and boost market share.

The criteria for choosing a capital structure in Western Europe are examined by Ana Mugoša (2015). The dependent variable in this study is book leverage (BL). In contrast, the independent factors are tangibility (TA), the logarithm of sales, market to book (MB), profitability, product uniqueness (PU), and total return—the quantitative research from 2003 to 2010 utilized panel data from 921 large Western European enterprises. The results indicated that the forecasted variables considerably impacted target debt or leverage ratio changes. The debt ratio estimation method employed the Fixed-Effect and FGLS techniques. An inverse relationship exists between the leverage ratio and tangibility, market-to-book ratio, profitability, product distinctiveness, and total returns. There is a favorable statistical correlation between the leverage ratio and size. The tradeoff and pecking order theories have been confirmed, and these findings align with earlier studies.

The financial structure of industrial businesses in Addis Ababa was studied by Amanuel Mekonnen (2015)**.** Every firm must make capital structure decisions since they affect value and cost. It examines how theoretical internal factors affect Addis Ababa industrial firms' capital structures. Regression research employed tangibility, non-tax shield, growth, earning volatility profitability, age, and firm size. The regression study linked these factors to overall, short-term, and long-term debt ratios. The researcher acquired secondary data from 12 industrial companies' 2007–2012 audited financial accounts. The researcher used stratified and simple random selection

to choose individuals from different industries within strata. They are quantifying data via multivariate OLS regression. The paper says Addis Ababa's industrial capital structure is based on tangible, non-debt tax sheltering, earning volatility, profitability, and business size. In many models, capital structure, total debt ratio, business age, profitability, firm size, and growth are always positively associated. The debt ratio decreases with tangibility, non-debt tax sheltering, and earning volatility. The short-term debt ratio model showed correlations: Firm growth, profitability, size, age, and non-debt tax protection connected with the short-term debt ratio. Short-term debt ratio, Earning Volatility, and tangible assets were adversely associated.

Multiple studies have been conducted to ascertain businesses' capital structure determinants. The studies have yielded inconclusive findings regarding the correlation, primarily due to variations in the measurement techniques employed to assess firm-specific and macroeconomic factors impacting firms' capital structure, as well as the utilization of diverse analytical tools and other context-specific firm-specific and macroeconomic factors in each study. The capital structure is influenced by various elements linked to the corporation's characteristics. These factors include profitability, asset turnover, company size, firm age, growth opportunity, tangible assets, earnings volatility, and non-debt tax shields. Moreover, macroeconomic factors such as inflation rate and gross domestic product also impact the choice of capital structures. Capital structure pertains to the overall amount of debt, including both long-term and short-term debt, that a company carries. Both firm-specific and macroeconomic factors highly influence the capital structure of firms.

3. Methodology and Data

The study utilized secondary data and conducted panel data regression analysis to examine the macroeconomic and firm-specific factors influencing the capital structure of large manufacturing firms in Ethiopia. The population of this study consists of 51 manufacturing enterprises registered and operating in Ethiopia for a minimum of 10 years before the 2023 period (2013-2022). The population was chosen using purposive sampling. The selected firms examine well-established manufacturing companies that have worked for at least ten years and consistently received loans from any of the financial institutions. In addition, the study necessitates the presence of audited financial data and the regular acquisition of debt from financial institutions. To analyze the effect of capital structure by establishing the link between macroeconomic and firm-specific variables directly or indirectly related to large manufacturing companies. The model was derived from previous research. The dependent variable in this study is total, long-term, and short-term debt proxies on capital structure. On the other hand, the independent variables are asset turnover profitability, company size, firm age, growth opportunity, asset tangibility, earning volatility, non-debt tax shields, inflation rate, and gross domestic product.

3.1 Measurement of variables and hypothesis

The study examines the effects of firm-specific and macroeconomic factors on Ethiopia's manufacturing companies' capital structure. The study included asset turnover profitability, company size, firm age, growth opportunity, asset tangibility, and earnings as independent variables. Volatility and non-debt tax shields are used as indicators of firm-specific factors, while the inflation rate and gross domestic product serve as macroeconomic factors. Total, long-term,

and short-term debt are proxies for the capital structure of dependent variables. Variables and their measurement issue that empirical works adopted from Ross et al. (2001), Ugochukwu et al. (2023), Raza et al. (2021), Farooq et al. (2023), Shibru (2019), Paseda & Obademi, (2020), Shahzad et al.(2021), Abdul Mohsen Al Afeef, (2023), Yitayaw (2021), Mengistu et al. (2020) among others.

H0: Macroeconomic and Firm-specific factors do not significantly affect Ethiopian manufacturing companies' capital structure.

Ha: Macroeconomic and Firm-specific factors significantly affect Ethiopian manufacturing companies' capital structure.

Model Specification

The model was developed based on earlier studies mentioned above. Capital structure (leverage) is a dependent variable in the relationship, and the independent variables are asset turnover profitability, firm size, firm age, growth opportunity, asset tangibility, earning volatility, non-debt tax shields, inflation rate, and gross domestic product. The model is specified on an empirical framework using the capital structure determinants of Ethiopia's large manufacturing companies.

$$Yit = \alpha + \beta Xit + eit \quad \text{……………………………………..………………………I}$$

Where

Yit - is a dependent variable.
α - is the intercept (constant variable)
Xit- is an independent variable.
eit - are the error terms.
i - The number of firms and
t - The number of period

Model 1

$$STD = \beta 0 + \beta 1Atoit + \beta 2Proit + \beta 3Agit + \beta 4Sit + \beta 5ATit + \beta 6Go\ it + \beta 7Evit + \beta 8NDTit + \beta 9GDPit + \beta 10IN + eit \quad \text{………………………………………………………….1}$$

Model 2

$$LTD = \beta 0 + \beta 1Atoit + \beta 2Proit + \beta 3Agit + \beta 4Sit + \beta 5ATit + \beta 6Go\ it + \beta 7Evit + \beta 8NDTit + \beta 9GDPit + \beta 10IN + eit \quad \text{………………………………………………………….2}$$

Model 3

$$TD = \beta 0 + \beta 1Atoit + \beta 2Proit + \beta 3Agit + \beta 4Sit + \beta 5ATit + \beta 6Go\ it + \beta 7Evit + \beta 8NDTit + \beta 9GDPit + \beta 10IN + eit \quad \text{………………………………………………………….3}$$

Where

TD= Total debt | LTD= Long term debt
STD= Short term debt | β0 - Constant coefficient
β1 – β10 = Regression coefficients for measuring independent variables
Ato= Asset turnover | EV = Earnings volatility
Pro= profitability | NDT= Non-debt tax shields
A=age of firms | IN=Inflation

S = Firm size
AT= Asset tangibility
GO = Growth Opportunities
GDP=Gross domestic product
eit = The Error Term

Table 1 Summary of Variables and Measurement Model 1-Model 3

Variables		Measurements	Expected sign	Sources
Dependent	Total Debt (TD)	Total Debt/Total Asset		(Stoiljković et al., 2023)
	Long-term Debt (LTD)	Long-Term Debt/Total Asset		(Riaz et al., 2022)
	Short-term Debt (STD)	Short-Term Debt/Total Asset		(Ahmed, et al., 2024)
Independent	Asset turnover ratio	Total sales/ Total assets	+	Perri & Cel 02)
	profitability	Net Income/Total Sales	-/+	(Suhardjo et al., 2022),(Mardan, et al., 2023)
	Age of firms	Natural Logarithm of Number of Years	+	(Ahmed et al., 2023), Perri & Cela (2022)
	Size of firms	Natural Logarithm of Total Asset	+	(Arhinful & Radmehr, 2023),
	Tangibility of asset	Fixed Asset/Total Asset	+	(Amare, 2021)
	Growth Opportunity	Percentage Change in Total Assets	-	(Liaqat et al., 2021),
	Earning Volatility	EBITt – EBITt-1) / EBITt-1	+	(Aregawi et al., 2018)
	Non-Debt Tax Shield	Depreciation Expense /Total Assets	+	Perri & Cela (2022)
	Gross Domestic product	Annual Gross Domestic Product Rate	+	(Arora et al., 2016)
	Inflation	Annual Inflation Rate	+	(Mardan & Moeljadi, Sumiati, 2023)
				(Ramzan & Qureshi, 2022)
				(Ramzan & Qureshi, 2022)

Result and Discussion

4.1 Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Minimum	Maximum
Short-Term Debt	510	.194	.117	.001	.546
LTD-Term Debt	510	.199	.116	.005	.489
Total Debt	510	.393	.149	.024	.598
Asset Turn Over	510	1.527	.465	.143	2.651

Profitability	510	.157	.077	.006	.395
Firm age (logFA)	510	1.259	.374	.301	1.954
Firm Size (logFS)	510	9.002	.473	7.952	9.981
Asset Tangibility	510	.185	.107	.002	.626
Growth Opportunity	510	.185	.157	.002	2.611
Non-debt tax shield	510	.166	.107	.001	.475
Earning Volatility	510	.186	.125	.005	1.311
Goss Domestic Product	510	.082	.02	.053	.106
Inflation Rate	510	.154	.086	.073	.34

Source: STATA output results and researcher's computation from 2013/14-2022/23

Table 2 Descriptive Statistics

Table 2 displays detailed statistics summarizing the secondary data collected from 51 manufacturing companies in Ethiopia over ten years from 2013/14 to 2022/23 The descriptive statistics indicate that the mean STD, LTD, and TD for manufacturing enterprises in Ethiopia are 19.40%, 19.90%, and 39.30% respectively. The findings suggest that the capital structure, as assessed by short-term debt (STD) and long-term debt (LTD), yields nearly identical consequences. The results indicate that the company's capital structure under examination is superior to that of manufacturing companies in Ethiopia from 2013/14 to 2022/23. However, the company still maintained a moderate level of debt during this period compared to other firms in Ethiopia's manufacturing sector. The average total debt ratio is 39.3%, with the remaining 60.7% of total assets allocated to shares. The short-term debt ratio accounts for 19.40% of the total debt ratio of 39.3%, leaving 19.90% for the long-term debt ratio. Manufacturing enterprises in Ethiopia primarily utilize equity over debt, preferring long-term debt over short-term debt. The manufacturing business may have a higher share of long-term debt than short-term debt due to the substantial capital investments needed in investment areas that require long-term financing.

4.2 Diagnostic Tests

The dataset contains observations across time for multiple individuals or entities. The CLRM assumptions are thoroughly evaluated to ascertain whether the OLS assumptions, which are the assumptions of the traditional linear regression model, are met while doing a regression analysis of the independent variables on the dependent variables.

4.2.1 Panel Unit Root Test

The study tested the two hypotheses using a panel research approach. The technique combines the characteristics of time series with cross-sectional data. Therefore, the researcher initially assessed whether the data was stationary or non-stationary. As a rule of thumb, non-stationary data are unpredictable and cannot be modeled or predicted.

Table 3 Levin-Lin-Chu panel unit root test

Variables name	Adjusted t*	Probability***
Total Debt	-13.9443	0.0000
Long-term debt	-8.7517	0.0000

Short-term debt	-12.0039	0.0000
Asset turnover	-10.5505	0.0000
profitability	-10.5972	0.0000
Firm Age	-36.2733	0.0000
Firm Size	-6.1688	0.0000
Asset tangibility	-7.6791	0.0000
Growth Opportunity	-7.0881	0.0000
Earning Volatility	-9.5208	0.0000
Non-Debt Tax Shield	-13.0444	0.0000
Gross Domestic Product	-6.7014	0.0000
Inflation Rate	-8.5402	0.0000

Source: STATA output results and researchers' computation from 2013/14-2022/23

The Levin-Lin-Chu panel unit root test was employed, as indicated in Table 3, to ascertain the stationarity of variables and prevent erroneous regression results. The Levin-Lin-Chu panel unit root test has satisfactory size and power across many datasets, particularly in microeconomic scenarios characterized by a restricted temporal dimension, T, and panels of over 25 observations. The investigation discovered no unit roots in any of the variables. The panel data in this study is stationary and can be used for hypothesis testing supported by (Gujarati, 2004).

4.2.2 Test of multicollinearity

Multicollinearity—a linear relationship between explanatory variables—may affect regression. Multiple variables may be near-perfect linear combinations. Regressing model estimates with multicollinearity can cause unstable regressor coefficients and greatly inflated standard errors. Table 4 shows that all variables had <0.8 correlation coefficients, indicating little multicollinearity (Gujarati, 2004). The Variable Inflation Factor (VIF) technique and correlation matrixes discover and support explanatory variable multicollinearity evidenced by (Gujarati, 2004).

Table 4 Result of diagnostic tests for model 1 to model 3

Diagnostic tests	***Model 1***	***Model 2***	***Model 3***
Hausman test chi2(1)	72.95	19.42	11.09
Prob > chi2	0.0000	0.0352	0.3507
Heteroscedasticity Test	1.72	3.46	1.57
Prob > chi2	0.1893	0.9433	0.235
Multicollinearity test (VIF)	3.275	3.275	3.275
Serial correlation test F (1, 50)	1.274	1.284	1.128
Prob > chi2	0. 2643	0.2310	0. 2934
Test of cross-sectional dependence	-0.375	0.049	0.193
P-values	0.7074	0.9612	0.8472
off-diagonal	0.286	0.278	0.277

Source: STATA output results and researchers' computation from 2013/14-2022/23

4.2.3 Hausman test of panel data

Three models examined how macroeconomic and firm-specific factors affected capital structure indicators. Breusch-Pagan Lagrange Multiplier (LM) tests a panel effect, fixed effects (FE), and random effects (RE) estimate model. Hausman tested estimating model consistency. We investigate that fixed and random effects coefficient discrepancies are not systematic. H0 = Different coefficients are inconsistent. Table 4 shows that the Hausman test of total debt is 11.09 ($p = 0.3507$) at the 5% test insignificance level, supporting the hypothesis. Thus, the random effect model was chosen. At 5% test significance, the Hausman test of long-term and short-term debt is 72.95 ($p = 0.0000$) and 19.42 ($p = 0.0352$). This proves the hypothesis. The fixed effect model was used for both dependent variables.

4.2.4 Heteroskedasticity test of the result

According to (Gujarati, 2004), a model has heteroskedasticity if the error variances of the observations are varied during this investigation. The Breusch-Pagan test detected Heteroscedasticity. This test reveals Heteroscedasticity if the p-value is statistically significant with 95% confidence. When the value is insignificant (over 0.05), Heteroscedasticity is absent. Table 4 indicates that the P-value is 0.1893, which is more significant than 0.05. Hence, it can't reject this research's null hypothesis of homoscedasticity. Therefore, this model does not face any Heteroskedasticity problem.

4.2.5 Serial correlation test of the result

The study employed the Wooldridge test for autocorrelation to investigate serial correlation in the data. Models 1, 2, and 3 had non-significant F-tests. From Table 4 above, the result shows no first-order autocorrelation in panel data.

4.2.6 Cross-sectional dependence test of the result

Basak & Das (2018) examine the asymptotic characteristics of parameter estimators for both fixed (inside) effect estimators and random effect (pooled) estimators in linear panel data models that include different types of cross-sectional dependency. A cross-sectional dependency (CD) test was employed to ascertain the presence of cross-sectional dependence in the fixed and random effect model. The panel data analysis indicates the absence of interdependence between the various sections, as demonstrated by the insignificant result of the Pesaran test for cross-sectional independence. The null hypothesis asserts that there is no association between residuals. Based on the result in Table 4, there is a lack of adequate evidence to reject the null hypothesis, leading us to conclude that cross-sectional dependence is nonexistent.

4.3 Correlation Regression

Correlation and regression analyses are interconnected as they examine the variables' associations. The correlation coefficient values are always constrained within -1 to +1. A correlation value +1 indicates a strong positive linear relationship, while a correlation coefficient -1 indicates a strong negative relationship between two variables. A correlation coefficient of zero signifies the lack of a linear association between the two variables. The correlation coefficient of a regression function is equivalent to the square root of the coefficient of determination. The

correlation coefficient precisely measures the degree of linear association between two variables. Table 5 Correlation matrices Table 5 indicated a positive correlation between firm-specific and macroeconomic parameters concerning the dependent and independent variables, except profitability. The variables included in the analysis are asset turnover, asset tangibility, earning volatility, non-debt tax shield, firm age, growth opportunity, firm size, inflation rate, gross domestic product, and total, long-term, and short-term debt. A company's profitability is inversely related to its leverage, including total, long-term, and short-term debt. The correlation coefficients for these relationships are 0.612, 0.396, 0.519, 0.667, 0.570, 0. 572, 0.446, 0.001, and 0.027, with statistical relationship*** $p<0.01$, ** $p<0.05$, * $p<0.1$, respectively. This correlation demonstrates that the aforementioned independent factors positively correlate with the dependent capital structure variables. This relationship is quantified by a correlation coefficient of -0.139, with statistical relationship*** $p<0.01$, ** $p<0.05$, * $p<0.1$. The result indicated that the leverage ratio exhibits an inverse relationship with profitability. The correlation matrix shows that the most vital connection coefficient, with a value of 0.667, was observed between Asset turnover and growth opportunity. According to Gujarati (2004), if the inter-correlation among the independent variables is above 0.80, it indicates a potential issue with multicollinearity. Nevertheless, the observed strong association is deemed acceptable due to the tendency of large enterprises to exhibit a high Asset turnover. Given that the maximum absolute correlation value is lower than the established threshold (in this study, set at 0.667), we may infer no multicollinearity among the independent variables.

Variables	(STD)	(LTD)	(TD)	(ATO)	(PR)	(logFA)	(logFS)	(AT)	(GO)	(NTS)	(EV)	(GDP)	(IR)
STD	1.000												
LTD	0.472***	1.000											
TD	0.705***	0.740***	1.000										
ATO	0.612***	0.499***	0.686***	1.000									
PR	-0.139***	-0.388***	-0.520***	-0.390***	1.000								
logFA	0.396***	0.452***	0.547***	0.404***	-0.302***	1.000							
logFS	0.519***	0.540***	0.776***	0.527***	-0.475***	0.353***	1.000						
AT	0.667***	0.430***	0.620***	0.536***	-0.106**	0.391***	0.459***	1.000					
GO	0.570***	0.260***	0.394***	0.334***	-0.055	0.244***	0.284***	0.620***	1.000				
NTS	0.572***	0.464***	0.633***	0.549***	-0.094**	0.416***	0.465***	0.544***	0.546***	1.000			
EV	0.446***	0.379***	0.537***	0.449***	-0.044	0.341***	0.411***	0.478***	0.483***	0.383***	1.000		
GDP	0.001	0.024	-0.046	-0.032	0.087**	-0.014	-0.148***	0.006	-0.046	0.034	-0.015	1.000	
IR	0.027	0.007	0.070	0.043	-0.065	0.016	0.139***	0.009	0.090**	-0.012	0.038	-0.698***	1.000

Source: STATA output results and researcher computation from 2013/14-2022/23

*The values *, **, and *** are statistically significant at the 10%, 5%, and 0.1% confidence levels, respectively.*

*** p<0.01, ** p<0.05, * p<0.1

4.4 Regression Result Discussion

Table 6, shows the results of estimating equations 1, 2, and 3. The estimations indicate that both random and fixed effects regression give consistent findings. The regression analysis of firm-specific and macroeconomic variables shows that all explanatory variables are explained by the dependent variables: large Ethiopian manufacturing companies' total, long-term, and short-term debt.

Table 6 Empirical result of model1 to model3

	(1) Model1_STD	(2) Model2_LTD	(3) Model3_TD
ATO	.03***	.04***	.05***
	(.006)	(.01)	(.009)
PR	- .013***	-.148***	-.293***
	(.012)	(.056)	(.046)
logFA	.018**	.044***	.067***
	(.007)	(.012)	(.01)
logFS	.011*	.044***	.12***
	(.006)	(.01)	(.008)
AT	.356***	.183**	.198***
	(.049)	(.085)	(.064)
GO	-.046**	-.041	-.029
	(.02)	(.035)	(.029)
NTS	.425***	.014	.174**
	(.043)	(.074)	(.056)
EV	.125***	.115*	.088*
	(.035)	(.06)	(.094)
GDP	.339**	.995***	.897***
	(.241)	(.361)	(.305)
IR	.094*	.161*	.177**

	(.049)	(.083)	(.070)
cons	-.174***	-.444***	-1.065***
	(.059)	(.1)	(.082)
Obs	510	510	510
R-squared	.815	.424	.782
Groups	51	51	51

Source: STATA output results and researcher computation from 2013/14-2022/23

*The values *, **, and *** are statistically significant at the 10%, 5%, and 1% confidence levels, respectively.* *** p<.01, ** p<.05, * p<.1

Macroeconomic and Firm-specific factors on the Capital Structure (total, long-term, and short-term debt) of Ethiopian manufacturing companies were asset turnover, asset tangibility, earning volatility, non-debt tax shield, firm age, firm size, inflation rate, gross domestic product significance and positively influenced on short-term debt, long-term debt, and total debt. Profitability and growth opportunities negatively and significantly affect the capital structure of manufacturing companies in Ethiopia, except for growth opportunities. The capital structure decisions of manufacturing companies in Ethiopia are greatly influenced by it. The pecking order theory, tradeoff, and agency theory support the result. Several previous studies were corroborating evidence for the pecking order theory (Abdul Mohsen Al Afeef, 2023), (Farooq, Mardani and Ugochukwu et al., 2023), (Kanbiro Orkaido Deyganto, and Shahzad et al. 2021), (Kasenda, 2020), (Shibru, 2019), (Amanuel Mekonnen,2015) and (Handoo & Sharma, Serghiescu & Văidean, 2014), (Mokhova & Zinecker, 2013).

5. Conclusion and Recommendations

According to the regression analysis of macroeconomic and firm-specific variables, all explanatory variables except growth opportunity variables had a statistically significant effect on Ethiopian manufacturing companies' total debts (leverage) while holding other factors constant. Asset turnover, Firm Age, Firm Size, Asset tangibility, GDP, Inflation Rate, Non-Debt Tax Shield, Earning volatility, and leverage (total debt) in Ethiopian manufacturing enterprises are positively correlated. Manufacturing business profitability and growth opportunity are strongly inversely related. Manufacturing enterprises in Ethiopia have development potential unrelated to leverage. According to regression data, tradeoffs, pecking order, market timing, and agency cost theories affect capital structure. The data imply that Ethiopian manufacturers use the agency cost hypothesis to support investments.

The macroeconomic and firm-specific variables result shows that all explanatory variables except Non-Debt Tax Shield and growth opportunity variables statistically affect manufacturing companies' leverage (long-term debts) in Ethiopia. Asset turnover, Firm Age, Firm Size, Asset tangibility, Gross Domestic Product, Inflation Rate, Earning Volatility, and leverage (long-term debt) in Ethiopian manufacturing companies are positively correlated. In Ethiopian manufacturing enterprises, profitability is negatively and statistically significant. The regression analysis shows

that leverage and explanatory factors match capital structure theories, including tradeoffs, pecking order, market timing, and agency cost. These theories explain the capital structure of Ethiopian manufacturing companies to support their investments.

Investigating macroeconomic and firm-specific variables shows that these factors significantly affected Ethiopian manufacturing businesses' leverage. Asset turnover, company age, firm size, asset tangibility, non-debt tax shield, earning Volatility, GDP, and interest rate are positively correlated with leverage (short-term debt) in Ethiopian manufacturing companies. Short-term indebtedness, or leverage, negatively affects Ethiopian manufacturing enterprises' profitability and growth.

This study suggests further study in the future by incorporating firm-specific and macroeconomic factors, external variables like market condition, investor attitude, competition, taxation, interest rate, governance legislative framework, and financial system impact should be considered when determining enterprise capital structure. The researcher ignored the above points. Thus, future research should address external factors that affect manufacturing firms' capital structures.

The Ethiopian government could also regulate the financial sector by lowering manufacturing industry interest rates via its monetary and fiscal policies since businesses rely on external borrowing to fund their projects. Profitability firms should grow their operations and optimize fixed asset use to increase fixed asset turnover. The survey collects data from Ethiopian manufacturers. It examines capital structure's theoretical and empirical effects on tradeoff pecking order and agency theory. Future researchers should increase their sample size, time series, and cross-sections to study how these factors affect manufacturing company capital structures.

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