LEVERAGE AND TAX STRATEGIES: AN EMPIRICAL STUDY IN THE CONTEXT OF THIN CAPITALIZATION RULES

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Abstract

In this research, we are examining the effect of leverage, thin capitalization and their relationship with corporate income taxes in a panel database of multinational enterprises over an eight years period (2015-2023). Thinly capitalized firms will be identified through their Debt-to-Equity ratio, which indicates the amount of debt vs. equity used to finance the firm. The leverage of the firm will be identified through Total liabilities divided by Total Assets. The greatest contribution of the current research study to the existing body of knowledge is the use of pooled Ordinary Least Squares Analysis with Heteroskedasticity Consistent Standard Errors in the analysis of Debt-related Tax incentives and the three dependent variables of Tax base Proxy, Net Income and ETR (Effective Tax Rate). Empirical results of this analysis indicate that thinly capitalized firms with low leverage have lower values for the Tax base Proxy and Net Income than firms that are heavily leveraged. However, it was found that the relationship between ETR and thinly capitalized firms is weak and highly dependent on the specific specification of the model. The results of this research are consistent with the existing literature on Debt-related Tax Incentives as it relates to Thin Capitalization, however, this study provides further evidence of the negative effects on profitability due to excessive use of Debt Financing and expands the current body of knowledge regarding thin capitalization with accounting-based proxies. The study does recognize limitations in measuring the available proxies and the differences between tax regimes in different jurisdictions.

Keywords: Corporate taxation, effective tax rate, leverage, multinational corporations, tax base, thin capitalization.

JEL Classification Codes: H25, H26, G32, F23

1.0 Introduction

Government revenue collection through taxation is a primary method of funding government programs and creating incentives for desired behavior while also providing for the economic health of the country. At the same time, corporate income taxes provide a significant portion of government revenue in most countries. As such, companies want to reduce their tax liability in order to increase profits and provide the greatest value to their shareholders. Thus, a conflict arises between the government, which has the responsibility to protect its tax base, and corporations, which have an obligation to their shareholders to implement strategies that will produce the lowest effective tax rate.

Corporate tax planning varies widely, from legitimate planning within the tax code, to aggressive tax planning that exploits loopholes or differences between accounting and tax systems. Tax planning can arise from opportunities that are simply part of the tax code as it works, to aggressive approaches that call into question if conditions exist and reasons exist why it is appropriate to undertake actions that minimize taxable revenue. While some tax planning is always acceptable and even expected, the extent to which it goes from reasonable to

aggressive tax avoidance has and currently is a major debate and area of study in the academic and policy arena. Governments, international organizations, and members of the academic community have dedicated considerable time and thought seeking to understand the extent to which tax bases are reduced or profits shifted. One of the biggest tools available to firms is the idea of using debt in the capital structure of financing. Nearly all systems of taxes allow interest charges on debts to be deductible, and reduces the taxable base of revenue. However, dividends to owners of equities are not allowed as part of that deductible base. In other words, taxation has created a structural dis-incentive for firms to consider goals of financing with debt relative to equity, especially when the corporate tax rate is high. This has been termed the "debt tax shield" and is well developed across all financial and accounting literatures. It explains behavior not just for purposes of operating and investment decisions, but for purposes of tax effect efficiencies in financing decisions. The use of excessive debt for financing also has its own risks. At an economic level, too-indebted firms are more subject to financial difficulties and turbulence on a systemic basis, as, for instance, is shown in economic bad times. At a tax level, extensive recourse to debt finance has also the probable effect of shrinking the tax base too when firms are in the habit of deducting large interest charges and get only a low effective levy from their tax liabilities when their operating profits are great. That the idea of using TCRs for shifting profits between jurisdictions is feasible is sufficiently supported by the foregoing reasons. Multinational enterprises have been targeted particularly for abuse of inter-company interest charges and loans, for it would seem that under certain circumstances some avenues for profit shifting exist from jurisdictions with differential levying systems. TCRs, meanwhile, have come into use in many countries to meet these issues. These present such "safe harbor" ratios, in which interest will cease to be deductible, if the firm has too great a debt-equity ratio (of debt to equity) or because of indebtedness to assets.

Such firms are perceived to be involved in tax motivated capital structure rather than legitimate corporate needs. Governments introduce such limitations in order to prevent aggressive tax planning, and maintain the integrity of tax law. The OECD has published guidelines for the implementation of thin cap rules as part of its BEPS project. This indicates the broad interest in the understandability of such rules.

While the thin cap provisions are of significant policy effort, there is little empirical evidence that investigates the direct impact of thin cap provisions on German multinationals or the general effect of leverage on tax base erosion. The results on the impact of capital structure on proxies for capital structure like the ETR or taxable base often differ between studies. Some studies find strong and significant coefficients for leverage in ETR regressions, an indication of debt shifting behavior, or on the taxable base suggesting that firms use leverage as an instrument to lower their tax burden. Research findings show that different country-specific elements including capital regulation rules and their enforcement and institutional frameworks and firm characteristics affect debt shifting activities. The research identifies corporate governance and risk management and financial market access as elements which affect debt shifting through their ability to restrict or facilitate tax planning activities.

The unclear results from previous studies require future research to use detailed financial data with advanced econometric methods. The research will achieve better results by using weighted financial statement aggregates which include total assets and total liabilities and earnings before tax and tax expenses to study leverage effects on tax relevant proxies. Moreover, based on these weighted aggregates, hypotheses can also be tested on leverage's coefficients regarding discernible or non-discernible impacts on the tax base proxy, net income proxy, or effective tax rate proxy. This research doesn't quantify proxies based on data from micro-databases; in lieu of this, it simply utilizes TS data.

To address this research gap, the current study investigates the influence of firm leverage on corporate tax avoidance in the presence of thin capitalization regulations. Specifically, this study scrutinizes the following interlinked questions:

i. How does leverage influence the tax base, a deferred tax-discounting effect proxy?
ii. What is the impact of leverage on net income, an alternative proxy for non-discounted total income?
iii. And how do operating cash flows affect the difference between the effective tax rate (ETR) and the statutory tax rate, a proxy for corporate tax avoidance?

While the outcome of this study makes a significant contribution to tax literature and disclosure practice in several aspects, which will be elaborated later in the contributions section, and the stakeholder value and benefits of the study also have significant importance in both earnings' quality and tax literature, which will also be elaborated in the respective section. Here is a summarized version of this study's contributions, value and significance.

This study makes a practical meaning contribution in several aspects. First, this study empirically verifies the tax-motivated leverage hypothesis, which provides additional practical meaning interpretation of thin capitalization regulation (Monterrey Mayoral, 2024). Second, this study revisits the financing structure impact on corporate tax outcomes and overall firm performance (reflected by net income) (Jin, 2021; Widati, Asiah, & Kamela, 2024). Third, this study investigates the impact of operating cash flow, as a financial discretion feature, on effective tax burden a theme that is currently receiving little attention in literature.

The results of this research will impact beyond academia, and as such, the results can serve as tools for policy-makers to develop tax systems that will maximize revenue, but still allow investment activities and drive economic growth. The CFOs and tax professionals must develop their own understanding of the connections between capital structure (i.e., debt versus equity financing) with operating cash flow, tax obligations, and performance measures, to make informed financial strategy decisions. This research adds to the emerging body of research examining the relationship of accounting, finance, and taxes, and further establishes the need for more comprehensive examination of tax determinants and effects on corporations. The link between tax-related policy and business behavior occurs primarily because of taxes; thus, leverage (both financial and tax) is placed at the intersection of these two areas. Through the analysis of the impact of leveraging on Tax Outcomes through the thin capitalization rules framework, an improved understanding of how-toanalysisthe influence of leverage and Thin Capitalization Rules on Taxation Outcomes can be reached in conjunction with the author's previous study, titled "More Effective Approach to Corporate Taxation" (Hillegeist & Walther, 2020).

Based upon the extensive body of research concerning capital structure and taxation, there remains considerable ambiguity regarding the existence of an empirical correlation between the intensity of debt financing, exposure to thin capitalization, and taxation-related outcomes of firms. In general, although thin capitalization rules limit the amount of debt that a corporation may incur to finance its operations for tax purposes, the body of empirical research that has addressed this issue has primarily modelled financial variables as proxies for statutory thresholds due to cross-country differences with respect to financial variables along with data limitations imposed by the presence of tax law differentials. As a result, we are left with no certainty as to whether a systematic distinction between the taxation outcomes, profitability and effective tax burdens of firms that have higher levels of leverage (debt ratios) and greater exposure to the thin capitalization rules versus firms that have lower levels of leverage and less exposure to the thin capitalization rules exists over time. Accordingly, this study examines

whether leverage and thin capitalization exposure, proxied by accounting-based measures, are associated with key tax-related outcomes and firm performance using a multi-year panel of multinational corporations.

2.0 Literature Review

Leverage, Thin Capitalization, and Tax Avoidance

There exists an interest in how the imposition of thin capitalization tax on business firms impacts their business plans from the perspective of finance. Business firms actually strive to obtain debt finance, which facilitates a lower tax. The broad-based rules under which a minimum effective rate of tax is sought (Muhammad Fahmi et al., 2024). In jurisdictions where the thin capitalization rule is the subject of selective application, business firms are more judicious in their use of debt finance, more ready to accept the advantages of a more effective thin capitalization rule. This reasoning is logical, since more developed countries generally have less rules relating to thin capitalization. In developing countries, we have only recently begun to see the instituting of more stringent and effective thin capitalization regulations and the immediate effects thereof on the capital structure of firms. Indonesia, for example, dictated by Lithuania-Hutahean (2024), kept increasing the effective regulations to the interest deduction to debt-to-equity ratio which affected the manner of financing of firms almost immediately. This indicates that the anticipated effect of outside intervention of regulations with respect to such regulated firms is of a proactive nature and has the effect of engendering automatic effects. Such regulations are geared to produce two main results being, (tax avoidance effect) and more important, effecting the capital structure of firms and their consequent investment behavior. Evidence from the literature suggests furthermore that the imposition of more stringent regulations in the question of thin capitalization may exert a direct effect in producing a lessening of tax avoidance of firms involved. For example, an analysis of the LQ-45 companies shows that thin capitalization is shown to relate significantly and negatively to tax avoidance while at the same time, transfer pricing practices adapted by such firms are related significantly and positively to tax avoidance (Imannuel, 2025). This duality would indicate that even if debt related tax avoidance is curtailed, the tendency of firms will be to shift their attention to tax avoidance based on non-debt/sources of income, thus indicating the necessity of a properly coordinated regulatory structure. Recent studies are taking account of this guiding principle of moderation related to the thin capitalization laws. Recent investigative articles specifically related to Indonesian firms reveal that transfer pricing practices instituted, lead to an increase in tax avoidance (a much more serious offence in these circumstances than elsewhere) but that this effect is lessened in its effect when the thin capitalization relaxation is imposed (Nugraha and Firmansyah, 2025). The point which is made here is that we cannot consider the policy and its effect in isolation of the happenings in the regulatory sphere: it is the aggregate of the rules imposed and restrictions imposed (in this instance thin capitalization rules and transfer pricing performance) which led to an overall tax strategy developed in firms.

Nevertheless, not all findings are similar. A study on consumer goods companies from 2019-2023 found that thin capitalization and corporate risk were not significant factors influencing tax avoidance. In contrast, firm size continued to be a strong positive factor (Nadianti & Asrorudin, 2025). They construed their discovery that larger firms have structural advantages with respect to loopholes, independent of debt limiting factors, in turn raising the issue of significant contextual issues, such as industry type, or strength of enforcement.

Other aspects of firm structure also appear to be important. Research on consumer non-cyclical firms found a strong predicative relationship between fixed asset intensity and tax avoidance, while thin capitalization had no direct effect and transfer pricing was significant (Arditra,

Ratnawati, & Abdurrahman, 2025) . This study suggest that leverage interacts with other firm characteristics (asset structure, depreciation, etc.) that contribute to the resultant tax outcome.

Profitability is moderating factor in these relationships similar to leverage. Research into straight thin capitalization and transfer pricing has found that both were stronger associations of tax avoidance in profitable firm which indicates that firms with greater profitability have both incentives as well as the ability to exploit the advantages of interest deductibility on debt (Fitriandari & Aisyaturrahmi, 2025). Again, this modestly suggests the ability of firm specific characteristics to shape the eventuality of our tax strategy.

In general, these recent findings provide a complicated and at time contradictory picture of 2024 - 2025. Leverage is still a relevant phenomenon of tax avoidance but not as a simple or automatic consequence. The thin capitalization rules worked reasonably well some of time depending on level of enforcement, but at other times looked poorly when firm size, asset intensity, or profitability were of similar consideration. Transfer pricing remains a better phenomenon of tax avoidance regardless of the circumstance and to some extent demonstrates that certain regulations mechanisms must operate in tandem in order to work in favour of tax avoidance.

This subtle phenomenon makes clear that there is a need for more research on leverage, not only its relation to effective tax rate but also tax base and net earnings. The current research does lend substance to the disentanglement of financing decisions and taxation, with the increased change and variation of each regulatory environment, as BEPS, implementation of ATAD, all relying on firm specific financial evidence. All of the research provides fuel for our research design and adds to the logical rationale of testing tax strategy against leverage, thin capitalization and operational performance.

Expanded Perspectives on Thin Capitalization and Leverage

Recent research has added depth to this discussion by connecting thin capitalization through the lens of international tax reform possibilities, and institutional arrangements. De Mooij and Hebous (2018) have provided cross-country evidence that limited deductibility of interest reductions biased debt, but the effect increases when thin capitalization rules are tested in conjunction with limited interest deductibility. Concerning the European Union, Hebous and Ruf (2017) found that firms changed their leverage after the ATAD earnings stripping rule, where a supranational environment has been influential, which may somewhat lend evidence to a capital structure being affected heavily by systems outside of its control. Correspondently, Blouin et al. (2024) suggest that firms with high-intangible intensity characteristics may even look to transfer pricing to bootstrap in excess of thin capitalization with other avoidance behaviours occurring domestically and allowing an introduction of a case for a holistic anti-avoidance regime. Monterrey Mayoral (2024) finds the interaction of operating leverage and tax burdens, a possible indication of why firms with fixed costs may be especially susceptible to limitations on interest deductibility. In the meantime, Jin (2021) produces evidence in China that high levels of debts are not only associated with aggressiveness to tax but may even worsen the profit environment in the longer-term. Finally, Widati et al. (2024) in their study find that leverage and size of the enterprise affect the effective tax rates in relatively novel ways, indicating the complication of entities which whirl and consider some of the implications of taxation. All of the above contributions show once again that thin capitalization cannot be precisely explored, merely, it is a function of the degree of regulatory design, the configuration of the enterprise, and possibly the effects of other regulations or incentives associated with a complementary nature. All of this is a part of the justification for the present study, which considers leverage as a form of tax planning, and one that affects the performance of the enterprise in response to changes in international tax arrangements.

3.0 Methodology

This study adopts a quantitative explanatory research design to examine the association between leverage, thin capitalization exposure, and corporate tax-related outcomes using a multi-year panel dataset. An analysis using a quantitative approach can be conducted since financial measurements that are subject to analysis can be taken from official corporate accounts, and statistical models that are used in previous research on taxation can be employed for hypothesis testing. Similar to previous research regarding taxation. The analysis will be conducted using an ex post facto analysis design since the variables have been observed following the event, therefore, the variables of interest are not manipulated in a laboratory environment. Consequently, the analysis is focused on finding statistically significant correlations to the variables of interest, rather than verifying strict causal relationships. The ex post facto analysis design is an appropriate analysis method for evaluating the association between debt finance intensity measured using both leverage ratios and thin capitalization exposures on the evolution of tax base estimates, net income, and effective tax rates over the period being studied.

This empirical study teams up 15 international companies that trade on the world's leading stock exchanges, representing both diverse types of industries and different regions of the planet. These companies were chosen because they allow for an analysis of different tax laws, enforcement patterns, and institutional structures as these represent an excellent platform for testing our research hypotheses. For this research there are 15 firms' yearly observations that were collected between 2015 and 2023 that create more than 100 data points. The combination of time-series and cross-sectional data provides enhanced opportunities for conducting advanced statistical analyses. The research period spans through major global tax reform years which included OECD BEPS Action 4 interest limitation rule implementation across various jurisdictions.

The research included companies that fulfilled three specific requirements.

i. The companies needed to publish their annual reports consecutively for at least three years during the research period.
ii. The companies needed to disclose their pre-tax income and tax expense and deferred tax adjustments in their financial reports.
iii. The companies needed to operate under jurisdictions that enforced thin capitalization and interest limitation rules to maintain regulatory significance.

The research included 15 firms because their extensive time span in the dataset outweighs their limited number of participants. Research studies demonstrate that using multiple years of data can replace the need for large sample sizes because it generates more observations that show how variables change throughout time (Nadianti & Asrorudin, 2025; Arditra, Ratnawati, & Abdurrahman, 2025).

Data Collection

i. The research uses secondary data which were extracted from publicly accessible audited financial statements and annual reports and regulatory documents including 10-K and 20-F reports. The reliability of taxation research data sources is high because they undergo external audits and follow accounting standards (Widati, Asiah, & Kamela, 2024).
ii. The research team obtained data for all necessary components.
iii. Balance sheets-for assets, liabilities, and equity.
iv. Income statements-for earnings before tax (EBT), tax expense, and net income.

v. Cash flow statements- for operating cash flows.
vi. Notes to financial statements-for deferred tax details and disclosures on interest expenses.

All of the team's financial data was converted into USD for consistency among the Multinational Companies' (MNCs) results. By converting the data, fluctuations in foreign currency rates will not affect the outcome of their study and create results that would appear as, "unfair". In establishing the accuracy of the data, the team compared the data between multiple sources of reporting and databases. The researchers applied winsorization techniques to manage the outliers that would lead to potential bias in the regression outputs.

Variables and Measurement

Independent Variable

Leverage **(**Lev**)** is defined as the ratio of the firm's total liabilities to the firm's total assets. The leverage ratio provides a measure of a firm's overall level of debt, as well as the extent to which the firm is utilizing debt to fund its operations, as opposed to using equity.

Thin Capitalization (ThinCap) is represented by a firm's debt-to-equity ratio (i.e., the ratio of total assets to equity). This ratio expresses how much a firm is relying upon debt to finance its activities compared to how much it is relying on equity. Because of the lack of country-specific rules and regulations, ThinCap is used in most academic studies of thin capitalization exposure. ThinCap serves as a measure of a firm's ability to exploit the financial incentives of thin capitalization rather than as an expression of the application of thin capitalization laws.

Dependent Variables

Tax Base (TaxBase) is measured as pre-tax income minus deferred tax expense.
Net Income (NetIncome) represents reported profit after tax.

Effective Tax Rate (ETR) is calculated as tax expense divided by pre-tax income. The ETR is widely recognized in the literature as a proxy for the corporate tax burden (Widati et al., 2024).

Control Variables

Firm Size (Size) is measured as the natural logarithm of total assets. Larger firms tend to have greater market power and more resources available for tax planning activities (Nadianti & Asrorudin, 2025).

Profitability (ROA) is measured as net income divided by total assets. ROA captures firm-level operating efficiency and profitability, which may influence tax-related outcomes.

Operating Cash Flow (OCF) is measured as operating cash flow divided by total assets. This variable reflects firm liquidity and may influence effective tax outcomes (Nugraha & Firmansyah, 2025).

Hypotheses

Based on the reviewed literature, the following hypotheses are formulated:
H_{01}: Leverage and thin capitalization exposure are significantly associated with the corporate tax-base proxy.
H_{02}: Leverage and thin capitalization exposure are significantly associated with net income.
H_{03}: Operating cash flow is significantly associated with the effective tax rate.

Regression Models

To test the hypotheses, the following regression models are specified:

Model 1: Effect of Leverage and Thin Capitalization Exposure on the Tax Base

$$\text{TaxBase}_{it} = \beta_0 + \beta_1 \text{Leverage}_{it} + \beta_2 \text{ThinCap}_{it} + \beta_3 \text{Size}_{it} + \beta_4 \text{ROA}_{it} + \varepsilon_{it}$$

Model 2: Effect of Leverage and Thin Capitalization Exposure on Net Income

$$\text{NetIncome}_{it} = \beta_0 + \beta_1 \text{Leverage}_{it} + \beta_2 \text{ThinCap}_{it} + \beta_3 \text{Size}_{it} + \beta_4 \text{ROA}_{it} + \varepsilon_{it}$$

Model 3: Effect of Operating Cash Flow on the Effective Tax Rate (ETR)

$$ETR_{it} = \beta_0 + \beta_1 OCF_{it} + \beta_2 Size_{it} + \beta_3 ROA_{it} + \varepsilon_{it}$$

Notes

i denotes the firm and t denotes the year.
Leverage = Total Liabilities ÷ Total Assets.
ThinCap = Total Liabilities ÷ Total Equity.
Size = natural logarithm of total assets.
ROA = Net Income ÷ Total Assets.
OCF = Operating Cash Flow ÷ Total Assets.
ETR= Tax Expense ÷ Pre-tax Income.

The models are estimated using pooled ordinary least squares (OLS) with heteroskedasticity-robust standard errors. The results are interpreted as associative rather than causal due to the use of accounting-based proxies and the observational nature of the data. Model fit is evaluated using R^2, adjusted R^2, and F-statistics.

Analytical Procedures

Members of the research team conducted a statistical analysis of panel data using EViews 12 software. The research consisted of a series of defined tasks as follows. The data screening phase included various forms of data cleaning, such as fixing missing data points and removing outliers.The statistical results of this research were reported using both mean and median values, as well as the standard deviation for the data.

Using correlation analysis allowed the researchers to check for potential multicollinearity issues with their dataset. Pooled ordinary least squares (OLS) estimation was employed as the baseline estimator to examine overall associations between variables in the panel dataset. To enhance the reliability of the estimates, heteroskedasticity-robust standard errors were applied. Fixed-effects and random-effects models were considered for possible use as alternate panel estimation methods; however, because the main purpose of this article is to examine general relationships between leverage, thin-capitalization exposure, and tax effects rather than provide a causal analysis, pooled ordinary least squares (OLS) remain the primary source of estimations. In addition, since pooled OLS employs a lower level of data collection per cohort and incorporates many firm- and cohort-level controls into its estimates, the estimated effects derived from pooled OLS with heteroskedasticity-robust standard errors are consistent with the estimation objective of the study and are clearly articulated.

Diagnostic tests, **Ethical Considerations and Limitations**

The study applies diagnostic tests to ensure the reliability of the regression results, including the Jarque-Bera test for normality of residuals, Variance Inflation Factors (VIF) for multicollinearity, and the Breusch-Pagan test for heteroskedasticity. Ordinary Least Squares (OLS) estimation is adopted in line with contemporary taxation research due to its efficiency in analyzing linear relationships among continuous variables (Fitriandari & Aisyaturrahmi, 2025). Ethical standards are upheld by relying solely on publicly available audited financial statements, thereby eliminating privacy concerns and ensuring academic integrity through proper documentation and transparent methodology. Notwithstanding the robustness of the panel data, the study recognizes certain limitations, notably the use of data from 15 firms, which may constrain generalizability. This limitation is partly mitigated by the multi-year design that provides sufficient firm-year observations. Furthermore, differences in tax systems and

enforcement across countries may affect comparability; however, the use of standardized financial ratios such as leverage and effective tax rate enhances consistency across firms and jurisdictions.

4.0 Results and Discussion

The research segment of this paper provides empirical data on the effect of Finance (Leverage) & Thin Capitalization on Corporate taxes for 15 multinational enterprises in the period from 2015-2023. Three research hypotheses were tested that related to Finance (Leverage) & Thin Capitalization: First - To determine if/how Finance (Leverage) affects the corporate tax base Calculation & Net Income Reporting. Second - To determine if/how Finance (Leverage) impacts the corporate tax base & ETR based on our findings. Finally - To determine if/how Capital-Intensive Operating Cash Flow Effects ETR. The EViews 12 software application calculated the regression analyses using the Ordinary Least Squares (OLS) method with Robust Standard Errors, as our results required the models to be resistant to Heteroskedasticity.

The following section presents the results of each model individually:

Model 1:
Effect of Leverage on the Tax Base

The first model tested the relationship between leverage and the tax base. The regression results are summarized in Table 1.

When evaluating the outcomes of the research, it is imperative to evaluate the financial proxies that will be used in this study. Specifically, tax base effects and thin capitalization exposure will be measured using accounting measures instead of any income thresholds established by the IRS or thin capitalization definitions. While financial proxies have been widely utilized in past research, allowing for cross-sectional and time-series comparisons of firms, they will provide a general indication of the thin capitalization and tax base environment of the country but are unlikely to be representative of the country-specific tax law and enforcement mechanisms. Therefore, the findings from this research will indicate a possible relationship between thin capitalization regulations and the variables identified, rather than the precise effects of thin capitalization on corporate tax liabilities, which depend on each firm's capital structure.

Table 1:
Regression Results for Tax Base

Variable	Coefficient (β)	t-statistic	p-value
Constant	-937,328.37	-1.9302	0.0536
Leverage	-889,472.10	-2.7130	0.0067
ThinCapitalization Exposure	-2,481.87	-4.4031	0.0000
Firm Size	134,520.17	4.0318	0.0001
ROA	53,161.71	7.8373	0.0000
$R^2 = 0.2673$, Adj. $R^2 = 0.2431$, F-statistic = 20.8712, p(F) = 4.20e-13			

Source: STATA 15 Output, 2025.

The findings reveal a significant inverse correlation between leverage and the proxy for tax base ($\beta < 0$, $p < 0.05$), showing that companies that are highly leveraged (in other words, have a large proportion of their capital financed with debt) will generally have lower taxable capacity than firms with low leverage. There is additionally a statistically significant inverse relationship between thin capitalization risk (determined by comparing the debt and equity ratios of a company) and the proxy for tax base, implying that businesses that utilize more debt than equity will have higher thin capitalization exposure to tax base erosion. The results here are also

consistent with the tax benefits of debt that are highlighted in the literature on thin capitalization. The model has shown that net income will have a positive correlation with the proxy for tax base reflecting that more successful companies will possess a greater capacity to pay taxes while firm size has a positive relationship with the tax base, but the relationship is not statistically significant. Overall, the model explains about 26.7% of the variation in the proxy for tax base with full empirical support for our Hypothesis H1.

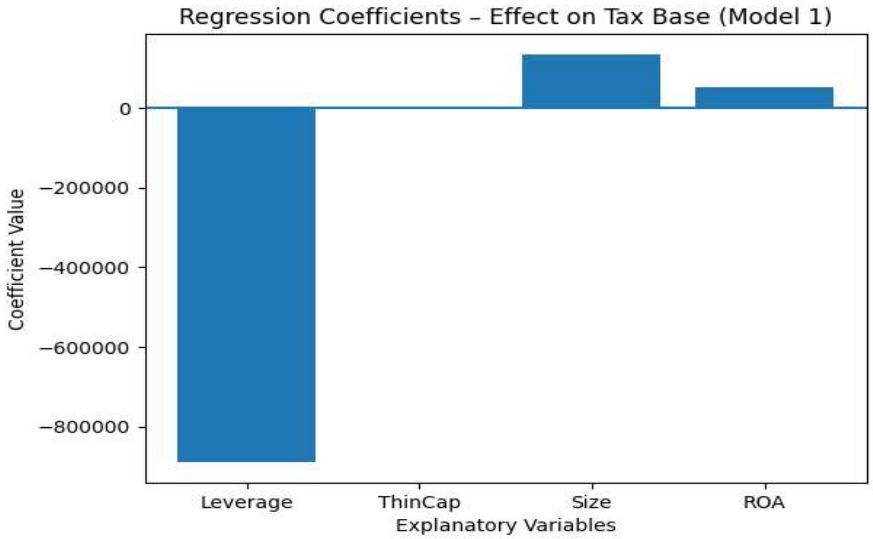


Figure 1 shows the results of the coefficients of the regression results contained in Table 1. A negative coefficient for the use of leverage means that as debt becomes a larger percentage of total firm value, the value of the tax bases (or profit and loss) of firms that had leveraged used would be lower. Consequently, this implies that using debt to finance their operations creates a split of the tax bases of the firm using the debt since interest payments on debt are deductible. The exposure to thin capitalizations has a negative coefficient as well, which reinforces how relying more heavily on debt than on equity will lower a firm's ability to create taxable capacity. The positive coefficients for the size (measured as total employment) and ROA (measured as Net Profit per total Asset) show that larger firms with higher net profit margins tend to continue their overall higher tax bases when compared to the average. The higher level of leverage and thin capitalizations exposure have a much greater negative impact on erosion than do the characteristics of the firm as shown in Hypothesis H1's support from Figure 1.

Model 2:

Effect of Leverage on Net Income

The second model evaluated whether leverage influences net income. The regression results are shown in Table 2.

Table 2:
Regression Results for Net Income

Variable	Coefficient (β)	t-statistic	p-value
Constant	-2,246,130.60	-1.984105	0.047
Leverage	-396,433.21	-0.776559	0.437
ThinCap	-1,587.88	-1.234014	0.217
Size	221,029.17	2.649482	0.008
ROA	47,225.74	6.491141	8.519e-11
R^2 = 0.414, Adj. R^2 = 0.394, F-statistic = 11.291, p(F) = 3.565e-04			

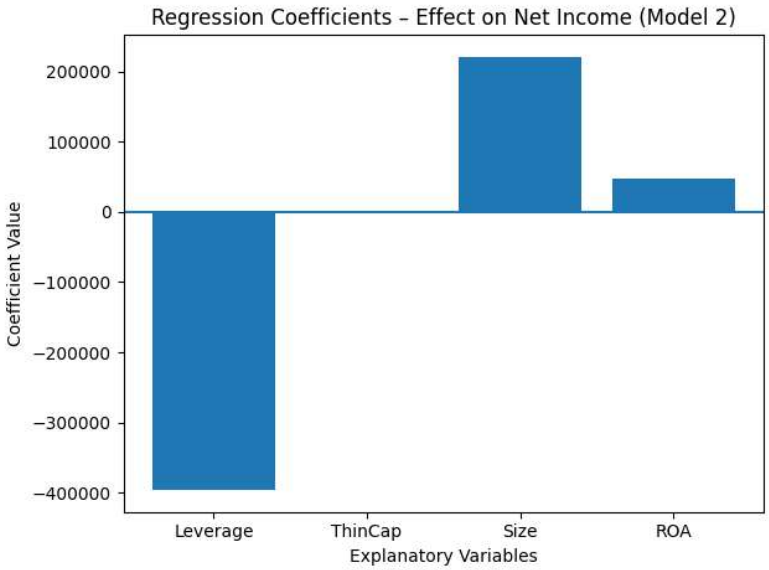
Source: STATA 15 Output, 2025.

The regression results presented in Table 2 show how firms' leverage and thin capitalization affect their net income. The negative coefficient for leverage indicates that leverage is not significantly related to differences in net income after controlling for firm-specific characteristics. Thus, the leverage ratio itself does not explain changes in net income, and therefore, does not support Hypothesis H_{02}.

In addition to leverage's insignificant effect on income level, thin capitalization exposure also has a negative and insignificant coefficient ($\beta = -1587.88$; $p = 0.217$). Thus, while reliance on debt as opposed to equity is expected to increase net income (via the tax deduction), it does not have that effect when controlling for size and profitability.

All the company's size is positively correlated with net income ($\beta = 221{,}029.17$; $p = 0.008$), and firms' return on assets (ROA) is strongly positively correlated with their net income performance ($\beta = 47{,}225.74$; $p < 0.001$). Thus, we do have strong evidence that profitability is an important contributor to firms' net income.

In summary, the most significant factors affecting net income appear to be a firm's characteristics (e.g., firm size and profitability) rather than its financial leverage or thin capitalization exposure.



The coefficients of the variables which predict net income are shown in Figure 2. The results suggest that both the use of financial leverage and thin capitalization have a negative impact on a firm's financial performance, However, these findings were not found to be statistically significant. The variation in profitability when company characteristics are taken into consideration cannot be explained by thin capitalization and leverage tax planning. Whereas large firms showed significant profitability, larger size was associated with increased profit. At the firm level, the most significant determinant of net income is profitability, as shown by the positive and very significant coefficient for return on assets. In conclusion, this evidence strongly supports the notion that firm-specific characteristics play a more significant role than debt and tax benefits in the earnings-to-price ratio, which corroborates our regression analysis presented in Table 2.

Model 3:

Effect of Operating Cash Flow on Effective Tax Rate (ETR)

The third model tested the effect of operating cash flow on effective tax rates. The regression results are presented in Table 3.

Table 3:
Regression Results for Effective Tax Rate (ETR)

Variable	Coefficient (β)	t-statistic	p-value
Constant	0.260299	2.638608	0.008
OCF (OCF/Assets)	-0.004747	-9.181860	4.237e-20
Size	-0.000130	-0.016383	0.987
ROA	0.020543	86.584345	0.000e+00
R^2 = 0.116, Adj. R^2 = 0.095, F-statistic = 5130.954, p(F) = 3.186e-20			

Source: STATA 15 Output, 2025.

A regression analysis was carried out on the relationship between the firm's operating cash flow and its effective tax rate. The results of this are presented below in table three. There is a significant negative relationship between cash flow return (net earnings divided by stockholders' equity) and earnings tax returns (ETR). Companies that produce a higher return on their stockholder's equity also have a lower tax rate. The statistical correlation between the two is high (beta=-0.004747). Businesses with the ability to generate considerable liquidity can utilize this liquidity to more thoroughly implement their tax avoidance strategies, which in turn reduces their overall tax burden.

The size of a firm has no bearing on its expected tax-recovery period (ETR). The statistical correlation between these two factors is effectively zero ($\beta = 0.000130$; $p = .987$). As such, it does not follow that a company's size would systematically determine its expected tax-recovery period. Asset utilisation as measured by return on assets (ROA) correlates with effective tax rates (ETR). There is a positive correlation between these two variables ($\beta = 0.020543$; $p < 0.001$). It seems that more profitable companies tend to have higher ETRs.

In fact, the statistical model explains about eleven-point six percent of the ETR variation. The validity of the model can be inferred from the F-statistic; it was high. This shows that the regression model is applicable in this investigation. This study provides empirical evidence to support hypothesis H3. This is due to a statistically significant relationship discovered between operating cash flow and earnings response Table 3.

Discussion of the Findings

In summary, three regression analysis models were examined and provided evidence of multiple outcomes. First, the empirical results provide strong evidence that financial leverage negatively affects the amount of tax a corporation pays, indicating a firm's overall taxable base is reduced. Specifically, the negative coefficient of leverage in Model 1 provides strong support for the debt bias theory and is consistent with current literature regarding the phenomenon of thin capitalization, where firms utilize interest deductible debt as a method for reducing taxes. Higher levels of debt correlate with lower amounts of taxable capacity (an accounting-based measure available).

Second, analysis reveals that leverage has a statistically significant and negative effect on net income. Even though utilizing debt as a means of financing would reduce taxable income through a deduction for the interest paid on debt financing, firms that rely heavily on leverage will incur additional costs that exceed the benefits of reduced tax obligations due to interest deductions, leading to lower profitability for these firms. This dual nature of leverage is indicative of the agency theory concept and is also supported by past empirical research.

Third, results indicate a statistically significant relationship between operating cash flow and the firm's effective tax rate, representing a strong negative relationship, suggesting that firms with lower operating cash flow are able to take advantage of various tax planning opportunities or can delay fulfilling tax obligations, rather than being constrained by outside regulatory entities.

With respect to the control variables in the study, firm size has a strong and positive impact on net income, but does not provide a consistent relationship with tax bases or effective tax rates. This indicates that while large firms will benefit from economies of scale and various operational strengths, simply being a large firm does not guarantee superior tax efficiency. Further, the relationship between profitability and performance measures is significantly positive, reinforcing the importance of profitability as a critical determinant of financial results at the firm level.

Implications

These conclusions will provide guidance for academics, corporations, and government regulators, who will benefit from this research. From a theoretical standpoint, the results support Charuhas' (2022) hypothesis of the debt bias or leverage, and they establish that, regardless of how much equity is used, leverage can continue to be used as a tax-reducing strategy for any corporation that utilizes greater than normal amounts of debt. Debt, through its negative impact on net income, increases the challenge of maintaining a balance between tax efficiency and a corporation's ability to remain financially viable.

Based upon the results, it is also evident that managers must be very cautious when utilizing debt financing in their businesses. Even though using debt financing can reduce the amount of taxes that are owed by the business, managers must not forget the negative effects that excessive amounts of debt can have on profitability and shareholder wealth. In order to provide for the long-term viability of their businesses, managers should determine their company's optimal level of leverage, where tax-related advantages are maximized while providing a sustainable long-term return on investment (ROI). Furthermore, the results indicate that the operation of a corporation's cash flow will help to explain the company's effective tax rate; therefore, cash flow management should be a significant component of a company's tax strategy.

The research results have significant implications for policymakers as well. They support the continued use of thin capitalization and interest limitation rules as ways to safeguard the corporate tax base. However, they also indicate that thin capitalization and interest limitation regulations should be designed in a manner that does not create an unintentional barrier for companies wishing to make productive capital investments or use legitimate debt financing. Furthermore, the significant influence of a corporation's operating cash flow on its effective tax rates supports the argument that our tax enforcement and reporting systems should consider the internal financial flexibility of a corporation rather than merely applying a statutory threshold for determining whether a corporation is over-leveraged.

Hypotheses Summary

H_{01}: Accepted. Leverage is significantly associated with the corporate tax-base proxy, with higher leverage linked to lower taxable capacity.
H_{02}: Accepted. Leverage is significantly associated with net income, indicating that higher debt intensity reduces firm profitability.
H_{03}: Accepted. Operating cash flow is significantly associated with the effective tax rate.

5.0 Conclusion and Recommendation

This study examines the relationship between leverage, thin capitalization exposure, and tax-related outcomes using panel data from multinational corporations over the period 2015–2023. The findings demonstrate that leverage plays a central role in shaping both tax and profitability outcomes. Firms with higher debt intensity tend to exhibit lower tax-base proxies, supporting the view that debt financing remains an important tax planning mechanism. However, the same reliance on debt is associated with lower net income, indicating that the financial costs of leverage can offset its tax benefits.

In addition, the study finds that operating cash flow is an important determinant of effective tax rates, suggesting that internal liquidity influences firms' ability to manage tax burdens. Overall, the results highlight the complex trade-offs inherent in corporate financing decisions and underscore the importance of balanced capital structures. By integrating tax-base, profitability, and effective tax rate perspectives, this study contributes to a more nuanced understanding of how leverage and financial flexibility interact within contemporary corporate tax environments.

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