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BIBLIOGRAPHIC REVIEW

Capital structure and debt tax shield: literature review and bibliometric analysis

Estructura de capital y escudo fiscal de deuda: revisión de literatura y análisis bibliométrico

Jesús Alexander Pinillos Villamizar[1], Hugo Macías Cardona[2], Luis Fernando Castrillon[3]

[1]Universidad Libre Seccional Cúcuta, Facultad de Ciencias Económicas, Administrativas y Contables. San José de Cúcuta, Colombia.
[2]Universidad de Medellín, Facultad de Ciencias Económicas y Administrativas. Medellín, Colombia.
[3]Universidad de Medellín, Facultad de Ciencias Sociales y Humanas. Medellín, Colombia.

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Corresponding Author: Jesús Alexander Pinillos Villamizar

ABSTRACT

Introduction: this study presents a bibliometric analysis and literature review focused on identifying publications, key themes, and recent trends in frontier research related to capital structure and the debt tax shield. The aim is to explore how the academic field has evolved over time and highlight the most influential works and recurring topics.
Method: the study analyzed 33 documents indexed in Scopus, published between 1978 and 2023. A bibliometric approach was used to determine publication patterns, countries of origin, journal prominence, and citation metrics.
Results: the bibliometric analysis revealed that the United States accounts for the highest number of studies. Journals such as Applied Financial Economics and Investment Management and Financial Innovations lead in publication volume but not in citation count. The main themes explored by the authors include corporate debt policies, optimal capital structure, valuation of tax shields, trade-off and pecking order theories, corporate social responsibility, and profitability. Key research trends focus on evaluating factors such as debt levels, tax rates, credit risk, and future fiscal policies and their impact on the value of the tax shield. Additionally, recent works analyze the effects of events such as the COVID-19 crisis on leverage strategies and capital structure, as well as the integration of modern models—such as compensation and information asymmetry-based pecking order—with traditional theories.
Conclusions: the literature demonstrates a growing interest in understanding the interplay between tax factors and corporate financing decisions, especially in light of evolving economic contexts and theoretical frameworks. The field continues to expand through the incorporation of new models and empirical evidence, signaling opportunities for future research in this area.

Keywords: Capital Structure; Interest; Tax Shields; Corporate Taxes.

RESUMEN

Introducción: este estudio aborda la literatura de frontera sobre la relación entre la estructura de capital y el escudo fiscal de la deuda. Su objetivo es identificar las publicaciones más relevantes, los principales temas abordados y las tendencias recientes en este campo de investigación.
Método: se realizó un análisis bibliométrico y una revisión de literatura con base en 33 documentos extraídos de la base de datos Scopus, publicados entre 1978 y 2023. Se analizaron variables como países de origen de los estudios, revistas académicas, temas abordados y evolución temporal de la producción científica.
Resultados: la mayor parte de los estudios provienen de Estados Unidos. Las revistas Applied Financial

Economics e Investment Management and Financial Innovations son las que más artículos han publicado sobre el tema, aunque no son las más citadas. Los temas recurrentes incluyen políticas de deuda corporativa, estructura de capital óptima, valoración del escudo fiscal, teorías trade-off y pecking order, responsabilidad social corporativa y rentabilidad.
Conclusiones: las tendencias actuales se centran en evaluar el impacto de factores como el nivel de endeudamiento, tasas impositivas, riesgo crediticio y políticas futuras sobre el valor del escudo fiscal. Además, se analizan los efectos de eventos como la crisis del COVID-19 en las decisiones financieras corporativas, y se estudia la integración de modelos modernos basados en la asimetría de información con teorías tradicionales sobre estructura de capital.

Palabras clave: Estructura de Capital; Intereses; Escudos Fiscales; Impuestos Corporativos.

INTRODUCTION

In corporate finance, a fundamental issue has captured attention and debate over an extended period. This issue relates to the intersection between the tax deductibility of debt interest in corporate taxation and its ability to act as a primary incentive that significantly influences investment project financing decisions through debt instruments. Although this topic has been the subject of ongoing analysis, its complexity, and relevance have endured in a constantly changing economic environment.

The interaction between capital structure and tax elements is crucial in firms' financial decision-making. Empirical evidence supports the notion that, for example, tax rates influence a firm's financing choices and debt and equity composition. However, despite progress in understanding these dynamics, fundamental questions remain. The relative influence of tax effects compared to other factors and the rationale behind not adopting more aggressive tax optimization strategies remain topics of debate and exploration in tax and finance research. In addition, how taxes affect investors and how this impacts corporate decision-making adds a layer of complexity to the relationship between capital structure and taxes.

The optimal capital structure is essential for companies' efficient financial management and corporate value maximization. However, the choice between equity and debt financing is not a trivial decision, as it directly influences the firm's future direction and its ability to face changing financial challenges in implementing financial strategies to make decisions aimed at efficiency and the best use of resources.[1]

The determinants of capital structure serve as solid pillars that provide strategies for an organization's competitive advantage.[2] The factors that determine the financial mix of an organization are dynamic, firm-specific, and depend on the industry to which it belongs and the firm's micro and macroeconomic environment. Consequently, the financial mix is an increasingly crucial and challenging strategic decision. Investment and financing decisions are mutually interrelated. Investment in profitable avenues requires money and, therefore, changes in financial structure by restructuring the proportion of alternative sources of finance.[3]

Therefore, an optimal capital structure is required to maximize the firm's value. A firm planning to venture into a new project or upgrade its existing technology should finance the project to minimize its cost of capital. By doing so, the firm indirectly aims to increase profitability for its shareholders. The basic objective of a firm is the maximization of shareholder wealth, which will positively influence the firm's value.[3]

However, when it comes to capital structure, different elements called determinants are widely studied in the literature. In recent years, two studies oriented towards investigating the determinants of capital structure through review works, in which scenarios of future directions for the development of research are also proposed, have been uncovered.

Capital structure is approached by stating that it is an existing and broad area of the discipline, which touches all sectors of the economy with its extreme relevance and that its importance cannot be limited to empirical analysis and the study of financial data but by knowing its importance, they attempt to highlight its characteristics, the areas covered by the countries in which the studies were developed, its relationship with the determinants and its evolution.[4]

Other authors [3] reviewed the research on capital structure determinants, highlighting the main gaps in the literature and posing some specific questions for future research. In their evaluation, they included some criteria, such as the year of publication and region, level of economic development, firm size, data collection methods, data analysis techniques, and theoretical models of capital structure.

Specifically, this paper is concerned, along the same lines as the work noted above,[4,5] with capital structure and its relationship to a determinant that influences the shaping of investment and financing decisions in business organizations: the debt interest tax shield. A tax shield is a reduction in taxable income for an individual or corporation that is achieved by claiming allowable deductions, such as mortgage interest, medical expenses, charitable donations, depreciation, and amortization. These deductions reduce taxpayers' taxable income for

a given year or defer income taxes to future years. Unlike dividends and capital gains, interest expense is tax-deductible; therefore, the tax shield (a benefit of debt financing over equity financing) is an essential factor influencing the choice of a company's capital structure.[6]

This article is divided into six sections. Section two describes the materials and methods used. Section three provides the research results. Section four provides details of the main approaches in the literature on capital structure and debt tax shields. Finally, section five presents the discussion, and section six presents the conclusions, suggesting areas for future research.

METHOD

This study is based on a bibliometric analysis and literature review to identify and synthesize relevant studies from the existing literature related to capital structure and debt shields published between 1978 and 2023 (the search was conducted in early March 2024). A systematic literature review should specify the eligibility criteria of the papers, which should be consistent with the purpose of the research, and the methods of searching for papers should be made explicit to present transparent and reliable results to draw conclusions and support decisions.[7]

This work follows the criteria of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA). This guideline is divided into four phases: identification, selection, eligibility, and inclusion.[8] The PRISMA statement suggests authors should report their search strategies in all databases, registries, or websites.[9] The first phase comprises identification and selection; the second comprises selection, eligibility, and inclusion.

The first phase involves identifying and establishing the number of records located through database searches. The Scopus database searched for papers that included capital structure and tax shield in their title, abstract, or keywords. The objective was to identify the existing literature on this topic published over the years, including articles and literature reviews. To this end, a search for documents was carried out in the Scopus database using the following search equation: (TITLE ('capital structure') AND TITLE-ABS-KEY ('tax shield') AND NOT TITLE-ABS-KEY ('Debt tax shield')) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, 're'))), obtaining 48 documents. The search equation was not limited in time, meaning there were no restrictions in this sense. Subsequently, applying inclusion criteria to the 48 papers, 33 were obtained, representing 68,75 % of the initial search, as shown in figure 1. The documents obtained represent a relevant contribution to the scientific production of the research topic and reflect the primary research on capital structure and tax shields for debt interest payments.

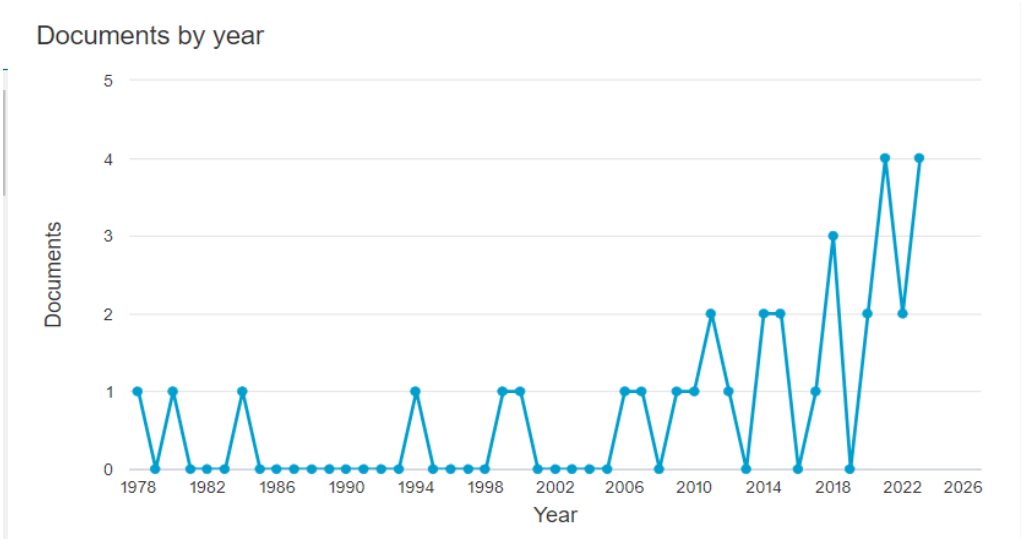

Figure 1. Papers published in Scopus on capital structure and debt interest tax shield

The analysis of authors, institutional affiliation, and countries/territories indicates the geographical location and institutions that concentrate on the scientific production of the research topic. The thematic areas establish the focus of the publications on capital structure and debt tax shield and clarify how this topic is addressed in the literature. The journals and authors with the highest number of published papers allow us to identify the recommended sources for publication and the papers with the highest impact. The main research topics and concepts are identified through the keywords of the collected documents, and the co-occurrence of these concepts is established through clusters generated with the VOSviewer software, identifying research nodes in each cluster through the size of their corresponding spheres.

RESULTS

The results of the bibliometric analysis indicate that the author with the most significant research contributions to the relationship between capital structure and debt tax shield is Haron, R.[5] (Kuala Lumpur, Malaysia), who provided two papers, one in the year 2018 and one in the year 2021.

Of the authors involved in this field, Haron R., Nomran N.M, Abdullah Othman A., Md Husin M, and Sharofiddin A. are identified as co-authors, reflecting cooperation between Asian institutions such as the Institute of Islamic Banking and Finance, IIUM, Malaysia, Institute of Islamic Banking and Finance, International Islamic University Malaysia, Kuala Lumpur, Malaysia and Department of Finance and Accounting, College of Business Administration, Kingdom University, Riffa, Bahrain.[5,10]

Table 1 corroborates this information and shows the primary institutional affiliations and the institutions with the highest scientific output on the research topic. In this sense, the International Islamic University Malaysia (Gombak, Malaysia) participates in 3,33 % of the publications,[5,10] and in second place is The University of Auckland (Auckland, New Zealand), which engages in 3,33 % of the publications,[9] where prominent authors such as Liang J., Li L.F., Song H.-S., Jou J.-B. and Lee T. Likewise, among the institutions contributing two papers is the Institute of Islamic Banking and Finance (Karachi, Pakistan).[5,10] Thus, the critical contribution of Asian universities to the field of research is noteworthy

Table 1. Leading affiliations

Affiliation	Documents	%
International Islamic University Malaysia	2	3,33
The University of Auckland	2	3,33
Institute of Islamic Banking and Finance	2	3,33

Table 2 corroborates this information, showing that Malaysia is in second place, accounting for 8,89 % of the documents, while the United States leads with US institutions accounting for 13,33 % of the papers published. Thus, the United States has the highest document production; however, this production is not concentrated in a few institutions or authors. The US institutions that contribute are University of California (Los Angeles), University of Wisconsin Business School (Madison), Forisk Consulting (Augusta), School of Business Administration, Winthrop University (Rock Hill), Washburn University School of Business (Topeka) and School of Management, Case Western Reserve University (Cleveland). Among the topics on which the US research focuses is the relationship between operational flexibility, capital structure, and investment decisions in firms, how financial decisions impact manufacturing technologies, the value of corporate debt, and optimal capital structure. In addition, it investigates the effect of flexibility on firm value, investment strategies, and innovation.[11]

Table 2. Scientific contribution by country

Country	Documents	%
United States	6	13,33
Malaysia	4	8,89
China	3	6,67
New Zealand	3	6,67
United Kingdom	3	6,67
Canada	2	4,44
Czech Republic	2	4,44
Saudi Arabia	2	4,44
Taiwan	2	4,44
United States	2	4,44

Table 3 shows that the two most dominant thematic areas of research on capital structure and debt interest tax shields are Business, Management and Accounting and Economics, Econometrics and Finance each with 21 related papers and with a share of 35,59 % of the total areas. In Social Sciences, the third most researched area, focuses on the determinants of capital structure and its impact on firm performance in various industries and countries, with a specific focus on the manufacturing industry.

In terms of publication sources, the leading journal in terms of the number of papers published is Applied

Financial Economics, accounting for 9,09 % of the articles published on the research topic, followed by Investment Management And Financial Innovations, which accounts for 6,06 % of the articles.

Table 3. Most recurrent thematic areas in the research theme

Thematic area	Documents	%	% Accumulated
Business, Management and Accounting	21	35,59	35,59
Economics, Econometrics and Finance	21	35,59	71,19
Social Sciences	7	11,86	83,05
Decision Sciences	4	6,78	89,83
Environmental Sciences	2	3,39	93,22
Agricultural and Biological Sciences	1	1,69	94,92
Computer Science	1	1,69	96,61
Engineering	1	1,69	98,31
Pharmacology, Toxicology and Pharmaceuticals	1	1,69	100,00

Table 4. Publication sources with the highest number of documents published

Source	Documents	%	Source type	Index h	Quartile
Applied Financial Economics	3	9,09	Journal		Q3
Investment Management And Financial Innovations	2	6,06	Journal	25	Q3

Of the main topics addressed in the articles considered in the literature review, the determinants of capital structure and tax shields stand out as the central theme and concepts used in the search equation. Figure 2 shows that the topics of corporate taxation, the role of CEOs, and corporate social responsibility also stand out, as addressed in 6 papers (18,18 %). Much of the discussion on capital structure and the debt tax shield focuses on the analysis of the determinants of capital structure, corporate debt policy, the relationship between senior management experience and capital structure decisions, the impact of corporate income tax on companies' choice of capital structure, the valuation of tax shields over interest in the presence of risky debt in the capital structure decision, and the influence of free cash flow, risk, growth, cost of debt, tax shields and cost of financial distress in determining the optimal capital structure for different types of firms.

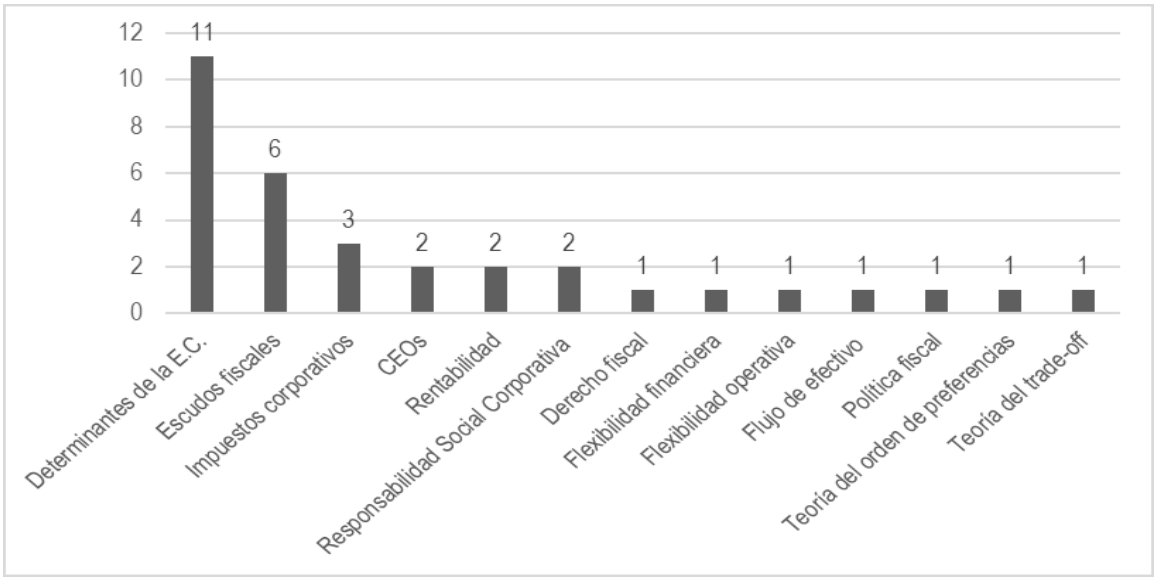

Figure 2. Main issues addressed in the literature

The association of these concepts is illustrated in fgure 3 which details the co-occurrence analysis of concepts and keywords across three clusters focusing on capital structure. The findings of the co-occurrence analysis allowed the identification of the concepts central to the relationship between capital structure and debt interest tax shield. For this purpose, the input database was prepared in advance by collecting keywords

from the documents. Accordingly, the VOSviewer software was configured with the following parameters: type of analysis: co-occurrence; counting method: full count; unit of analysis: all keywords. Of the 33 documents analysed, 11 keywords were obtained (minimum number of occurrences of a keyword: 3). Thus, using the data on total link strength and occurrence between keywords (table 5), three clusters of scientific areas and topics were identified. The clusters were named according to the main keyword with the highest total link strength and occurrence.

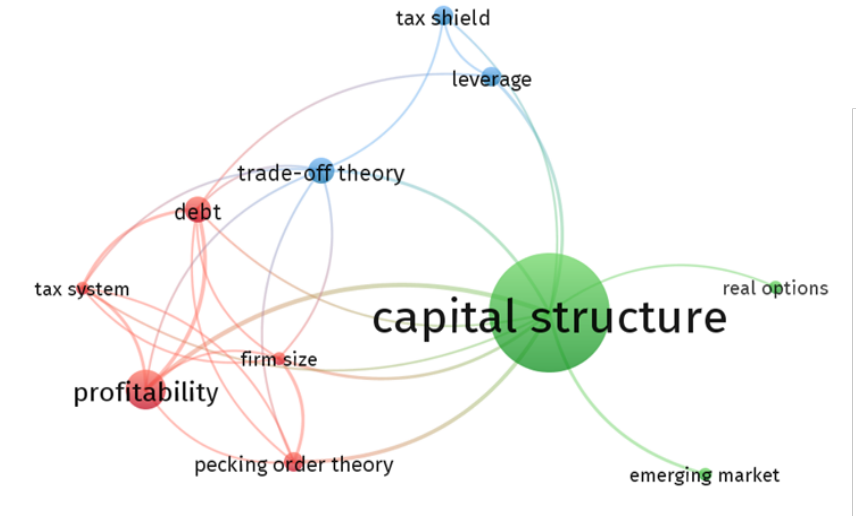

Figure 3. Analysis of co-occurrence of concepts and keywords

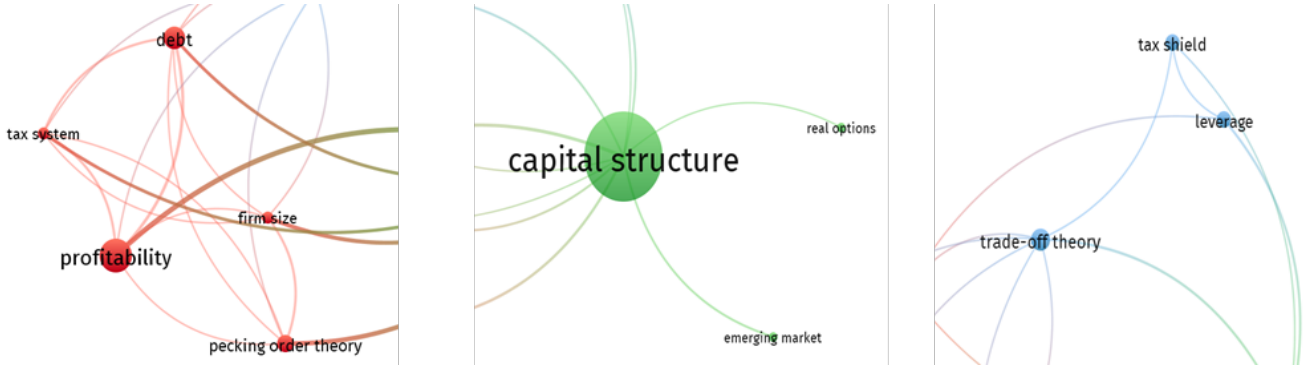

Figure 4. (a) Group 1: red; (b) Group 2: green; (c) Group 3: blue; (Vos viewer)

Table 5. Co-occurrence analysis findings

Keyword elements	
Number of groups: 3	
Group	**Group Keywords**
Group 1	Debt Firm size Rank order theory Profitability
Group 2	Capital structure Emerging market Real options
Group 3	Leverage Tax shield Offsetting theory

Main approaches in the literature on capital structure and interest tax shields

Capital structure and its determinants

The main research work on capital structure originates from a well-known article,[15] which has led to the

emergence of several theories on capital structure over the last five decades. Researchers, in general, tend to have different perspectives on capital structure.[3]

Table 6. Key research around capital structure

Series	Author	Reference	Author's contribution
1	Modigliani y Miller	[15]	He marked a milestone in corporate finance with his significant contribution by proposing the "Theory of Irrelevance", which holds that the capital structure has no impact on the value of the company.
2	Modigliani y Miller	[16]	He analyzed the impact of the tax shield on interest expense, considering taxes and their effect on capital structure.
3	Kraus y Litzenberger	[17]	Provided the classic version of the "Trade-Off Theory (TOT)," which addresses the trade-off between the cost of financial distress and the benefits of the debt tax shield.
4	Stiglitz	[18]	He developed the pecking order concept and concluded that the leverage ratio is the fortuitous result of a firm's earnings and investment history.
5	Jensen y Meckling	[19]	Introduced the concept of agency cost and introduced the "Agency Cost Theory" to the capital structure literature, analyzing the impact of conflict between managers, shareholders and debt holders on financing decisions.
6	Miller	[20]	Proposed the importance of considering both personal and corporate taxation in making financing decisions.
7	Ross	[21]	Developed the "signaling theory" of capital structure, promoting debt issuance as a positive indicator of a firm's performance compared to equity issuance.
8	Bradley et al.	[22]	Proposed the "static equilibrium theory"
9	Kane et al.	[23]	Introduced the "dynamic equilibrium theory," which expands the trade-off theory by considering the effect of the continuous time model in relation to uncertainty, costs, taxes and tax benefits.
10	Myers y Majluf	[24]	Proposed the "pecking order theory" and emphasized the crucial role of information asymmetry in the selection between internal funds, debt and equity in financing the capital structure.
11	Fischer et al.	[25]	Initiated the concept of transaction cost and demonstrated its impact on leverage within the firm's capital structure.
12	Harris y Raviv	[26]	Initiated the concept of "control-driven theory" after reviewing the literature on capital structure theories and finding that capital structure decisions were inconclusive.
13	Baker y Wurgler	[27]	He introduced the "market moment theory" in the area of capital structure, which predicts the long-term impact of market value fluctuations on capital structure. According to this theory, companies issue equity when the market is overvalued and debt when it is undervalued.
14	Uckar	[28]	He proposed the new concept of "Behavioral element in the capital structure".

Although capital structure is considered an important area where research has sought to produce evidence and new insights on issues affecting firm value, only a handful of papers have reviewed the literature. Harris M et al.[26] provide one of the breakthroughs in reviewing the literature on capital structure. The following is the list of review articles on capital structure in chronological order:

- Harris and Raviv (1991).
- Lugi and Sorín (2009).
- Migló (2010).
- Iqbal et al. (2012).
- Kumar et al. (2017).
- Sisodia and Maheshwari (2022).

A common observation about these reviews Harris et al.[26] is that they are based on capital structure theories. No other chronological, methodological, and thematic approach is incorporated in the literature analysis, as other authors do,[3] as they provided a comprehensive and systematic literature review of reputable journals and potential directions for future research.

The literature focuses on the determinants of financing decisions: profitability, firm size, tangibility, liquidity, firm age, growth, managerial ownership, entrepreneurial ownership, operating cash flow, non-debt

tax shield, debt interest payment tax shield, entrepreneurial risk, bankruptcy, bankruptcy, bankruptcy, agency cost, dividend payout, and managerial skills.

It is argued that firms' capital structure decisions are influenced by both firm and country characteristics, adding that management must understand how these characteristics affect firm value and make appropriate capital structure decisions; firms in emerging countries rely heavily on internally generated funds and face difficulties in obtaining external financing, suggesting the need for government policies that facilitate access to external funding and that firm managers should maximize the benefits of the debt interest tax shield to increase firm value by ensuring adequate funding.[14,29]

In the continued exploration of the determinants of capital structure, there is evidence that growing firms appear to employ a high level of debt, taking advantage of the tax shield as explained by the trade-off theory; firms in Indonesia opt for debt financing. Larger, more profitable firms with high tangible and intangible assets and liquidity levels operating in a highly munificent environment follow the pecking order theory.[5]

Landing the exploration with the most commonly studied variables in the chosen papers, it becomes evident that the relationship between growth and firm age with capital structure varies according to the context and economic environment. In Indonesia, growing firms often opt for higher debt levels to take advantage of the tax shield, which aligns with the trade-off theory, especially in industries with high ownership concentration.[5] However, these same firms tend to reduce their debt when operating in dynamic environments to avoid the risk of bankruptcy.[30] Unlike growth firms, those that are older and more profitable, with significant tangible and intangible assets and high liquidity, follow the pecking order theory, prioritizing internal financing before resorting to debt.[5] This pattern suggests that firm age influences their preference for internal resources over debt, particularly in emerging markets such as Indonesia.

In contrast, a study of the energy sector in a developing country reveals that firm growth does not significantly impact capital structure. At the same time, other factors, such as size and profitability, are relevant.[10] In the Czech context, firms prefer internal financing over debt, aligning with the pecking order theory, and firm age and asset growth are considered less influential than tangibility and return on assets.[31] In an Islamic financial environment, where the tax shield is irrelevant, banks' capital structure is based on their size and the market value/book value of their shares, highlighting the influence of the economic context on financial decision-making.[32] These studies reflect how environment and sector-specific characteristics can modify the relationship between growth, firm age, and firm capital structure.

In the capital structure literature, the variable 'tax shields' shows varying effects depending on the economic context and regulatory environment in which firms operate. We examined firms in Malaysia and found that tax shields negatively and significantly impact debt measures. Suggesting that, despite the trade-off theory, which predicts that firms will use debt to benefit from tax advantages, in practice, greater access to tax shields may disincentivize the use of debt. This paradox may be due to the influence of other variables, such as profitability and cash flow volatility, which could reduce the need or attractiveness of using debt despite the tax benefits available.[14] On the other hand, in the real estate sector, the use of debt may be more attractive than the use of debt.

On the other hand, in China's real estate sector, tax shields hurt the leverage ratio of firms, which is in contrast to the trade-off theory. In the Chinese context, real estate market conditions and specific regulations may influence how tax shields affect capital structure. This suggests that government policies and particular market conditions may alter the expected effect of tax shields on debt at the sectoral and national levels.[33]

Other authors provide an additional perspective from Indonesia, where they observe that growing firms in highly concentrated sectors use a high level of debt, taking advantage of tax shields. However, this behavior changes in highly dynamic environments, where firms tend to take on less debt to mitigate bankruptcy risk. It confirms the trade-off theory in specific contexts but also shows that economic conditions and market dynamics can modify the impact of tax shields.[10]

Tax shields affect Small and Medium Enterprises (SMEs), as a positive relationship exists between tax shields and leverage. This finding aligns with trade-off theory, which argues that firms take advantage of tax benefits to justify a higher level of debt. However, firm age and other factors also play an essential role in determining leverage, suggesting that tax shields are only one of several determinants of SME capital structure.[34] These studies reflect the complexity of the impact of tax shields on capital structure and how their effect can vary depending on the specific context and market conditions.

The relationship between profitability, risk, and firm size and their influence on capital structure has been the subject of research in various contexts and markets, and there is evidence that profitability has a crucial influence on the capital structure of firms, as evidenced by several studies. These show that profitability negatively and significantly impacts debt measures, supporting the pecking order theory that suggests that profitable firms prefer to finance themselves with internal resources before resorting to external debt. This is aligned with a negative relationship between profitability and debt level, indicating that more profitable firms avoid excessive debt. In an Islamic financial environment, they reveal that, despite the irrelevance of the tax

shield in these contexts, profitability remains a significant factor in capital structure, suggesting that profitable firms in financially constrained markets still prefer less expensive and more stable financing.[14,32,34]

Risk also plays a vital role in leverage decisions. Firms in highly dynamic and risky environments tend to take on less debt to avoid bankruptcy risk, suggesting risk aversion in their financing strategy.[5,10] This result is complemented by other studies[30] that indicate that firm risk and volatility negatively affect capital structure choice. This idea is also reinforced[35] by highlighting that increased investment risk may discourage debt financing in favor of less risky and more flexible strategies.[27]

Firm size is a significant determinant of capital structure, with larger firms tending to use more debt. Larger firms can take on debt more easily due to their financial stability and access to credit markets. This finding points to asset size and profitability positively impacting the leverage of real estate firms in China.[33] It highlights that firm size is crucial in determining their capital structure, with larger firms often preferring financing strategies that take advantage of their greater ability to manage debt.[5,14,20,30]

Tax shields and tax shields on debt interest payments

A tax shield is an effect of an increased return on equity on a firm's capital structure. The interest on debt as part of the costs decreases the profit, which is used to pay a tax, thus reducing the company's tax burden.[6] The tax shield is one of the reasons why the company's external resources are cheaper than the use of capital. Its effect is generated by the interest on the loan, which is usually tax deductible. The equity cash flow assumes that the risk of the tax shield is equal to the risk of the operating free cash flow. The debt and interest will be proportional to the company's future value, and the coming tax savings will depend on the level of future operating profit.[6]

The trade-off between debt and non-debt tax shields has gained momentum among academics and policymakers, especially in the current economic environment affected by the pandemic and the energy crisis. The literature on tax shield trade-offs emerges from the robust theoretical framework.[36] It has developed piecemeal in various disciplinary fields such as accounting, finance, and economics.[37]

The relationship between tax shields and capital structure is a central theme in the literature. ased on a model that illustrates how corporate tax shields, such as book depreciation and tax credits, influence firms' leverage decisions[36], this model suggests that firms adjust their capital structure to maximize the tax benefits of debt. However, other authors[38] find a mixed relationship between taxes and debt, with an unexpected negative relationship between taxes and debt in the long run, which defies theoretical expectations and suggests that local specificities may alter the effectiveness of the tax shield.[36,38]

The selected studies also explore how incorporating additional variables, such as debt risk and economic conditions, can modify capital structure decisions. An 'agency shield' is introduced in addition to the tax shield in their model, highlighting how agency costs and risk can influence capital structure. This approach extends Modigliani and Miller's framework by considering factors that affect firm value beyond tax benefits.[39] It challenges the classical view by demonstrating that an optimal capital structure does not necessarily depend on a high debt ratio, suggesting that other factors, such as borrowing costs, should be considered.[39,40]

The literature also reveals that industry and firm-specific characteristics can influence capital structure decisions; in the forestry industry, the relationship between profitability, firm size, and debt does not follow theoretical expectations, indicating that industry characteristics influence financing.[41] Similarly, real estate investment trusts in New Zealand are examined, and trade-off theory is found to be more appropriate than pecking order theory, especially when considering the impact of the exchange rate on leverage decisions.[41,42]

The importance of the exchange rate in the capital structure of real estate investment trusts is highlighted, showing that exchange rate fluctuations can significantly influence long-term debt. This consideration of external variables is crucial for a more complete understanding of capital structure in open economies. This finding suggests that theoretical models must be adapted to reflect the impact of global factors on financial decisions.[42]

Alternative models address phenomena such as 'financial conservatism' and adjust capital structure decisions to special situations such as abnormal growth and expected bankruptcy. These models offer a more detailed understanding of how firms adapt their leverage in response to various economic conditions and risks. They provide a solution to some of the problems observed in traditional models.[43]

The tax system and stability influence capital structure, highlighting that an efficient and predictable tax system can improve corporate decision-making. The importance of a stable and well-designed regulatory environment for capital structure optimization is highlighted, suggesting that a sound fiscal framework can foster entrepreneurship and facilitate better financial decision-making.[44]

Financial aspects

Financial flexibility is a central theme in studying capital structure and tax shields. Multinational firms with financial flexibility can better manage the adverse effects of operating in high-tax countries by adjusting

leverage more efficiently, allowing firms to take advantage of tax shields by taking on additional debt. Thus, adjusting financial decisions according to market conditions is crucial for optimizing capital structure.[11,45]

In a theoretical perspective that enriches the understanding of the relationship between leverage and tax shields through a dynamic model that incorporates risk, complemented by other results, it is noted that dynamic models reveal a complex interaction between the tax shield and bankruptcy costs, something that static models might miss. The integration of risk allows for a better interpretation of how operational flexibility can affect leverage decisions, broadening the theoretical framework to include risk factors and changes in the economic environment.[11,46]

Other authors reveal that specific market conditions, such as limited access to the bond market and low local tax rates in China, influence how firms use tax shields.[47] This finding contrasts with other views that argue that the cost of the tax shield varies with leverage and risk in a more general theoretical model.[46] The difference in market conditions highlights how economic context can challenge traditional theories. It suggests that firms adapt their financing strategies to their local circumstances, which is consistent with operational flexibility.[11,46,47]

A psychological dimension is introduced to capital structure analysis by investigating CEO overconfidence and its influence on financing decisions, complemented by other studies showing that psychological biases can skew leverage decisions away from theoretical predictions. Other authors emphasize financial flexibility as a key factor in leverage management by showing how overconfidence can lead to suboptimal decisions, such as an excessive preference for short-term debt, which may not adequately take advantage of tax shields.[45,48]

Operational flexibility and its impact on capital structure are discussed in the literature. Studies highlight that firms with greater operational flexibility can better manage leverage and tax shields. The ability to adjust production and financing in response to changes in the economic environment allows these firms to optimize their capital structure more effectively. This operational flexibility also suggests that static models may not fully capture the advantages of financial and operational flexibility.[11,45,46]

Other studies address the relationship between profitability and capital structure, highlighting that profitability is a key factor in leverage decisions. Profitability and other financial and operating variables affect capital structure in Indonesia. Similarly, both profitability and macroeconomic variables influence capital structure in the Ecuadorian tourism sector. These findings suggest that profitability remains a key determinant of financing decisions in addition to dynamic and psychological factors, as reflected in cash flow theory.[12,46,49]

Theoretical models of capital structure

Table 7. Application of theories by author and contribution from their framework of study

Theory	Author (Reference)	Contribution (In its study framework)
Pecking order	Ni et al.[47]	Discusses how this theory explains the high proportion of equity in small and young firms, and their performance in large firms.
	Mundi et al.[48]	
	Nga et al.[30]	Overconfident CEOs tend to prefer debt financing, especially short-term debt financing over equity financing, and do not fully utilise available tax shields. There are positive correlations between CEO overconfidence and market-to-book ratio, cash flows and vested options. There are negative correlations between CEO overconfidence and firm size and stock ownership.
	Heckenbergerová et al.[31]	Profitability is inversely correlated with the ratio of total debt to total assets and the ratio of short-term debt to total assets. This suggests that firms with higher profitability tend to finance themselves with internal rather than external sources of capital.
	Obay[13]	Czech firms prefer to use equity rather than debt, with the exception of the CZ-NACE G sector. This finding is consistent with Myers' (1984) preference order theory.
Trade-Off	Matemilola et al.[51]	Leverage in the GCC countries is influenced by firm size, profitability, tangibility and non-debt tax shield.
	Hull[39]	Senior management experience is positively related to debt ratios, indicating that more experienced managers tend to use more debt in their capital structure decisions.
	Dong[42]	Managers are offered a tool to help choose a level of debt that maximises wealth, relying on trade-off theory, which postulates that the optimal level of leverage is achieved when the benefits of the last dollar of debt issued are offset by its costs.
	Zhang[43]	Support is found for the trade-off theory, while the pecking order theory is rejected in the context of listed property trusts (LPTs) in New Zealand.

	Guizani et al.[52]	The optimal leverage ratio determined by the models developed is close to most survey data. The optimal leverage ratio is approximately 31,57 %, which is consistent with empirical data documented in several studies.
	Buus[46]	Companies in Saudi Arabia that comply with Islamic principles first issue debt-based instruments, then equity, and finally Sukuk as a last resort to cover their financing gap.
	Liang et al.[33]	Static trade-off theory predicts that firms with high earning power should have high levels of leverage. However, the analysis conducted indicates that a low difference between the rate of return (r) and the growth rate (g) makes low leverage optimal.
	Liu[53]	They confirm the applicability of the trade-off theory to real estate firms in China, except for the ranking between leverage and tax shield.
	Chandra et al.[12]	Firms should consider both the benefits and costs of debt financing to adjust towards their optimal debt ratio.
	Bogovac[44]	Large firms tend to use debt, especially short-term debt, as a source of financing to increase profitability and adopt the trade-off theory, using debt to achieve higher profitability. The theory suggests that companies should ensure sufficient liquidity to obtain debt, which has a positive effect on capital structure.
Trade-off y Pecking order	Haron[5]	They provide guidelines for the establishment of a tax system that stimulates entrepreneurship and facilitates the sustainable development of the country. A neutral, simple, transparent and stable tax system, aligned with efficient tax systems in other countries, provides a solid basis for achieving economic objectives. The overall legal certainty and stability of the tax system is likely to motivate corporations to direct their activities towards substantial business challenges, while reducing the attractiveness of various tax avoidance instruments.
	Sheikh et al.[38]	Firm- and industry-level factors significantly influence the leverage of Indonesian firms.

Over the years, various theoretical approaches have emerged with the aim of understanding and explaining how firms choose their optimal financial structure. These theories offer unique insights into the factors and considerations influencing financing decisions, from the impact of taxes and tax benefits to the influence of risk, growth, and the business environment.[15,20]

Two of the most studied theories in the literature are trade-off theory (T.O.), also known as trade-off model or objective leverage model, and pecking order theory, also identified as financial pecking order model. The Trade-off Theory states that firms finance their investments for tax benefits. In contrast, the pecking order theory states that firms have an order of priority in obtaining financing.[49]

The trade-off and pecking order theories are not alternative views of the same problem but represent complementary approaches to how firms define their capital structures.[50] For this reason, numerous empirical studies in finance have tested many capital structure theories. As noted above, the pecking order and trade-off theories are among the most influential capital structure theories. Table 7 below presents a synthesis of these two theories that have contributed to shedding light on this field of study and the authors who have applied and used them in their studies, highlighting a relationship and contribution to this field of the discipline.

DISCUSSION

These studies suggest that profitability and firm size influence capital structure, while risk is an essential moderator of leverage decisions. The complexity of these relationships highlights the need to consider multiple factors and specific contexts when analyzing how firms manage their capital structure.

The literature shows that a complete understanding of capital structure requires integrating theoretical models with empirical data and considering a variety of additional variables. Including factors such as tax shields, debt risk, exchange rate, and sectoral characteristics provides a richer and more accurate picture of leverage decisions. Recent studies indicate that models must evolve to capture the complexity of the globalized financial environment, allowing firms to formulate financing strategies that reflect their specific contexts and economic dynamics.

The reviewed studies challenge and enrich traditional theories of capital structure. Theories are expanded by incorporating dynamic and operational aspects, introducing psychological factors that affect financing decisions. The importance of economic context and profitability in capital structure is demonstrated, revealing that understanding capital structure and tax shields requires an integration of multiple factors, from market conditions and operational flexibility to psychology and profitability, providing a more complete and nuanced view of the subject.

CONCLUSIONS

In capital structure and debt tax shields, the traditional academic approach, as set forth by Modigliani and Miller's irrelevance theory, has been challenged and re-evaluated, highlighting the need for new research better to understand financial decisions and their impact on firm value. The idealistic assumptions of this theory suggest that capital structure should not affect firm value in a perfect market. However, financial reality shows that capital structure and tax shields play a crucial role in firm valuation, and it is essential to review and extend these concepts through future research.

While there is consensus on the relevance of taxes on capital structure, a wide variety of estimates persist on the magnitude of the tax shield. International research has revealed that factors such as debt level, tax rate, credit risk, probability of bankruptcy, and future financing policies are significant variables that influence the value of the tax shield. Future research must explore how these variables interact and affect the valuation of firms in different economic contexts.

More research is needed to better understand how free cash flow and agency conflicts influence the relationship between tax avoidance and capital structure. Moreover, the impact of the recent COVID-19 crisis could provide a unique opportunity to analyze the effect of non-debt tax protection policies on corporate capital structure.

The emergence of new theoretical models, such as the trade-off model and the pecking order concept based on market information asymmetry, requires thorough empirical analysis. Research on the DeAngelo and Masulis model and marginal personal tax rates could provide a clearer perspective on leverage decisions.

Future research on capital structure and tax shields needs to address various factors, including the impact of economic crises, the evolution of theoretical models, and variations in international markets and their complexity.[54]

international markets. These approaches will contribute to a deeper and more nuanced understanding of financial decisions and their influence on corporate value, reflecting the complexity and dynamism of the global financial environment.

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AUTHORSHIP CONTRIBUTION

Conceptualization: Jesús Alexander Pinillos Villamizar.
Data curation: Jesús Alexander Pinillos Villamizar.
Formal analysis: Jesús Alexander Pinillos Villamizar, Hugo Macías Cardona, Luis Fernando Castrillón.
Research: Jesús Alexander Pinillos Villamizar, Hugo Macías Cardona, Luis Fernando Castrillón.
Methodology: Jesús Alexander Pinillos Villamizar, Hugo Macías Cardona, Luis Fernando Castrillón.
Project management: Jesús Alexander Pinillos Villamizar.
Resources: Jesús Alexander Pinillos Villamizar.
Software: Jesús Alexander Pinillos Villamizar.
Supervision: Hugo Macías Cardona, Luis Fernando Castrillón.
Validation: Hugo Macías Cardona, Luis Fernando Castrillón.
Visualisation: Hugo Macías Cardona, Luis Fernando Castrillón.
Writing - original draft: Jesús Alexander Pinillos Villamizar, Hugo Macías Cardona, Luis Fernando Castrillón.
Writing - revision and editing: Jesús Alexander Pinillos Villamizar, Hugo Macías Cardona, Luis Fernando Castrillón.