Impact of taxes on banks' capital structure: Evidence from Algerian commercial banks

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Abstract:
This paper aims to identify the impact of income corporate tax and other internal and external factors on the capital structure of Algerian banks. By means of a panel data analysis, we used data from all commercial banks operating in Algeria (20 banks: 6 publics and 14 privates) during the period 2010-2020. The results of this study indicate that the income corporate tax has a negative impact on leverage ratio. All the other explanatory variables examined in this study have also a statistically significant impact on the leverage ratio. The size of the bank, tangibility and economic growth have a positive impact on leverage ratio while profitability, bank liquidity and risk have a negative influence.
Keywords: Corporate income tax, Determinants of capital structure, Algerian Banks, panel data.
Jel classification code : G2, H25, C23.

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1. Introduction

For several decades, and since the work of Modigliani and Miller (1963); Capital structure studies have become an important topic and central theme in corporate finance theory. The concept of capital structure is generally described as the particular combination of debt and equity used by a company to finance its activities and its growth, this selection is of great importance both for the managers of the firm and for the suppliers of capital because the wrong mix of equity and debt financing can affect the survival and performance of the business.

In this context, several theories have been developed in order to define and explain the financing structure and the factors which determine the capital structure of companies such as the theory of M&M (1958) and (1963) which their article constitutes the cornerstone of capital structure theory, which mathematically demonstrates the non-existence of an optimal capital structure that maximizes the value of the firm in the case of a perfect market and in the absence of taxes and bankruptcy costs, and therefore the choice between debt and/or equity financing is irrelevant. Apart from this simplified framework and the reality of the non-existence of a perfect market; several more relevant financial theories are developed such as: Miller's theory (1977), static trade-off theory (1973), and hierarchical funding theory (1984).

Initially, research on capital structure was devoted much more to the study of this question in the non-financial sector. Research relating to the study of this question in the regulated sector such as banks is less numerous and it has started to develop than in recent years.

Studies on the capital structure of banks are inspired by corporate finance theory. Miller (1995) demonstrated that the theorem of Modigliani and Miller also applies to banks by assimilating deposits to debts. However, the determinants of the capital structure of banks differ from those of non-financial firms since banks play different roles from others. Banks are required to hold capital above the minimum capital required by regulators since banks tend to face several risks that could affect the banking operation and have serious risks of insolvency. Banks, which are considered highly leveraged, should have the ability to determine the appropriate amount of capital to absorb unexpected losses resulting from their day-to-day transactions.

A bank's ability to meet the needs of lenders and borrowers is closely linked to its capital structure. Understanding how banks choose their capital structure has been the subject of several theoretical and empirical studies (Kuo and Lee (2003); Asarkaya and Ozcan (2007); Kleff and Weber (2008); Amidu (2007) Gropp and Heider (2010); Octavia and Brown (2010); Juka et al. (2012); Shahchera (2013); Al-Mutairi and Naser (2015).

The existing literature on the impact of taxes on bank capital structure emphasizes the significance of these taxes in banks' financing decisions. Studies have highlighted the tax shield effect, where the deductibility of interest on debt reduces the after-tax cost of borrowing, thereby motivating banks to increase their debt levels. Furthermore, the debt bias in the tax system encourages banks to favor debt financing over equity financing.

Regulations and tax laws can also influence banks' capital structure decisions by interacting with banking regulations. However, the effects of taxes on bank capital structure can vary across countries due to differences in tax systems, legal frameworks, and economic conditions. It is also important to consider the temporal dynamics and economic cycles to fully understand the impact of taxes on bank capital structure. Overall, taxes play a significant role in bank capital structure decisions and require a comprehensive analysis that takes into account various factors and contexts.In Algeria and like many developing countries, the role of banks in financing investments is all the more increased due to the low level of development of financial markets. The Algerian banking system currently consists of twenty (20) banks: (06) public banks and (14) foreign private banks. Public banks remain predominant in terms of deposits and loans. However, the growth in the activity of private banks remains appreciable.

This study aims to identify and examine the determinants of the capital structure of Algerian banks over the period 2010-2019. To do this, we used the panel data method. The study covers all banks operating in Algeria.

The rest of the article is organized as follows: The first section presents a review of the literature on the determinants of capital structure and develops the research hypotheses. The second section discusses the elements of the methodology employed. The third section is devoted to the descriptive study. The results obtained are presented and discussed in the fourth section and are followed by a conclusion.

2. The impact of taxes on bank's capital structure – Literature review

Modigliani and Miller (1958) originally demonstrated that, in a world without taxes, transaction costs, and assuming efficient markets, the value of an economic asset is independent of the financing mix between debt and equity. This implies that the capital structure has no impact on the value of a company. However, when corporate income tax is introduced, Modigliani and Miller (1963) showed that firm value becomes an increasing function of leverage, suggesting that the optimal capital structure would be 100% debt rather than equity. However, Kraus and Litzenberger (1973) argued that increased indebtedness raises the likelihood of bankruptcy, leading to bankruptcy costs. The higher the debt level, the higher the probability of bankruptcy. Therefore, debt offers both advantages (tax savings) and disadvantages (bankruptcy costs). As a result, companies adjust their capital structure to achieve an optimal mix of equity and debt that maximizes their value.According to the static trade-off theory, the relationship between debt and tax is positive because a higher tax rate would lead to greater tax benefits from debt and that is why companies that have a high tax should use more debt to maximize their tax savings.

As per Myers (2001), a company should borrow until the point where the additional tax savings gained from increased debt are offset by the increase in present value of potential bankruptcy costs. This implies a trade-off between the tax benefits of debt and the costs associated with bankruptcy.

According to the hierarchical financing theory, a higher tax rate suggests that a company is more profitable and would prefer to use internal financing rather than debt. Consequently, this theory implies a negative relationship between tax rates and the inclination to utilize debt financing. Empirically, numerous studies focusing on non-financial firms have found evidence supporting this inverse relationship between debt and taxes (e.g., De Mooij and Keen, 2012; De Mooij, Keen, and Orihara, 2014; Horvath, 2013; Ashcraft, 2008). However, in the case of studies examining the impact of tax changes on the capital structure of American banks, such as Schandlbauer (2015), a positive relationship between taxes and the level of indebtedness has been observed. Furthermore, Schepens (2016) demonstrated that reducing tax discrimination between debt and equity financing leads to better-capitalized financial institutions.

H1: The corporate income tax has a negative impact on the capital structure of a bank.

3. Other determinants of bank capital structure

The factors influencing a company's capital structure can be classified into two categories: internal factors, which are directly related to the company and its unique characteristics (microeconomic variables), and external factors, which are linked to the company's environment and the market (macroeconomic variables).

The size

Size is widely considered as a crucial determinant in corporate financing decisions, with numerous authors recognizing its significance and explanatory power in the capital structure literature. According to the bankruptcy cost theory, which explains the positive relationship between size and capital structure, larger companies tend to have greater access to capital markets and benefit from activity diversification, leading them to utilize more debt compared to smaller companies. This increased borrowing is driven by the ease of capital market access and the reduced volatility of cash flows due to activity diversification (Vatavu, 2012). Moreover, in line with agency theory, larger companies with more dispersed ownership tend to have less control over managers, incentivizing them to influence the debt ratio upward to safeguard their personal investments in the company (Miniaou, 2012). Conversely, the pecking order theory suggests that growing companies generate more profits, allowing them to rely on internally generated resources and minimize their reliance on debt financing (Sibindi, 2018, p.4).

In the banking context, fewer studies have explored the relationship between bank size and capital structure. However, the majority of these studies observe that banks exhibit financing behavior similar to non-financial companies, with larger banks tending to have higher levels of indebtedness. For example, Tong and Diaz (2017) examined a sample of 30 commercial banks in Vietnam during the period of 2009-2014 and found a positive relationship between the size of Vietnamese banks and their indebtedness ratio. Similarly, Wong et al. (2005) investigated the capital structure of Hong Kong banks and identified that large banks benefit from economies of scale, which reduces borrower risks and consequently necessitates less capital. Consistent results were also found in other studies such as Octavia and Brown (2008), Caglayan and Sak (2010), and Gropp and Heider (2010).

H2: The size of the bank has a positive impact on its capital structure.

The profitability

Profitability is a crucial factor influencing the capital structure of firms as it serves as a performance indicator and is highly regarded by capital providers when evaluating companies. Higher financial profitability enhances the attractiveness of a company. For credit institutions, profitability reflects their ability to generate sustainable earnings from operations after deducting operating costs, ensuring the continuity of their activities.

Different theories on capital structure offer varying explanations for the relationship between profitability and firm indebtedness. According to the trade-off theory, more profitable firms prefer debt financing to benefit from tax advantages and deductibility of interest expenses. Additionally, highly profitable firms have greater ease in accessing debt due to their solid guarantee of repayment capacity, suggesting a positive relationship between profitability and indebtedness. In line with the agency cost theory, Jensen (1986) and Williamson (1988) argue that profitable firms tend to have higher free cash flow, which may lead managers to invest in a discretionary manner. To mitigate this agency problem, debt is seen as a discipline mechanism that promotes managers' focus on maintaining profitability to meet debt obligations. Consequently, highly profitable firms are expected to absorb more debt, indicating a positive relationship.

Contrarily, Myers (1984) suggests a negative relationship between debt and profitability, assuming that successful firms have less reliance on external financing. The hierarchical financing theory (pecking order theory) posits that highly profitable companies prefer self-financing over debt financing, implying an inverse relationship between profitability and indebtedness.

Empirical studies predominantly demonstrate a negative relationship between profitability and indebtedness, with more profitable banks tending to have higher levels of equity. Sibindi's (2018) study, based on a sample of 16 South African banks, reveals a negative association between profitability and indebtedness. It also highlights that bank financing behavior aligns with the hierarchical financing theory, particularly after the global financial crisis of 2007-2008.

H3: The profitability has a negative impact on the bank capital structure.

Tangible assets

Capital structure theories suggest that the composition of a firm's assets influences its financing decisions, with tangible assets playing a crucial role. Tangible assets, such as fixed assets and inventories, serve as valuable collateral for creditors, enabling firms to secure more debt. Furthermore, tangible assets are less susceptible to information asymmetries and hold higher value in the event of bankruptcy.

The compromise, agency, and hierarchical finance theories all support a positive relationship between tangible assets and debt. According to the agency theory, firms with a higher proportion of tangible assets possess stronger debt capacity and lower agency costs associated with debt. The hierarchical finance theory proposes that tangible assets mitigate information asymmetry, leading firms to rely more on debt financing. Similarly, the trade-off theory suggests that companies with greater tangible assets have a higher debt capacity. Empirical studies by Titman and Wessels (1988), Rajan and Zingales (1995), and Kremp and Stoss (2001) have confirmed this relationship.

In the context of credit institutions, Gropp and Heider (2010) find that tangible assets significantly impact the capital structure decisions of banks. They demonstrate that banks with a substantial share of fixed assets can easily access additional debt or obtain debt at lower rates by utilizing these assets as collateral. However, other studies such as Caglayan and Sak (2010), Octavia and Brown (2008), Anarfo (2015), and Aremu et al. (2013) present opposing findings.

H4 : The bank's tangible assets have a positive impact on its capital structure.

Liquidity

Liquidity refers to the immediate availability of funds and can serve as an internal source of financing. In the context of financial markets, liquidity refers to the ease and speed of buying or selling assets in large volumes. The more liquid an asset is, the more stable its price tends to be.

According to the trade-off theory, there exists a positive correlation between the level of indebtedness and liquidity. Firms with a high liquidity ratio, as explained by Ozkan (2001), have a strong ability to meet their short-term obligations, enabling them to increase their level of debt. This positive relationship between liquidity and indebtedness is attributed to their capacity to honor financial commitments.

Conversely, the hierarchical financing theory suggests that firms with a high liquidity ratio are less likely to rely on debt financing and instead prefer self-financing.

Examining a sample of 25 deposit banks in Turkey from 1992 to 2007, Caglayan and Sak (2010) found a negative relationship between indebtedness and liquidity risk. In the case of GCC banks, Al-Mutairi and Naser (2015) reported a negative but statistically insignificant association between liquidity and leverage. Similar findings were observed by Siam et al. (2005) and Siddiqui et al. (2011). On the other hand, some studies, such as those conducted by Pinkowitz (1999) and Anderson (2002), indicate a positive relationship between indebtedness and liquidity.

H5 : Liquidity has a negative impact on the capital structure of the bank.

The risk

Risk, in the context of corporate finance, refers to the degree of volatility or uncertainty surrounding a company's cash flow or revenue projections. The theories of agency, trade-off, and hierarchical financing propose a negative correlation between debt and risk. In other words, companies with highly volatile cash flows are advised to avoid debt financing. This is because volatile cash flows can lead to financial difficulties and increase the probability of default. However, Vatavu (2012) presents a different perspective, suggesting that firms may still opt for debt financing even in the presence of high risk in order to maximize the benefits derived from leverage.

A study conducted by Juca et al. (2012) on a sample of 30 North American banks found an inverse relationship between risk and leverage, supporting the notion of risk negatively impacting a firm's capital structure. Conversely, Sibindi's (2018) research on South African banks indicated a positive relationship between risk and indebtedness.

H6 : Risk has a negative impact on the capital structure of the bank.

Economic Growth

This factor serves as a reliable indicator of the growth opportunities available to companies within the market. Economic growth plays a crucial role in shaping

banking activities, particularly lending, as higher growth rates reflect an elevated pace of economic activity and an increased demand for financing. In the context of credit institutions, regulatory requirements necessitate that banks bolster their own funds in the event of negative GDP growth, mitigating the risk of default and bankruptcy. Consequently, the financial leverage ratio decreases. Conversely, during favorable economic conditions with positive growth expectations across various sectors, including banking, risks are relatively low, leading to a more significant financial leverage ratio (Asarkaya and Özcan, 2007).

Empirical studies yield inconclusive results regarding the relationship between the level of indebtedness and GDP growth. Asarkaya and Özcan (2007) observe a positive and significant relationship between the level of indebtedness of Turkish banks and the economic growth of the country. Conversely, Jucá and Fishlow (2012) find an inverse relationship between the level of indebtedness and the economic growth of banks in Brazil and North America.

H7: Economic growth has an impact on the capital structure of the bank.

3. Methodological approach :

3.1 Sample and data collection:

Our study is based on a sample consisting of all operating banks in Algeria (20 banks: 6 public and 14 private). To conduct this study, we utilized the financial statements (balance sheets and income statements) of these banks during the period of 2010-2019. These documents were obtained from the National Center of Commercial Register (CNRC) and the banks' websites. As for the macroeconomic data, they were collected from the official website of the World Bank.

3.2 Measures of variables:

Before specifying our model, we will describe all the variables selected for econometric analysis and mention the studies that have used the measures we have chosen.

3.2.1 The dependent variable:

To measure the capital structure of a bank, we used as proxy the ratio of debt to equity (total debt / equity) of the bank. This measure has been used by Titman and Wessels (1988).

3.2.2 Explanatory variables:

The measures of the explanatory variables selected for the multivariate analysis and their sources are presented in the following table:

Table 1. Description of internal explanatory variables and data sources

Variables	Notation	Measure	Source
Taxes	TAX	$\dfrac{\text{Corporate income tax}}{\text{Total assets}}$	suggested by the author
Profitability	ROA	$\dfrac{\text{Net income}}{\text{Total assets}}$	Sibindi (2018) Naser and al., (2015)
SIze	SIZE	Ln (Total assets)	Diaz (2017) , Wong and al. ;(2005) Octavia and Brown (2008)
Tangibility	TAN	$\dfrac{\text{Tangible assets}}{\text{Total assets}}$	Aremu and al., (2013), Naser and al., (2015) and Sibindi (2018)
Liquidity	LIQ	$\dfrac{\text{Loans}}{\text{Deposits}}$	Sharma and al, (2015)
Risk	RISK	The Standard deviation of (ROA)	Sibindi (2018)
Economic growth	GDP	The real annual growth rate of GDP	Jucá and al., (2012)

Source: Developed by author.

3.3 Model specification:

To test the hypotheses of our research, we chose the Panel Data Regression method. Our panel consists of 200 bank-year observations. The model to be estimated is specified as follows:

$$CS_{it} = \beta_0 + \beta_1 TAX_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 TAN_{it} + \beta_5 LIQ_{it} + +\beta_6 RISK + \beta_7 GDP_{it} + \epsilon_{it}$$

3.4. Descriptive statistics

In this section, we will first present some descriptive statistics regarding the dependent variable and the explanatory variables.

Table 2. Descriptive statistics of the dependent variable and the explanatory variables

	CS	TAX	SIZE	ROA	TAN	LIQ	RISK	GDP
Min	.21458	0	23.315	-.00825	.00029	.28327	.00226	.01
Max	20.481	.024173	28.881	.06583	.13638	3.0619	.01410	.038
Mean	5.5517	.0067653	25.999	.01968	.0254	.97717	.00749	.0268
Sd	4.1210	.0040402	1.5172	.01142	.02847	.34005	.00399	.01061

Source: Based on statistical processing by the STATA 11 software.

The table above indicates that the debts of Algerian banks on average represent more than 5 times the amount of their equity, with a high dispersion (4.12). As for the TAX variable, the results show that the average tax burden borne by Algerian banks is 0.67% with a relatively low level of dispersion.

Regarding the other explanatory variables, the average size of the banks in the sample, measured by the logarithm of total assets, is 26 with a very high standard deviation. This high dispersion is mainly due to the significant difference between the average size of public banks (28.00998) and private banks (25.13806) comprising the study sample. The average size of public banks is more than 17 times the average size of private banks. The average profitability measured by the ratio of net income to total assets is 1.96% with a relatively low dispersion. As for liquidity, measured by the loan-to-deposit ratio, which actually represents the illiquidity of the bank, it has an average of 97.71% with a standard deviation of over 34%. This means that the average liquidity of Algerian banks (1 - loan-to-deposit ratio) revolves around 3%. The average share of fixed assets in total assets is 2.54%. The risk measured by the standard deviation of return on assets (ROA) has an average of 0.75% with low dispersion.

As for the average growth rate of real GDP in Algeria, it is 4.7% during the period 2010-2019. Since the 2014 oil shock, GDP growth in Algeria has significantly slowed, dropping from 5.6% in 2014 to 2.4% in 2019. This situation once again confirms the increased dependence of the Algerian economy on hydrocarbons and the lack of a serious alternative that could reduce the loss in terms of growth.

Before empirically testing the hypotheses of our study, it is necessary to establish the correlation matrix in order to preliminarily test the relationship between the dependent variable and the independent variables, and to detect any

potential problems of multicollinearity among the explanatory variables.

Table 3. The correlation matrix

	CS	TAX	SIZE	ROA	TAN	LIQ	RISK	GDP
CS	1.0000							
TAX	-0.6445*	1.0000						
SIZE	0.7782*	-0.5790*	1.0000					
ROA	-0.5966*	0.7834*	-0.5578*	1.0000				
TAN	-0.2701*	0.2758*	-0.3617*	0.2479*	1.0000			
LIQ	-0.5104*	0.4457*	-0.4739*	0.3653*	0.2637*	1.0000		
RISK	-0.6547*	0.4045*	-0.7044*	0.3722*	0.3675*	0.4020*	1.0000	
GDP	0.0355	0.0557	-0.1251	0.1848*	0.0018	0.0530	-0.0000	1.0000

(*): Refers to the 5% level of significance.
Source: Based on statistical processing by the STATA 11 software.

The correlation matrix represented in the table above shows that the capital structure of Algerian banks is significantly correlated with all explanatory variables except for the GDP variable. Tax burden (TAX), profitability (ROA), tangibility (TAN), liquidity (LIQ), and risk (RISK) are positively correlated with the capital structure, while size (Size) is negatively correlated.On the other hand, the correlation matrix shows that there are no correlation coefficients between the explanatory variables that exceed 80%, which is the threshold at which the model could potentially have multicollinearity issues (Gujarati, 2003). The VIF test, displayed in the following table, is used to verify the presence of multicollinearity.

Table 4. Results of the VIF test

Variable	VIF	1/VIF
TAX	3.00	0.333702
ROA	2.83	0.353064
SIZE	2.73	0.366762
RISK	2.10	0.477040
LIQ	1.40	0.716561
TAN	1.20	0.831506
GDP	1.08	0.926175
Mean VIF	2.05	

Source: Based on statistical processing by the STATA 11 software.

According to this table, the VIF coefficient for all variables did not exceed the tolerance limit of 10, which is the norm indicating the presence of multicollinearity.

4. Results and discussion:

The nature of panel data requires the adherence to certain econometric steps, especially regarding the specification of the estimation model. The model specified in this study includes a variable (RISK) that takes the same values over time for each bank. Conducting a fixed-effects regression would have arbitrarily excluded this variable from the set of explanatory variables. For this reason, we opted for a random-effects estimation model and used the "Breusch-Pagan Lagrangian Multiplier test for random effects" to ensure the presence of a random individual effect (Prob > chibar2 = 0.000; below 5%, indicating random effects) or not, without necessarily resorting to the Hausman test.

Subsequently, it was necessary to conduct various tests to examine autocorrelation and heteroscedasticity in the model to be estimated. Thus, the test by Wooldridge (2002) indicated the presence of autocorrelation among the variables, as the probability is below 5% (Prob > F = 0.0000). As for heteroscedasticity, the test indicates its existence (Prob > chi2 = 0.0000).

To address any potential issues of autocorrelation and heteroscedasticity, we employed the Panel Corrected Standard Error (PCSE) method proposed by Beck and Katz (1995). This method provides unbiased coefficients, particularly for micropanels. The regression results after correction is presented in the following table:

Table 5. Regression results

Variables	Notation	Coef. P value	Expected sign
TAXES	TAX	-175.3285 0.002***	-
SIZE	SIZE	1.230264 0.000***	+
Profitabilité	ROA	-49.46111 0.004***	-
Tangibility	TAN	11.30551 0.000***	+
Liquidity	LIQ	- 1.42744 0.000***	-
Risque	RISK	- 202.737 0.000***	-
Economic growth	GDP	51.69492 0.015**	+/-
	_cons	-23.03413 0.000***	
Wald chi2 Prob > chi2		693.83 0.000	

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

Source: from statistical processing by STATA 11 software.

The results of the Wald Chi2 test for overall significance indicate that the explanatory power of the model is satisfactory (Prob > chi2 = 0.0000).

The results indicate that the tax burden has a negative and significant influence on the capital structure of Algerian banks. This relationship can be explained by the tax advantages of debt. As mentioned earlier, bank indebtedness can offer tax benefits, such as interest deductibility on debt. By using more debt in their capital structure, banks can reduce their tax burden by deducting interest from taxable profits. Therefore, a higher proportion of debt relative to equity can lead to a decrease in the tax burden borne by banks. Like any other business, banks seek to optimize their tax situation by employing different strategies. By adjusting their capital structure and increasing the level of debt, banks can lower their taxable income and, consequently, their tax burden. This can result in a negative relationship between the tax burden and the debt-to-equity ratio.

Furthermore, banks are subject to prudential regulations aimed at ensuring their financial stability and preventing systemic risks. A well-balanced capital structure with an adequate proportion of equity is often considered a measure of financial prudence. A higher tax burden may incentivize banks to maintain a less leveraged capital structure in order to strengthen their stability and better cope with risks. This can lead to a negative relationship between the tax burden and the debt-to-equity ratio. This result is in line with the pecking order theory of financing. Thus, hypothesis (H1) is confirmed.

Regarding the control variables, the results also indicate that bank size significantly and positively affects the capital structure of Algerian banks. Large banks in Algeria, which are state-owned banks, often have higher borrowing and deposit-collecting capacity due to their size and scale. They can access more diversified sources of funding. This increased borrowing capacity allows large banks to raise more debt relative to their equity, which can lead to a positive relationship between bank size and the debt-to-equity ratio. Hypothesis (H2) is therefore validated. This result is consistent with findings from Tong and Diaz (2017), Wong et al. (2005), Octavia and Brown (2008), Caglayan and sak (2010), and Gropp and Heider (2010).

As for profitability, the results confirm, as anticipated in hypothesis (H3), the existence of a negative and statistically significant association between bank profitability measured by ROA and the bank's capital structure. This could be explained by the impact of interest expenses borne by the bank. When a bank has a higher level of debt relative to its equity, it generally has higher interest expenses to pay on its debt (interest paid on deposits). This can reduce the bank's profitability, as a larger portion of its income is dedicated to interest payments on the debt. Therefore, a more leveraged capital structure can result in lower profitability, leading to a lower ROA. This finding is consistent with previous studies such as Caglayan and sak (2010), Sibindi (2018), and Amidu (2007).

Our results also reveal that asset tangibility has a positive and significant effect on the bank's debt ratio. This result supports the idea that assets such as real estate or equipment can serve as collateral for loans and borrowings obtained by the bank. Lenders may be more inclined to grant loans to a bank that has tangible assets due to the possibility of recovering a portion of their investment in case of default. Therefore, banks with a higher proportion of tangible assets may have easier access to borrowing, which can lead to a more leveraged capital structure. Hypothesis (4) is thus confirmed. This finding aligns with that of Anarfo (2015).

As for liquidity, measured by the loan-to-deposit ratio, it has a negative and significant impact on the debt ratio of Algerian banks. This confirms hypothesis (5). A high loan-to-deposit ratio, indicating a significant proportion of loans compared to deposits, can make a bank more vulnerable to liquidity risks. This means that the bank may have difficulties in meeting repayment obligations in the event of massive deposit withdrawals or difficulties in accessing short-term funding sources. To manage these risks, banks may prefer a stronger capital structure with a higher proportion of equity compared to debt, strengthening their ability to withstand liquidity pressures. These findings are consistent with those of Caglayan and sak (2010), Siam et al. (2005), and Siddiqui et al. (2011).

Consistent with the results of previous studies such as Juca and Fishlow (2012) and Titman and Wessels (1988), risk has a negative and significant influence on the debt ratio of Algerian banks. Thus, hypothesis H6 is confirmed.

The table above shows that economic growth has a positive and significant effect on the debt ratio of Algerian banks. This means that higher economic growth is associated with a higher debt ratio for banks. When the economy is growing, the incomes of individuals and businesses generally increase. This increase in income can lead to higher savings and deposits by individuals and businesses (considered as debt for the bank). A growing economy thus offers potential deposit growth for banks, which in turn can support an increase in their deposit mobilization capacity. Ozkan (2007) and Bouth et al. (2011) found similar results. Therefore, hypothesis H7 is confirmed.

5. Conclusion

The objective of this article was to examine the relationship between the tax burden borne by Algerian banks and their capital structure, as well as to identify other factors determining the capital structure of Algerian banks using panel data from all banks operating in Algeria over the period 2010-2019. The debt-to-equity ratio was used as a proxy for the financing structure. In addition to the variable measuring the tax burden, this ratio is explained by a set of internal and external variables (size, profitability, tangibility, liquidity, risk, and GDP growth rate).

The results of this study indicate that corporate income tax has a negative impact on the debt ratio of Algerian banks. All other explanatory variables used in this study also have a statistically significant impact on the debt ratio. Bank size, tangibility, and economic growth have a positive impact on the debt ratio, while profitability, bank liquidity, and risk have a negative influence. These findings are consistent with several previous studies on the determinants of bank capital structure and suggest that the financing behavior of Algerian banks aligns with the theory of hierarchical financing.

From a practical perspective, this research is likely to be of interest to various stakeholders in the Algerian banking sector. Identifying certain determinants of the capital structure of Algerian banks will serve as a guide for bank executives to make necessary decisions and implement appropriate policies regarding financing structure, ultimately leading to improved bank profitability.

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