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Determinants of Capital Structure in the Banking Sector: Lessons from the Western Balkans

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Abstract

The study examines the capital structure of the Western Balkan banking industry across the period 2015 - 2020. Forty-seven of the total Western Balkan-based commercial banks were included in the study. By constructing a balanced panel, this study uses pooled ordinary least squares, fixed and random effects regressions, to assess the relationship between bank book leverage as the dependent variable and the set of bank-specific explanatory variables that include profitability, leverage ratio, bank size, earnings volatility, collateral, growth opportunities, and liquidity. The study shows a significant positive relationship between profitability and book leverage for the period studied. In contrast, leverage ratio, earnings volatility, collateral, growth, and liquidity significantly negatively impact the book leverage of Western Balkan banks. An extensive and comparative study of banks operating in Western and Eastern Balkan countries is recommended. The findings have practical implications for bank executives. They will assist them in identifying the bank-specific factors that influence the capital structure and selecting values that promote optimal capital structure. The findings of this study can help regulators develop an effective prudential framework. This study opens up new avenues for further research in this area for academics, researchers, and analysts.

Keywords: Capital structure, Book leverage, Robust Fixed effects, Banking sector, Western Balkans.

JEL: D22; G21; G32

1. Introduction

The need for capital structure has been extensively discussed from a broad theoretical standpoint. Financial theory has not made much progress when it comes to

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creating models that can offer quantitative advice on decisions made regarding bank capital structures, the influence of prudential rules on those decisions, and the ensuing bankruptcy risk (Correia & Martins, 2019; Gramanová & Ivanová, 2018; Hugonnier & Erwanm 2017; Allegret et al., 2017; Kayhan & Titman, 2017).

Financial academics have studied capital structure and given numerous proposals on the best financial structure of firms since the 1950s (Castro & Lopez, 2021). On the other hand, bank-funding choices remain a mystery, attracting the interest of both banking regulators and corporate finance scholars. Banks have until now been excluded from current capital structure studies, owing to the assumption that regulatory capital structure is the fundamental determinant of banking capital structure. On the other hand, the banking sector has broad popular support, and the global financial crisis has had a substantial economic impact (Miles et al., 2012).

A company's capital structure is the mix of debt and equity that allows it to sustain all of its operations and expansion. This makes it easier for analysts to determine a company's cost of capital. A company can finance its assets in three ways: by borrowing, using its profits, or issuing stock. Alternatively, the capital structure is a combination of debt and equity, with shareholders as owners (with a medium-to-long-term commitment to the company and the expectation of a return (regular dividend or increase in share price as repayment)) and debt holders as borrowers (with a short-term commitment focused on timely repayment of bonds and interest).

Compared to non-financial companies, there is a less meaningful understanding of how banks practice their capital structure and the determinants or factors that may influence the decision on the capital structure of these banks. Research on capital structures specifically conducted for banks is also relatively scarce. There are several studies on the capital structure of banks, including those by (Octavia & Brown, 2010; Shahchera, 2013; Al-Mutairi & Nasser, 2015; Kleff & Weber, 2015).

Thus, the study will attempt to empirically test the determinants of capital structure for 47 commercial banks operating in the Western Balkan countries, using balanced panel data from the period 2015 to 2020. The study will seek empirical answers to the following research questions: (1) what are the main determinants that affect the capital structure of commercial banks; and (2) is the level of financial leverage in the commercial banks of the Western Balkans affected by these analyzed determinants?

The current study context and stated problems related to determining factors in shaping optimal capital structure are the central issues of this study. Thus, the primary goal of this study is to measure how much capital comes in the form of debt and thus perceive how the majority of assets are funded, investigate the elements of capital structure and assess the impact of these factors on commercial banks' capital structure in the Western Balkans.

2. Literature Review

The elements that affect a company's capital structure have been the subject of several theoretical and empirical studies. A company's capital structure refers to various strategies to raise the money required for its investing activities. The combination of debt and equity is referred to as the "capital structure," one of the two primary kinds of

funding accessible to businesses. The search for the best capital structure that maximizes enterprise value while minimizing the cost of capital occupies a significant part of the financial decision-making process.

There is extensive empirical data on this topic that supports various capital structures. Researchers from all across the world are working to pinpoint the key factors that affect capital structure. Yet, we frequently uncover empirical data that contradicts even with itself-concerning apparent truths. These inconsistencies and discrepancies result from the majority of the empirical research that has been carried out to support the intended point of view. This appears to make obtaining support for any idea from later analysis more accessible. Despite the wealth of empirical research on the topic, the main variables that affect how corporations finance themselves are not universally agreed upon, even though organizations often have the best capital structures.

Most studies on this subject have generally been concerned with identifying the variables that affect corporate finance behavior, particularly in American corporations. To reach an agreement regarding the variables that affect corporate finance behavior, researchers have recently broadened their research to test capital structure theories from the US in industrialized nations with comparable structures and features. (Rajan & Zingales, 1995) made the first attempt in this manner when they discovered the same factors affecting the determinants of corporate financing in the US and the G-7. The following research has focused on the United States or wealthy countries (Rajan & Zingales, 1995; Khaki & Akin, 2020).

There has been less research on the factors influencing capital structures in developing nations, even though developed countries with similar institutional systems and features have received most of the attention. (Booth et al. 2001) carried out some of the most significant and pioneering research on testing capital structure theories in emerging nations. The study aimed to determine whether the factors influencing capital structures in industrialized countries might be applied to developing nations. Despite significant disparities in the institutional system, the findings showed that the same determinants drove business-funding behavior in emerging and industrialized nations.

Short-term liabilities, long-term liabilities, company size, tangible assets, profitability, risk, company growth, interest coverage ratio, bank capital, asset quality, return on assets, liquidity, etc. are just some of the factors discussed in the capital structure literature and that theoretically and practically can affect the leverage ratio (Sibindi, 2018; Kamil et al., 2020; Sriram & Khan, 2020; Gardi et al., 2020: Deneke & Gujral, 2021), etc.

In contrast to non-financial institutions, several studies on the determinants of capital structure have been conducted in financial institutions, mainly from the banks' perspectives.

(Chechet & Olayowola, 2014) used agency theory to assess the impact of capital structure on bank profitability in Nigeria. The study's findings show a negative relationship between the capital structure and profitability of the banks studied, which contradicts the agency theory. Furthermore, the authors failed to adequately describe the practical implications of their findings, which are contrary to the agency theory. In other words, their data show that increasing debt does not affect lowering agency costs and thus increasing shareholder

value. The authors do not explain why the findings were presented in this manner.

(Shibru et al., 2015) discovered that profitability, company size, physical assets, and bank liquidity are significant predictors of bank capital structure in Ethiopia. However, due to the expansion and risk of banks, they have no statistically significant impact on the capital structure of these institutions.

(Siddik et al., 2017) used 30 commercial banks in Bangladesh as their study sample to close the knowledge gap regarding capital structure in developing economies. They discovered that the bank's return on equity, return on assets, and earnings per share were all inversely correlated with its capital structure.

(Sibindi 2018) examines the relationship between leverage and the determinants of capital structure in a sample of 16 South African banks from 2006 to 2015, demonstrating that growth opportunities, risk, and size variables were positively related to leverage, while profit and financial crisis variables were negatively related to leverage.

(Vishnu, 2019) examines the impact of capital structure on the financial performance of small financial institutions in India over two years, from 2017 to 2018. The study investigates how capital structure influences bank financial performance and how financial leverage influences that connection. The debt-to-total assets and debt-to-equity ratios evaluate the capital structure, whereas the return on capital employed, net profit ratio, and net interest margin assess financial performance.

(Abeysekara, 2020) investigates the capital structure determinants of nine Sri Lankan banks listed on the Colombo Stock Exchange between 2007 and 2019. The dependent variable was leverage, and the independent variables were GDP growth rate, inflation, bank size, return on assets, taxes, profitability, and total debt-to-equity ratio. According to the research, the debt-to-equity ratio is a crucial driver of the capital structure of banks in Sri Lanka. However, GDP growth, inflation, bank size, return on assets, and profitability were discovered to have no statistically significant impact on the capital structure of Sri Lanka-listed banks.

(Deneke & Gujral, 2021) base their research on determining the impact of capital structure on the financial performance of Ethiopian commercial banks. Based on the data analysis, it is concluded that the capital structure significantly influences operational profit and net profit. Still, it has no significant effect on the return on assets, return on equity, and return on capital employed.

(Deyganto, 2021) highlights the specific characteristics of the capital structure of microfinance firms in Ethiopia. The regression test found a favorable and statistically significant relationship between leverage and growth, profitability, firm size, age, and fixed assets. In contrast, profitability has a statistically significant and unfavorable impact on capital structure. Based on the findings of the study, the researcher concluded that the firm-specific characteristics of the capital structure of microfinance institutions in Ethiopia include growth, profitability, firm size, age, and fixed assets.

(Wilson et al., 2022) discovered that the short-term debt-to-total-assets ratio significantly affects a bank's financial performance. Based on the results, bank management should work hard to reduce the short-term debt-to-total assets ratio, which has a negative impact on financial performance. They also tend to increase debt to asset ratio as it increases their financial performance.

Long-term debt to total assets ratios should be reduced in the capital structure as they have a negative impact on financial performance.

We anticipate that the findings of this study will help bank managers understand the effects of bank-specific factors on capital structure and help them determine a balanced capital structure to create value for shareholders. The remainder of the paper is organized as follows: Section 2 discusses the determinants that influence capital structure. Section 3 discusses data, variables, and research methodology. Section 4 presents and discusses empirical findings. Section 5 concludes with conclusions and directions for future research.

2.1. Determinants of Bank's Capital Structure

According to empirical research, the significant characteristics that support the assumptions of capital structure theories and may alter the firm's financing mix include profitability, earnings volatility, collateral, growth, bank size, short-term debts to an asset, long-term debt to purchase, and liquidity.

2.1.1. Profitability

Each capital structure theory predicts different effects of a firm's profitability (PROF) on its choice of debt and equity. For instance, the trade-off theory suggests that businesses with positive earnings before taxes aim for higher leverage ratios to take advantage of tax breaks. Hence, it is anticipated that profitability and leverage will be positively correlated. Many authors prove this conclusion (Güner, 2016; Neves et al., 2019; Lutfi et al., 2020; Deyganto, 2021). On the other hand, the pecking order theory foresees a conflict between profitability and leverage. According to this theory, more profitable firms borrow less because they have adequate internal funds for their capital investment programs. Most empirical research reveals a negative link between profitability and leverage, which endorses the assumptions of the pecking order theory (Sheikh & Qureshi, 2017; Almuither & Marzouk, 2019; Rahman et al., 2020). Moreover, profitable firms may likely repay loans; those firms may borrow more. Consequently, we present the following hypothesis**:**

H_1: Profitability has a significant positive impact on financial leverage.

2.1.2. Leverage Ratio (Tier 1 Capital)

A leverage ratio is one of many financial metrics that examines the amount of capital borrowed (in the form of loans) and evaluates a company's capacity to pay its debts. Because businesses typically employ a combination of debt and equity to fund their operations, the leverage ratio category is crucial. Knowing how much debt a company has can help determine if it will be able to pay off its loans when they are due. As a leverage ratio in our investigation, we used Tier 1 capital (Castro and Lopez, 2021). The term "tier 1 capital" refers to the core capital held in a bank's reserves and used to finance the bank's business operations. It comprises common stock, disclosed reserves, and a few other assets. In addition to Tier 2 capital, the size of a bank's Tier 1 capital reserves is used to assess its financial strength. Tier 1 capital consists of a bank's equity capital and reported reserves. It is used to determine the bank's capital sufficiency. Common Equity Tier 1 (CET1) and Additional Tier 1 are the two parts of Tier 1 capital. The Basel III Accord is the main piece of banking legislation that establishes the minimal Tier 1 capital ratio standards for financial organizations. In our

situation, the leverage ratio is defined as the proportion of Tier 1 capital to the book value of the assets (Castro and Lopez, 2021). As a result, we present the following hypothesis:

H_2: Tier 1 Capital has a significant negative impact on financial leverage.

2.1.3. Bank Size

Bank size (BSz) is the logarithm of total assets. According to trade-off theory, large firms often have a higher borrowing capacity, which leads to higher leverage ratios. Because they are larger, they are more diverse and less susceptible to financial problems. Consequently, the research emphasizes bank size as an inverse proxy for insolvency. According to the pecking order theory, the largest firms with internal resources typically use these funding sources. Thus, this theory anticipates a negative relationship between firm size and leverage. According to agency theory, big firms with weak ownership use debt to reduce agency and transaction costs. This idea contends that increased creditor oversight and contractual responsibilities will minimize management opportunism. The literature's empirical study has produced a variety of results. For instance, Chen (2004) identified a favorable but not statistically significant link between size and leverage in Chinese enterprises. Sheikh and Wang (2013) discovered that in Pakistani enterprises, size and leverage were positively correlated. Tin and Diaz (2017) discovered that bank size is the factor that affects leverage the most consistently across big, medium, and small banks. Also, other authors have found a positive relationship between firm size and leverage (Anarfo, 2015; Shibru et al., 2015; Sheikh & Qureshi, 2017; Jaafar et al., 2017). Other studies in banks show the opposite findings. (Abeysekara, 2020) showed a negative correlation between size and leverage. (Abeysekara, 2020; Zemenu, 2021; Sriram and Khan, 2020; Yensu et al., 2021; Deyganto, 2021), and others come to the same conclusion. Other authors have analyzed the impact of the bank's size on other factors such as the ownership structure (Khan S. et al., 2020), but since our field of research is focused on leverage, the impact of size and other factors will be analyzed in a future paper. The ratio of bank size to financial leverage is presented in the following hypothesis:

H_3: Bank size has a statistically significant positive impact on bank profitability.

2.1.4. The Collateral

The collateral (COL) determines how much collateral a business may offer its debtors. The collateral is sometimes represented as a percentage of the entire book value of the assets divided by the book value of the physical assets that may be used as security. This variable has a positive relationship with the firm's leverage since it guarantees the lender that certain collateral assets will support the loan. According to trade-off theory, a larger ratio of fixed assets to total assets gives a better level of security, resulting in more value for asset liquidation in the case of bankruptcy. According to the pecking order theory, selling safe debt can help the organization by lowering the cost of information asymmetry between insiders and investors. The organization can capitalize on this opportunity. Most empirical studies in developed and emerging markets have shown a positive relationship between firm tangibility and Leverage, i.e., they support the trade-off and pecking-order agency theories that show a positive relationship between collateral and leverage. (Sibindi, 2018; Yousef, 2019; Dang et al., 2019; Sriram and Khan, 2020; Yensu

et al., 2021; Deyganto, 2021), Other studies reveal the reverse ((Shibru et al., 2015; Sheikh & Qureshi, 2017; Dakua, 2019; Doan, 2019). Additionally, other studies suggest that the impacts of tangibility on banks' leverage are insignificant since growing their holdings of tangible assets may provide them more collateral to fall back on in the case of liquidation, which might lead to a rise in leverage on its own (Toumi et al., 2015). This research examines collateral (asset tangibility) as the ratio of fixed assets to total assets, as most experts do. Accordingly, we propose the fourth hypothesis:

H_4: The collateral has a negative relationship with financial leverage.

2.1.5. Earnings Volatility

According to the trade-off theory, a firm's leverage and earnings volatility (VOL) are incompatible. Because the company is contractually obligated to fulfill debt-related obligations by issuing debt, it is predicted that an unstable company's earnings may reduce its borrowing ability. These payments may put you in financial trouble if the company's earnings are inconsistent. Additionally, a tax shield may not provide the obligated company with as many advantages during periods of poor revenues. Empirical data, however, shows a range of outcomes. (Chen, 2004; Arsov & Naumovski, 2016; Merve and Cevheroglu, 2018), for instance, found no correlation between changing wages and debt ratios. However, the findings of De Jong et al. (2008) were congruent with the hypothesis of the trade-off theory. Moreover, Shibru et al. (2015) found that earnings volatility is negatively related to Leverage, but the relationship is insignificant. Contrary to this, Sheikh & Qureshi (2017), and Khan et al. (2020) found that earnings volatility was positively related to the book leverage, which is inconsistent with the predictions of trade-off theory. Based on this, we present the following hypothesis;

H_5: Earnings volatility has a significant negative impact on financial leverage.

2.1.6. The Bank's Growth

The bank's growth (GROWTH) is an intangible asset that increases the worth of a company but cannot be pledged as security and does not generate taxable revenue. Many theories provide predictions to demonstrate the link between growth and leverage. Various studies (Shibru et al., 2015; Sheikh & Qureshi, 2017; Khaki & Akin, 2020) found that organizations with fewer development prospects prefer debt financing because growth potential cannot be utilized as security since it is not a physical asset. Other studies expected an inverse link between company growth and solely long-term debt and a direct association with short-term debt (Rajan & Zingales, 1995; Titman & Wessels, 1988; Bevan & Danbolt, 2002). Conversely Gill et al. (2009); Sharif et al. (2012); Jaworski and Dos Santos (2021); and Yensu et al. (2021), found a positive relationship between leverage and firm growth, while a negative relationship between firm growth with leverage was discovered by Sibindi (2018); Neves et al. (2019); Almuither & Marzouk (2019); Sriram and Khan (2020); Deyganto (2021), etc. This study expresses growth opportunities as a percentage change in assets. So, we propose the sixth hypothesis:

H_6: The bank's growth positively and significantly impacts financial leverage.

2.1.7. LIQUIDITY

Many authors have analyzed the impact of liquidity (LIQ) on monetary policies, market

structure, and capital structure (Bashir et al., 2017; Bashir et al., 2020; Hussain M. et al., 2021), several other studies employed liquidity as an independent variable to assess its possible influence on business leverage. Simply put, liquidity is a company's capacity to satisfy its short-term obligations. According to Ozkan (2001), a high liquidity ratio indicates that a company has more ability to pay its debt when it falls due. Several researchers have used Liquidity as an independent variable, including (Handoo & Sharma, 2014; Merve & Cevheroglu, 2018; Siddik, 2017; Terzioglu, 2017). This study defines liquidity as the ratio of total loans and advances to incremental deposits. Based on the literature review, we present the following hypothesis:

H_7: Liquidity has a negative impact on financial leverage.

3. Data, Variables, and Research Methodology

The study is descriptive research that relies on secondary data sources, namely data from audited financial statements of commercial banks in the Western Balkans from 2015 to 2020. The study sample comprised 47 commercial banks, resulting in 282 bank-year observations. Banks' data were utilized to enable the researcher to perform an in-depth examination of the sample obtained for the designated time to examine the determinants of capital structure. For a relevant comparison of the findings with prior investigations, the study utilized the definitions of the variables from the existing literature. In harmony with the leverage definition, the book leverage is selected as a dependent variable as a stand-in for the banks' capital structure, just like (Deyganto, 2021; Sriram and Khan, 2020; Merve & Cevheroglu, 2018; Sibindi & Makina, 2018; Sheikh & Qureshi, 2017).

We use underlying elements identified as significant in various studies in our research.

Regarding the independent variables, the selected regressors, based on some empirical studies and theoretical literature, mainly correspond to empirically identified determinants at the bank level of capital structure. Leverage ratio (Tier 1 capital only), profitability, bank size, collateral (tangibility of assets), earnings volatility (risk), bank growth, and liquidity are all determinants of capital structure. They were summarized and analyzed in different components to test the relationship between these variables using the multiple panel data regression model and SPSS.

In this study, the determinants of bank capital structure were empirically investigated using the following methods:

- Descriptive statistics were used to characterize the lowest, highest, mean, and standard deviation values of the dependent (LEV), independent (RCAP, PROF, BSz, COL, EVOL, GROWTH, and LIQ),
- The Pearson correlation test was used to assess the strength of the relationship between dependent and independent.
- The variance inflation factor (VIF) examines whether or not the independent variables are multicollinear in regression analysis. The VIF estimates how much the variance of a regression coefficient is inflated due to multicollinearity, ranging from one to ten (a VIF value above 10 indicates a high correlation and is cause for concern).
- A linear regression analysis was done to discover the critical component of work that contributed more to protecting the bank's capital structure determinants. The pooled ordinary least squares (OLS)

model was the simplest model to analyze our data set. However, since OLS can only be used when certain conditions are previously met – (for example, when the error terms have the same variance, there is no correlation between the errors, and there is no correlation between the error terms and the explanatory variables), we focused on the alternative technique used to analyze panel data: Fixed Effects (FE), specifically the Robust fixed effect model. In this area, we have applied the Breusch-Pagan and Hausman tests, to decide which model can better fit our study.

- A robust fixed effect model to adjust the model-based standard errors using the observed variability of the model residuals, which are the difference between the observed outcome and the outcome predicted by the statistical model.

Following (Sheikh & Qureshi, 2017; Assfaw, 2020; Khan et al., 2020; Castro & Lopes, 2021; Oliveira & Raposo, 2021), book leverage has been used as a proxy for capital structure.

To examine the determinants of the capital structure in the sampled banks, a regression model was formulated as follows:

$$Y_{it} = \beta_0 + \beta X_{it} + \varepsilon_{it}$$

Where: Y_{it} - represents the dependent variable (banks' leverage ratio i at time t); X_{it} - was the predictor variable for bank i at time t; β_0 - was the intercept/constant term; β_1 - was the coefficient that represents the predictor variables' slope; ε_{it} - was the error term (scalar); i - denotes cross-sections (banks); t - means time-series dimensions (years). The general model specified for the study was:

$$LEV_{it} = \beta_0 + \beta_1 PROF_{it} + \beta_2 RCAP_{it} + \beta_3 BSz_{it} + \beta_4 COLL_{it} + \beta_5 EVOL_{it} + \beta_6 GROWTH_{it} + \beta_7 LIQ_{it} + \varepsilon_{it}$$

Table one details the approved definitions and basis for the dependent and independent variables.

Table 1. Measurements of Dependent and Independent Variables

Variables	Symbols	Proxy:
Dependent variable		
Book Leverage	LEV	Computed as 1 - (book value of equity/book value of assets)
Independent variables		
Profitability	PROF	Computed as the ratio between the sum of pretax profit and interest expenses and the book value of assets
Leverage ratio	RCAP	Computed as the ratio of Tier 1 Capital to Book Value of Assets
Bank size	BSz	The logarithm of the book value of assets
Collateral	COL	Computed as the ratio between the sum of the following items: "total securities," "fixed assets," and "cash and due from banks" and the book value of assets
Earnings volatility	EVOL	The ratio of (profit after taxes t - profit after taxes t-1) to profit after taxes t-1
Bank growth	GROWTH	(Total assets t – total assets t-1)/ total assets t-1
Bank liquidity	LIQ	The loan-to-deposit ratio assesses a bank's liquidity by comparing its total loans and advances to its total deposits for the same period.

4. Empirical Results

4.1. Descriptive Statistics

This section presents the descriptive statistics of dependent and independent variables used in the study for the sampled banks in the Western Balkans. The dependent variables used in this study were capital structure (leverage). In contrast, the independent variables were profitability, leverage ratio, size of the bank, earnings volatility, collateral, growth, and liquidity of selected banks. Table 2 shows the mean and standard deviation of the dependent and independent variables throughout the study.

The mean value for the dependent variable (LEV) for the study period was 0.843 percent, suggesting that 84.3 percent of the assets of Western Balkan banks were debt. In contrast, the standard deviation within this data set was 10.7 percent. This also demonstrates that most banks in the Western Balkans have limited financial autonomy. This leverage may be primarily due to Western Balkan banks, which mobilize and collect deposits from the public (Assfaw, 2020). The highest value of the total liabilities to total equity ratio is 96.4 percent, while the lowest number is 7.9 percent.

The following independent variables should be highlighted: Profitability (whose chosen proxy is PROF) provides a mean of 0.008, indicating that 0.8 cents before tax were created from a 1 euro investment in bank assets. This conclusion is lower when compared to previous empirical investigations conducted on US and other European banks (Miles et al., 2012; Gibson et al., 2016). The standard deviation of profitability is 0.038, and the range is from -0.103 to 0.402. In addition, the mean of the leverage ratio (RCAP) is 0.036, the standard deviation is 0.107, and the minimum and maximum are 0.004 and 1.517, respectively. Bank size (BSz) is measured as Ln of total assets and has a high mean of 12.94, ranging from 5.848 at the lowest to 15.627 at the highest and a standard deviation of 1.685. The mean of earnings volatility (EVOL) is 0.138, the standard deviation is 2.289, and the range is from -9.626 to 9.175 for the maximum and minimum values. The mean of collateral (COL) is 0.0267, and the standard deviation of 0.162. The minimum collateral is 0.011, and the maximum is 0.753. The mean value of growth opportunity (GROWTH) is 0.060, with a minimum of -4.557, a maximum of 0.999, and a standard deviation of 1.003. This means that, on average, the total assets

Table 2. Summary statistics of the variables

Variable typology	Variable	N	Minimum	Maximum	Mean	Std. Deviation
Dependent	LEV	282	0.079	0.964	0.843	0.107
Independent	PROF	282	-0.103	0.402	0.008	0.038
	RCAP	282	0.004	1.517	0.036	0.107
	BSz	282	5.848	15.627	12.946	1.685
	COLL	282	0.011	0.753	0.267	0.162
	EVOL	282	-9.626	9.175	0.138	2.289
	GROWTH	282	-4.557	0.999	0.060	1.003
	LIQ	282	0.001	4.065	0.796	0.415

Source: Authors' calculations

of the sample commercial banks rose by 6 percent throughout the research period. The mean value of the non-deposit to total asset ratio (NDA) is 0.056, with a minimum of -0.725, a maximum of 0.874, and a standard deviation of 0.159. Liquidity provides a mean of 0.796, the least liquidity rate was minus 0.000, and the most considerable liquidity rate recorded throughout the research period was 4.065, which deviates from its mean value on both sides by 0.415 percent.

4.2. Correlation Analysis

The Pearson correlation quantifies the strength of the linear relationship between two variables. For clarity, Pearson's correlation coefficient determines the degree of the linear relationship between two continuous variables. Table 3 shows the findings of the correlation analysis, which is based on the connection between the dependent and independent variables. This point illustrates that all explanatory variables are interrelated. In other words, this is an attempt to avoid the problems associated with multicollinearity. All correlations between the independent variables are smaller than 0.75, as expected. As a result, it appears that there are suspicious examples of multicollinearity affecting the research variables. A multicollinearity problem exists if the correlation coefficients between two explanatory variables are greater than 0.75 (Assfaw, 2020). The predictor variables' variance inflation factor (VIF) should not be greater than 5 to rule out multicollinearity, even though (Assfaw, 2020) in his study accepts the VIF of the predictor variable as greater than 10. In our study, the reciprocal of the VIF is greater than 0.20. These numbers revealed the absence of multicollinearity.

Table 3. Pearson Correlation Coefficients and VIF test

Variable	LEV	PROF	RCAP	BSz	EVOL	COLL	GROW	LIQ	VIF	1/VIF
LEV	1									
PROF	0.245** 0.000	1							1.025	0.97
RCAP	-0.065 0.358	0.019 0.795	1						1.001	1.00
BSz	0.108 0.128	0.062 0.381	-0.047 0.511	1					1.040	0.96
EVOL	-0.119 0.094	-0.230** 0.001	-0.230** 0.001	0.079 0.269	1				1.000	1.00
COLL	0.001 0.994	-0.088 0.218	-0.007 0.922	0.013 0.852	0.047 0.507	1			1.201	0.83
GROW	0.055 0.440	0.169* 0.017	0.039 0.579	0.207** 0.003	0.191** 0.007	0.272** 0.000	1		1.060	0.94
LIQ	-0.607** 0.001	-0.156* 0.027	-0.030 0.670	-0.195** 0.006	0.013 0.855	-0.409** 0.000	-0.238** 0.001	1	1.454	0.69
**. Correlation is significant at the 0.01 level (2-tailed).										
*. Correlation is significant at the 0.05 level (2-tailed).										

Source: Authors' calculations

At a substantial level of 99.9 percent, leverage shows a positive connection with profitability (r = 0.245, p = 0.001). The leverage ratio has a negative but not statistically significant relationship with book leverage at 64.2 percent (r = -0.065, p = 0.358). Bank size has a positive but not statistically significant link with leverage at 89.2 percent, BSz (r = 0.108, p = 0.128). Earnings volatility shows a negative but not significant association with leverage at 88.1 percent (r = - 0.119, p = 0.094), and collateral at 99.9 percent (r =0.001, p = 0.994). Non-deposit to asset ratio has a positive correlation with Leverage of 97.2 percent (r = 0.028, p = 0.694), growth has a positive correlation of 94.6 percent (r = 0.055, p = 0.440), and liquidity has a negative correlation of 39.30 percent (r = - 0.607, p = 0.001). We may conclude from evaluating the independent variables and their relationships that the independent variable has a mixed relationship.

4.3. Regression Results

Pooled ordinary least squares (OLS), fixed effect models (FE), and random effect models (RE) are the three most commonly used panel data estimator models in many financial studies. The results of various model specification tests, such as the Hausman and Breusch and Pagan tests, determine which model has the best estimation power. Table 4 summarizes the results of the three methods.

The Durbin-Watson test begins at zero and ends at four to detect the study's autocorrelation problem, as shown in Table 4. A value closer to zero indicates positive autocorrelation. According to Assfaw (2020), the autocorrelation problem decision rules state that when the value is $1.765 < d < 2.235$, there is no positive or negative autocorrelation, and positive autocorrelation is not an issue when the value is $1.335 \leq d \leq 1.765$. Table 4

Table 4. Estimations and Tests of Significances

Variables	Model 1 (OLS)			Model 2 (FE)			Model 3 (RE)		
	β (Std)	T	Sig.	β (Std)	t	Sig.	β (Std)	T	Sig.
(Constant)	1,056	19,90	0,000***	1,043	19,41	0,000***	1,048	19,36	0,000***
PROF	0,299	1,876	0,062*	0,286	1,793	0,074*	0,291	1,824	0,068*
RCAP	−0,088	−1,678	0,095*	−0,091	−1,731	0,085*	−0,090	−1,716	0,086*
BSz	−0,001	−0,389	0,697	.000	0,007	0,994	−0,00	−0,123	0,901
EVOL	−0,004	−0,785	0,432	−0,006	−1,044	0,297	−0,006	−0,959	0,337
COLL	−0,175	−4,379	0,000***	−0,179	−4,477	0,000***	−0,177	−4,451	0,000***
GROWTH	−0,002	−1,090	0,277	−0,002	−0,954	0,341	−0,002	−1,002	0,316
LIQ	−0,184	−11,81	0,000***	−0,189	−11,83	0,000***	−0,188	−11,84	0,000***
Observation			284			284			284
R^2			0.467			0.471			0.466
Adjusted R^2			0.447			0.468			0.447
F-test			24.016			21.341			
Prob > F			0.000			0.000			
Durbin - Watson			2.068			2.093			2.091
Overall R^2									-
Chi^2			-			-			168.65
Prob > Chi^2									0.000
R^2 within						0.468			0.453
Hausman Test Chi^2			-			-			0.661
Prob > Chi^2									0.416
Breusch-Pagan									0.039
Prob > Chi^2									0.842

Notes: ***p < 0.01; **p < 0.05; *p < 0.10

Source: Own compilation

results show no autocorrelation in the model (Durbin-Watson d-statistic around 2).

According to Table 4, the results of OLS show that profitability has a positive effect (0.299) on leverage that is statistically significant at the 0.10 level. The leverage ratio has a negative coefficient (-0.088) statistically significant at 10 percent. Collateral has a statistically significant negative effect (-0.175) at the 0.01 level. Liquidity, on the other hand, has a substantial impact on book leverage (with a coefficient of -0.184) at the 0.01 level. Bank size, earnings volatility, and growth do not significantly affect book leverage. The F-test probability is less than 0.01, indicating that the model is effective and fits the study's data. The R-square and adjusted R-square values suggest that the independent variables explain 46.7 percent and 44.7 percent of the book leverage variation, respectively.

The results of the Fixed Effects (FE) method show that this model is superior to OLS because the F-test indicates that the test statistics equal 21.34. Its probability is less than 0.01, meaning the FE method is appropriate and fits the study's data well. According to the findings of FE, profitability has significant positive effects at the 0.1 level. The leverage ratio, collateral, and liquidity have a negative impact at a 0.1 level. Bank size, earnings volatility, and growth do not substantially affect book leverage.

Because the probability of Chi^2 is greater than 1 percent, the random effects (RE) results show that this method is inappropriate. The same results are also shown with the Breusch-Pagan test (the value of Prob (Chi^2) is 0.842, which is greater than 5 percent). Inconvenient results are also derived from the Hausman test when comparing RE and FE methods. The result shows that the test's Prob (Chi^2) is greater than 0.05 (0.416), indicating that RE is not an appropriate method for estimating the study's model. RE results confirm the findings of FE, namely that profitability has positive effects. This effect is statistically significant at 0.1. In contrast, at the 0.01 level, collateral and liquidity have statistically adverse effects. Bank site, earnings volatility, and growth have a negative coefficient and do not affect leverage.

Table 5 shows the FE model results after controlling for heteroscedasticity using the robust method or HAC robust standard errors:

Table 5. Robust (HAC)Fixed Effects Model Results

Variables	Model 4 (FE)				
	β (Std)	Std. error	t-value	p-value	Sig.
(Constant)	1.043	0.029	35.06	0.000	***
PROF	0.286	0.005	50.62	0.000	***
RCAP	−0.091	0.005	−16.74	0.000	***
BSz	0.000	0.001	0.072	0.942	
COLL	−0.179	0.023	−7.751	0.000	***
EVOL	−0.006	0.001	−5.275	0.000	***
GROWTH	−0.002	0.000	−178.4	0.000	***
LIQ	−0.189	0.039	−4.827	0.000	***
Mean dependent variable		0.843	SD dependent variable		0.108
R^2		0.497	A number of observ.		284
F –statistic		2.602	P-value		0.027
Chi^2		45.191	P-value		0.000
Within R-squared		0.468	Durbin-Watson		2.093

Notes: ***p < 0.01

Source: Authors' calculations

Table 5 shows that the explanatory power of the R-square within models was used to calculate its value and was 46.8 percent. This suggests that a good part of the variations or changes in the capital structure of the understudied bank in Western Balkans are determined by the dependent variable selected for this study. F-statistics for the model is also significant at the 5% significance level, implying that all predictor variables can be used together to influence the rate of 46.8% over variation in the Bank capital structure. The Durbin-Watson Statistic of 2.093 indicates no serial correlation in our model's error terms, suggesting that it is a spurious regression (a value near two indicates non-autocorrelation).

In line with the expectations of the study, bank **profitability** has a positive effect (0.286) on book leverage, which proves the first hypothesis. It is assumed that for each percent increase in profitability, a 28.6 percent increase in return for the book leverage that takes the other factors into account will remain the same. The profitability value is 0.000, less than the 1 percent significance level. This relationship endorses the trade-off theory. The finding aligns with the other studies (Güner, 2016; Neves et al., 2019; Lutfi et al., 2020; Deyganto, 2021). Hypothetically, this positive relationship could affect the deposits of more profitable banks. However, this might not be the case because of the banks' nature of business and the regulatory framework implemented by the central bank. In the case of Western Balkan banks, the mean profitability is 0.84 percent (see Table 2).

The second independent variable is the **leverage ratio.** The leverage ratio coefficient value is (0.009), or (0.9) percent. Each one percent decrease results in a 0.9 percent increase in book leverage. The RCAP conclusion is consistent with the data (Allegret et al., 2017), which shows that capital requirements induce a non-linearity in bank behavior when capital falls to levels extremely close to the regulatory minimum. This finding confirms the second hypothesis, namely that the leverage ratio has a significant negative impact on financial leverage.

Collateral has a significant negative relationship with book leverage at the level of 0.00, which means less than 1 percent (which proves the fourth hypothesis). The coefficient of collateral is -0.179, which is 17.9 percent. This means that a one percent decrease in collateral will increase book leverage by 17.9 percent. The negative relationship does not support the trade-off and pecking order agency theories that show a positive relationship between collateral and leverage. The results of the current study are similar to the findings of (Bopkin and Arko, 2009; Shibru et al., 2015; Sheikh and Qureshi, 2017; Dakua, 2019; Doan, 2019).

Earnings volatility is the fifth independent variable, with a coefficient of -0.006, or 0.6 percent. This means that if earnings volatility falls by 0.6 percent, book leverage rises by the same amount. The probability value is 0.00, indicating a significant level of less than 1 percent, which supports the fifth hypothesis. Those findings align with the results of (Shibru et al., 2015; Mangafic & Martinovic, 2015), who found that earnings volatility is negatively related to leverage, which is consistent with the predictions of trade-off theory.

Bank's Growth has a coefficient of -0,002, which is 0.2 percent, while the probability value is 0.000, which means that it has significant negative relationships with book leverage at the 1 percent level (which does not prove the sixth hypothesis). The negative

relationship between growth and leverage confirms the pecking order theory's prophecy. Furthermore, a negative relationship is consistent with agency explanations, implying that higher growth opportunities incentivize managers to invest inefficiently or accept risky projects that transfer wealth from debt holders to shareholders. Our results align with those (Sibindi, 2018; Neves et al., 2019; Almuither & Marzouk, 2019; Sriram and Khan, 2020; Deyganto, 2021).

The study depicts a negative relationship between liquidity and book leverage. The coefficient of liquidity is -0.189 or 18.9 percent. Consistent with those (Režňáková, 2010; Güner, 2016; Ullah et al., 2017; Sakunasingha et al., 2018), the results reveal a negative and significant impact of liquidity on book leverage for Western Balkan banks. These findings confirm the seventh hypothesis, which means that liquidity has a significant and negative impact on financial leverage.

The probability value of **bank size** is 0.942, which is greater than the 10 percent significance level, indicating that bank size has no significant effect on book leverage. Although logically the size of the bank should have a significant impact on financial leverage, our results do not confirm this and therefore we cannot conclude that any kind of impact, whether positive or negative, on financial leverage is proven.

5. Conclusions

This study examined the capital structure of forty banks selected as a sample in Western Balkan countries from 2015-2020. Three models are employed to satisfy this primary objective: the OLS model, the FE model, and the RE model. The analysis uses descriptive and association measures, a multiple linear regression model, and a robust fixed effect model. The study examines specific factors (i.e., profitability, leverage ratio, bank size, collateral, earning volatility, growth, and liquidity) and capital structure with book leverage as the dependent variable.

Regarding correlation analysis, our findings align with the predictions of the major theories. Relatively to the profitability, leverage ratio, bank size, collateral, and growth, which also stated that leverage is positively correlated with profitability. Besides, leverage is inversely associated liquidity, which can be explained premised on the predictions of the pecking order theory.

Regressing the panel data through the Robust (HAC) Fixed Effects model, we found some factors that significantly affect the Western Balkan banking capital structure. Generally, this study's findings align with previous empirical evidence. Some elements do not influence leverage (i.e., bank size). Still, the other determinants (i.e., profitability, leverage ratio, collateral, earnings volatility, growth, and liquidity) have been the most consistent variables affecting leverage in all bank groups.

Despite laying some groundwork to understand the determinants of capital structure and their impact on it, the study is limited in the number of banks sampled. A future study in this field can be developed in three directions. First, we recommend that future studies extend the study period to ensure that the sample does not bias the conclusions. Second, we need a data set that also includes macroeconomic determinants, especially GDP and the inflation rate. Third, the comparison with Eastern Balkan countries would be of great interest to researchers, which remains to be included in a future study.

This study will provide key stakeholders, such as bank managers, financial analysts, and policymakers, with a better understanding of the factors that influence the capital structure of the banking sector in the Western Balkans and can improve the competitiveness of the banking sector.

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