Journal of Global Information Management
Volume 31 • Issue 1

The Effect of Information Resources Management in the UK on Financial Institutions

Victor Chang, Aston University, UK*
https://orcid.org/0000-0002-8012-5852

Vincent Andrew Kozah, Aston University, UK

Qianwen Ariel Xu, Aston University, UK

Yujie Shi, Aston University, UK
https://orcid.org/0000-0002-8333-3497

Xihui Haviour Chen, Herriot-Watt University, UK
https://orcid.org/0000-0003-0723-4574

Jonathan Mills, Aston University, UK
https://orcid.org/0000-0001-7904-4919

ABSTRACT

The authors adopt the resource-based view (RBV) and information processing theory to discover the problems that impact the capital structure of financial institutions in the UK. Five firm-level explanatory variables (profitability, size, tangibility, age, and growth) were selected. The relevant capital structure measure was then regressed against the dependent variable leverage (debt-to-equity ratio). Consequently, correlation and multivariate regressions are applied to firm financial data from the selected financial institutions during the fiscal years 2011–2022. The primary conclusions of the study indicate that important information resources management variables for financial institutions in the UK are profitability and size. While the two other factors, profitability and growth, exhibit negative associations with capital structure, the remaining four variables, tangibility, size, age, and profitability, did not. The study reveals that optimal determinants of information resources management enhance financial performance in the case of top UK banks.

KEYWORDS

Capital Structure, Information Processing Theory, Information Resources Management, RBV

DOI: 10.4018/JGIM.334015

*Corresponding Author

1. INTRODUCTION

1.1 Background

An optimal capital structure, defined as the ideal mix of debt, equity, and other financing sources that maximize a company's value while minimizing its cost of capital, is beneficial to firms in several ways. It offers a lower cost of capital, bolsters financial flexibility, curtails the risk of ownership dilution, and enhances the credit rating (Forbes & Hodgkinson 2014). However, despite the many advantages of having an optimal capital structure, the major issue is how to establish a relatively perfect capital structure. Given different theories, such as Resource-Based View (RBV), Information Processing Theory, Pecking Order Theory and Trade-off Theory, have been proposed for the financial structure of firms, it is essential for us to explore whether an optimal capital structure actually exists or the factors that influence this financial structure.

The representative information resources management theories that can be applied to the capital structure of banks in the United Kingdom (UK) are Resource-Based View (RBV) (Varadarajan, (2023) and Information Processing Theory (Wickens & Carswell, 2021). The former suggests that a firm's resources, including information resources, contribute to its competitive advantage. In the case of banks, effective management of information resources can help optimize the capital structure by enabling better risk assessment, improved decision-making, and efficient allocation of financial resources. The latter examines how organizations acquire, process, and use information to make decisions. Within the context of capital structure, it can be applied to analyze how banks gather, analyze, and utilize information to assess risk, determine optimal capital levels, and make financial decisions. Efficient information processing can lead to better capital structure decisions and risk management practices. In addition to these two theories, the trade-off theory emphasizes the existence of an optimal capital structure. Specifically, an optimal debt ratio that is decided by the contrasting benefits of debt[1] and the cost of debt[2]. Existing studies have analyzed the effect of transaction costs and the speed of adjustment in achieving the optimal capital structure (Miguel and Pindado, 2001; Guad et al., 2005; Flannery and Rangan, 2006; Gonzalez and Gonzalez, 2008; Qiao and Lin, 2023). Moreover, the pecking order theory indicates the existence of informative asymmetry between the company and the market, as well as the disciplinary effect brought by the market on firms, representing that companies tend to get funding internally rather than receive financing externally. However, the pecking order theory does not support the existence of an optimal debt ratio. In terms of its framework regarding information asymmetry, it can also be considered from tax, agency, or behavior (Frank and Goyal, 2009).

Previous studies have found that the capital structure of firms is determined by more than just firm- or country-specific factors (Booth et al., 2001; Bancel and Mittoo, 2004). Moreover, country-specific factors can also affect firm leverage through their effect on the impact of firm-specific variables (De Jong et al., 2008). In this paper, we focus on our analysis of the United Kingdom since the UK has the advantage of effective management of information resources, a unique institutional and legal framework, and a dynamic and diverse economy. Firstly, the effective management of information resources can optimize the capital structure of banks operating within the UK financial system. By leveraging advanced technologies infrastructure, robust data analytics capacities, and a well-established regulatory framework, banks in the UK are well-positioned to harness the power of information resources in shaping their capital structure decisions. Through efficient risk assessment, enhanced decision-making processes, and the utilization of timely and accurate financial information, banks can strive for an optimal mix of debt and equity financing that aligns with their risk appetite, business objectives, and regulatory requirements (Gimber and Rajan, 2019). Furthermore, the effective management of information resources enables banks to adapt to dynamic market conditions, anticipate emerging risks, and make proactive adjustments to their capital structure to maintain financial stability and competitiveness in the UK banking sector. More importantly, the UK is one of the leading global financial centers, making it an important market for companies looking to raise

capital. As a result, the UK capital markets have a diverse range of financial instruments, making it an ideal market for studying capital structure decisions and their impact on a firm's financial performance. Second, the UK has a unique institutional and legal framework that shapes corporate finance decisions. The UK's legal system, for example, is based on the common law system, which provides a stable and predictable legal environment for firms (Caenegem, 1988). Additionally, the UK has a well-developed institutional infrastructure, such as stock exchanges, regulatory bodies, and financial intermediaries, which provides a robust framework for firms to access capital markets. Finally, the UK has a dynamic and diverse economy, with firms across various sectors, including finance, technology, and manufacturing. The diversity of firms and sectors makes it possible to study the impact of capital structure decisions on firm performance across different industries and business models. We provide the possibility of analyzing how country-specific factors affect capital structure indirectly through firm-specific variables.

The UK belongs to a market-oriented economy, offering greater investor protection and transparency than the bank-oriented economies like Spain, Italy, Germany, and France. For this reason, it further supports why we analyze banks in the UK instead of the bank-oriented economies. In this paper, we adopt the multiplicative model to estimate the unique factors influencing a firm's capital structure in the UK. This paper makes two pivotal contributions to the realm of capital structure research, particularly in the context of banks within the UK. Specifically, our research uniquely integrates multiple theories - the Resource-Based View, Information Processing Theory, trade-off theory, and the pecking order theory - to offer a comprehensive understanding of capital structure dynamics.

1.2 Research Objectives

Following the trade-off theory, this framework relies on a target adjustment model to elucidate the current debt situation in the UK. It examines the process of capital structure adjustment by considering the past debt and the desired debt level of banks. In this paper, we adopt the system GMM estimator with instrumental variables to address endogeneity issues. It incorporates panel data methodology to account for unobservable heterogeneity, which refers to omitted variables influencing the outcome of interest and having a connection to the covariates. Additionally, this method enables the examination of time effects and the rate at which UK banks adjust their capital structure towards the desired target.

Based on the previous argument, this paper considers the indirect influence of firm-specific factors on the capital structure of UK banks. Furthermore, we also explore the changing nature of capital structure decisions by analyzing the relationship between debt levels and a range of explanatory variables over time.

This paper is structured as follows. Section 2 proposes a literature review and hypotheses regarding capital structure. Section 3 describes the data description and variable definition. Section 4 explains the empirical framework. Section 5 reports empirical results and inferences. The last section presents the conclusion, limitations and future research.

2. LITERATURE REVIEW AND HYPOTHESES REGARDING CAPITAL STRUCTURE

As previously mentioned, the market-oriented economy (i.e., the UK) has more transparency and investor protection than the bank-oriented economy. In particular, the management of information resources differs between market-oriented economies and bank-oriented economies due to their distinct financial systems and priorities. In a market-oriented economy, the focus is on the efficient allocation of resources through market mechanisms. Information resources play a critical role in facilitating transparency, competition, and decision-making within the market. Information technology and systems are utilized to provide timely and accurate data, enabling market participants to make informed investment decisions. Market-oriented economies prioritize information dissemination,

ensuring that relevant financial information is accessible to investors, regulators, and stakeholders. This includes financial reporting, disclosure requirements, and market surveillance systems to detect and prevent market abuses. On the other hand, in a bank-oriented economy, the financial system relied more heavily on banks as intermediaries for financial transactions. Information resources are managed with the objective of maintaining financial intermediation. Banks play a central role in collecting, analyzing, and managing financial information. Information resources are utilized to assess the creditworthiness of borrowers, manage loan portfolios, and make lending decisions. Banks also rely on information systems for risk management, regulatory compliance, and liquidity management. In bank-oriented economies, regulatory frameworks focus on prudential regulations and supervision to ensure the soundness of the banking system.

In such cases, most firms will operate in bank-oriented economies using bank financing rather than capital markets when in search of financing. The potential reason for the unexpected result is that the degree of information asymmetry between the banks and firms is much lower, not only because the relationship between lenders and borrowers is narrower, but also because banking groups are usually among the firm's shareholders. In this section, we analyze different variables derived from financial theories that explain the capital structure of companies and attempt to particularize their predictions for firms that operate in the UK. The expected and estimated relationship between tax, financial distress cost, firm size, investment, asymmetric information and capital structure has been shown in Table 1.

2.1 Tax Aspects of Capital Structure

The two capital structure theories, the Pecking Order Theory (Wijaya et al., 2020; Yıldırım & Çelik,2021) and the Static Trade-Off Theory (Hoang et al., 2021), have significant differences regarding profitability. The Static Trade-Off Theory suggests that corporations are incentivized to take on more debt, especially when they're highly profitable. Why? Because debt can bring about tax benefits. Specifically, when a company borrows, the interest expenses on that debt can reduce taxable income, subsequently leading to a lower tax liability. So, according to this theory, the more profitable a corporation becomes, the more it stands to gain from these tax advantages by leveraging more debt. Contrastingly, the Pecking Order Theory asserts that as a company's earnings increase, its reliance on internally generated funds—namely, retained earnings—also grows. Retained earnings refer to the portion of net income that a company keeps, rather than paying out to shareholders as dividends. This theory posits that companies prefer to use these retained earnings first to finance new projects or cover any capital shortfalls. If these funds are insufficient, only then do they seek external financing, like issuing debt or new equity. The static trade-off theory predicts a positive (+)

Table 1. Hypothesized and Observed Signs of the Independent Variables

Model:	Definitions	Hypothesized signs	Indicators that capture the theoretical factors influencing capital structure		
			STT	POT	ACT
Size (SZ)	based on the natural logarithms of bank profits (turnover).	+	+		
Growth (GRWT)	calculated as a percentage growth in the net total asset.	+	-		
Tangibility (TAN)	Net total asset divided by Measured Fixed Asset	+	+		
Profitability (PROF)	Assessed using Return on Asset (profit before tax divided by total asset)	-	+		
Age (AG)	Measured the length of time since the company's incorporation.	+	+		

relationship between profitability and leverage, but the pecking order hypothesis predicts the exact opposite (-) relationship.

The profitability of a bank can have significant implications for its borrowing mix or leverage. As the profitability of UK banks changes, it might influence their inclination to borrow or leverage. Based on our foundational understanding:

Hypothesis 1: To determine how a change in profitability affects the borrowing mix (leverage) of UK banks.
H1: Profitability and leverage ratio have a negative relationship.

2.2 Financial Distress Cost and Capital Structure

The tangibility of assets in a company can affect its borrowing capacity. With tangible assets, companies often find it easier to secure loans and at lower interest rates. This is consistent with the insights from Harris and Raviv (1991):

Hypothesis 2: To ascertain the impact of change in the tangibility of assets on the debt-to-equity ratio of UK banks.
H2: Tangibility and leverage ratio have a positive relationship.

2.3 Firm Size

A firm's size is crucial when considering its borrowing capacity. Larger firms often find it easier to issue debt, largely because their risk of bankruptcy is lower, as suggested by Titman and Wessels (1988):

Hypothesis 3: To determine how variations in firm size explain changes in UK financial institutions' debt-to-equity ratio.
H3: Firm size and leverage ratio have a positive relationship.

2.4 Investment and Capital Structure

According to the static trade-off argument, companies with more capacity for growth will have fewer debts since they won't need as much financing. Growth possibilities are another type of capital asset that boosts a business's value, notwithstanding the fact that they won't ensure and do not yield current taxable income (Titman and Wessels, 1988; Ahsan and Gupta, 2023). Revenue growth and debt ratio have a diametrically opposed relationship. There are assertions that claim there is a negative correlation between growth and leverage (-).

Benito (2003) offered an alternative, arguing that since internal resources are inadequate for company expansion, such companies would turn to external sources of finance and their debt loads would rise.

Hypothesis 4: To ascertain how a change in UK banks' expansion will affect their leverage.
H4: Firm growth and leverage ratio have a positive relationship.

2.5 Asymmetric Information and Agency Problem

As per Mintesinot (2010), as companies become older, their long track records will make it much easier for them to convince lenders. Additionally, they will be equipped with the information needed to quickly find alternative credit sources with favorable conditions while looking for loan financing.

As the range of theoretical arguments is too large and intricate to provide a clear prediction, we list the expected relationship between firm size and debt level in Table 1.

Hypothesis 5: To determine how the capital structure of the financial institutions operating in the UK responds to age variance.
H5: The age of the bank and leverage ratio have a positive relationship.

3. DATA AND METHODOLOGY

3.1 Data Source and Collection

We collect financial records (such as income statements and balance sheets) of the leading 10 UK financial institutions for a ten-year period from the fiscal years 2011 to 2020 (see Appendix Tables 9 and 10). The information was gathered from the official websites of the following organizations: HSBC Holdings, Barclays, Lloyds Banking Group, Standard Chartered, Royal Bank of Scotland Group, Schroders, Santander UK, Close Brothers Group plc, Coventry Building Society and Nationwide Building Society. The financial statements include the necessary details for the research regarding stock equity, secured loans, preferred stocks, profit, and shareholder dividends. The regression analysis will involve a total of 100 observations.

3.2 Variables Definition and Measurements

In this study, the researcher examined five explanatory factors, including profitability, tangibility, size, growth, and age, from the most well-known and current empirical studies, along with one dependent variable, Leverage. The selection criteria for the independent variables (firm-specific) and dependent variables (leverage, a proxy for capital structure), respectively, are described below. The summary of variables and their measures is shown in Table 2.

3.2.1 Dependent Variable (Leverage)

Numerous capital structure measurements have been investigated in the literature, but the majority of research employs a metric of leverage, which gauges the extent to which companies utilize debt financing. There is no consensus over how much leverage businesses should maintain. Studies such as Shyam Sunder and Myers (1999), Fama and French (2002), and Frank and Goyal

Table 2. Variables and their measures in summary

Variable Acronym	Variable Name	Variable Measurement	Source
LEV	LEVERAGE	measured as the ratio of long-term debt to total asset	Ashenafi 2005
SZ	SIZE	based on the natural logarithms of bank profits (turnover).	Handoo & Sharman 2014
GRWT	GROWTH	calculated as a percentage growth in the net total asset.	Handoo & Sharman 2014
AG	AGE	Measured the length of time since the company's incorporation.	Aremu, Ekpo and Mustapha 2013
TAN	TANGIBILITY	Net total asset divided by Measured Fixed Asset	Berber & Udell 1998
PROF	PROFITABILITY	Assessed using Return on Asset (profit before tax divided by total asset)	Aminu 2013 and Soyemi, Akinpelu & Ogunleye 2013)

(2002) use debt ratio as a proxy for leverage. Previous studies, like Rajan and Zingales (1995), and Ashenafi (2005), use the debt-to-equity ratio as one measure of leverage. Therefore, the debt-to-equity ratio is determined by:

$$\text{Leverage (debt to equity ratio)} = \frac{Total liability}{Total Holder Equity}$$

3.2.2 Independent Variables

1. **Size (** SZ_{it} **):** According to Handoo and Sharman (2014), large businesses generally have higher degrees of diversification, more assets, and regular cash flows; as a result, larger companies exhibit a reduced likelihood of default in contrast to their smaller counterparts. As a result, the danger of financial trouble is lower for larger enterprises. To accurately represent business size, many existing studies have employed a variety of measurements. The frequently adopted is the logarithm of a firm's overall revenue as an indicator of its size, as seen in Titman and Wessels (1988), and Benito (2003):

$$SZ_{it} = \ln\left(SZ_{it}\right)$$

2. **Growth (** $GRWT_{it}$ **):** Various studies have employed different growth measurements (investment opportunities). According to Titman and Wessels (1988), growth is determined by the yearly percentage rise in the total assets of the banks in this study. Businesses that have additional capacity development plans, new product lines, acquisitions of rival businesses, maintenance, and asset replacement are those with growth possibilities. Businesses with significant cash flow volatility and high development potential are motivated to reduce debt in their capital structure gradually. The rate of increase in total gross assets is used to quantify growth. The growth factor is computed using the percentage change in assets. Handoo et al. (2014):

$$GRWT_{it} = \left(\frac{TA_t - TA_{t-1}}{TA_{t-1}}\right) * 100\%$$

3. **Tangibility Assets (** $TANG_{it}$ **):** That may be used as security by creditors for issuing debt are known as asset composition, or collateral value of assets. The tangible nature of these assets demonstrates the impact they have on a company's level of leverage. Tangibility is determined by calculating the ratio of fixed (tangible) assets to total assets:

$$TANG_{it} = \frac{Fixed assest}{Total asset}$$

4. **Age (** AG_{it} **):** A corporation often builds a reputation, especially in the eyes of creditors, when it operates for a longer period (represented by variable age). Since the market is aware of this reputation, obtaining debt financing is simpler. The length of time each bank has been operating serves as a proxy for age:

AG_{it} = Number of years in business

5. **Profitability** ($PROF_{it}$)**:** Is a measure of how financially strong a company is and is of utmost importance to its shareholders as it reflects the company's capacity to generate profits. In this research, profitability is determined as the operational income divided by the total assets. There are various methods to assess profitability. For owners, managers, workers, and creditors of banks, profitability is crucial. Net Interest Margin, Return on Equity, and Return on Capital employed are a few factors that are often taken into consideration when determining a bank's profitability. Return on assets is determined by dividing net income or post-tax income by the total assets (ROA). An alternative measure is the excess of net income over average total assets. Khrawish et al. (2011), Gul et al. (2011), Soyemi et al. (2013), and Aminu (2013) all adopted net income over total assets as their measurement. The ROA used by Srairi (2009), Sufian (2011), and Antonina (2011), on the other hand, was determined by dividing net revenue by the average total assets:

$$PROF_{it} = \frac{Operating\,income}{Capital\,employed}$$

3.3 Methods

Before conducting the regression analysis, the descriptive statistics were first evaluated to understand the variables defined in the model and their relationship with each other. After that, this study evaluates the model adequacy through the normality test and multicollinearity test, which are important steps to ensure that the regression analysis results are reliable and accurate. Finally, the multivariate regression analysis is performed and hypotheses are tested. In addition, this study discusses the consistency of our findings with existing capital structure theories.

3.3.1 Normality Test

A normality test serves the purpose of assessing if a normal distribution adequately describes a set of data and determining the chance that an underlying random variable follows a normal distribution. The most effective approach to gauging the deviation of the dataset from a bell-shaped normal distribution is by visually inspecting a graph and identifying significant deviations. As a result, both graphical and non-graphical tests of normalcy are employed.

3.3.2 Multicollinearity Test

Multicollinearity refers to the presence of a linear relationship between explanatory factors, which might lead to bias in the regression model (Gujarati, 2003, pp342). Table 5 presents the pair-wise correlation matrices of the chosen variables and Table 6 presents the VIF results, allowing for an analysis of the potential degree of multicollinearity among the explanatory variables.

3.3.3 Heteroskedasticity Test

A consistent pattern in mistakes called heteroskedasticity occurs when the variances of the errors do not remain constant (Gujarati, 2003 p387). Ordinary least square estimators are ineffective due to heteroskedasticity since the estimated variances and covariance of the coefficients I are skewed and inconsistent, invalidating the validity of the tests of the hypotheses. The test on the standardized residuals is conducted in this study to test for heteroskedasticity.

3.3.4 Multivariate Regression Analysis

In previous empirical research, the factors influencing a firm's capital structure have often been investigated using various estimating techniques dependent on the types of data. Analysis of pooled

cross-sectional data is the most used technique. Therefore, it is important to look at how sensitive the results are to changes in the estimation methodology.

Using audited financial statements of the chosen UK banks and building societies that were spooled from the financial institutions' official websites. The empirical data pertaining to various variables is estimated over a period of ten years (2011-2020). Therefore, to give a thorough study concerning the factors that influence the capital structure of UK financial institutions, this study employs pooled cross-sectional data and applies multivariate ordinary least square (OLS) regression.

3.3.5 Hypothesis Testing and Evaluation

Hypothesis testing was carried out by analyzing the connection observed between the dependent and explanatory variables. The issue of theory testing as well as the evaluation of the regression findings, are covered as well.

4. EMPIRICAL RESULTS

4.1 Empirical Model

Based on the theoretical framework outlined earlier, the empirical model on capital structure to account for variance in leverage ratios between businesses is shown below:

$$LEV_{it} = \beta_0 + \beta_1 SZ_{it} + \beta_2 GRWT_{it} + \beta_3 TANG_{it} + \beta_4 AG_{it} + \beta_5 PROF_{it} + \varepsilon_{it} \quad (1)$$

where LEV_{it} refers to leverage (debt-to-equity ratio), SZ_{it} represents size of the firm, $GRWT_{it}$ refers to firm growth, $TANG_{it}$ refers to tangibility of asset, AG_{it} means age of firm i in operation, $PROF_{it}$ represents profitability, ε_{it} is error term.

Given the structure and intent of our empirical model, OLS appears well-suited. It allows for the estimation of relationships between leverage and its potential determinants in a way that's both interpretable and consistent with theoretical expectations.

Table 8 displays the summarized results of the regression analysis conducted on the UK bank leverage equation, with the explanatory variables representing the determinants of capital structure. Using the relationship seen between dependent and explanatory variables, tests of the study hypotheses were conducted. The issue of theory testing, as well as the evaluation of the regression findings, are covered in the following subsections.

4.2 Results and Discussion

4.2.1 Descriptive Statistics

Table 3 presents a concise overview of the descriptive statistics for the values of the variables. It provides the average, minimum, maximum, and standard deviation values for five explanatory variables (SZ, GRWT, TAN, PROF, AG) and the dependent variable (LEV). The information includes samples from 10 UK financial institutions during the last ten years (2011 – 2020). In Table 3, we mainly discuss five perspectives: first, it presents the average debt to equity ratio (LEV) for UK banks is 15.61, meaning that banks are funded (leveraged) with debt at a rate around fifteen times higher than the equity alternative. In other words, the bank is leaning more toward deposit mobilization rather than relying on equity financing. Second, the data from the standard deviation demonstrates that banks have prioritized debt financing over equity financing over the past ten years. Third, it is discovered that the institutions under inquiry have an average annual profitability of 324 percent. Since operating income to total assets is the metric used to determine profitability, the highest average profitability rate ever achieved stands at 248 percent, while the lowest average profitability rate

Table 3. Summary of descriptive statistics

Stats	LEV	PROF	SZ	TAN	GRWT	AG
Mean	15.6131	3.2407	12.3108	0.7773	1.6314	167.69
Median	16.1685	2.7386	12.5957	0.7683	3.6475	143.5
SD	6.4047	8.9928	1.8605	0.0764	8.1383	96.9440
Variance	41.0205	80.8701	3.4616	0.0058	66.232	9398.135
N	100	100	100	100	100	100
Range	29.4902	56.1008	6.1914	0.3424	45.7176	329
Min	4.3044	-31.24301	8.7175	0.5944	-28.7114	1
Max	33.7946	24.85779	14.9088	0.9368	17.0063	330

Notes: LEV refers to leverage (debt-to-equity ratio), SZ represents the size of the firm, GRWT refers to firm growth, TAN refers to tangibility of asset, AG means age of firm, PROF represents profitability.

reaches -312 percent. Furthermore, there exists a range of other profitability rate values amounting to 273 percent, indicating that each financial institution has a consistent profitability rate throughout the year. Fourth, the average asset composition is determined to be 77.7%, meaning that fixed assets held by banks only make up 77.7% of all assets. Business banks often have high tangible assets, with a range of 34.2 percent, because of their nature. It implies that UK banks may receive loans and raise their leverage ratio by using their high tangibility rate collateral. Fifth, over the 10 years of the research period, there has been an average increase of 1.6 percent in the banks' overall assets. The asset growth varies between -28 and 17 percent (minimum and maximum growth rates), which reinforces the significance of variation in the variable's acceptance. Sixth, the variation of the age variable shows that the age values are very erratic; the banks vary in age, ranging from 1 year to 330 years, with Barclays Bank in the UK being the oldest. Lastly, in a similar vein, HSBC reported a big size with a maximum value of £2,984,164,000,000.00, while Close Brothers Group plc reported a small size with a minimum value of £6,108,600,000.00. In the sample of UK banks, there is a wide range in bank size, wherein the largest bank surpasses the smallest bank by a factor of over 488.

4.2.2 Assumptions Testing

We conduct a series of tests to assess the stationary of our data. Initially, we did a normality test to determine if a normal distribution adequately describes a set of data and to determine the probability of an underlying random variable conforming to a normal distribution. The data is graphically represented by the histogram shown in Figure 1. The "normal" curve is depicted on the histograms as a bell-shaped black line. Take note of how the data are normal for fitted values. Nevertheless, there are a few outliers that deviate from the mean insignificantly. As a result, the residuals are normally distributed and won't cause any issues with the given model. In addition, Table 4's Skewness/Kurtosis test results reveal a p-value of 0.0559, which is larger than 0.05 and accepts the null hypothesis that the residual values are normally distributed. Second, in terms of multicollinearity, the extent of potential multicollinearity among the explanatory variables is examined by employing pair-wise correlation matrices. The findings, presented in Table 5, indicate that all variables have low correlation powers. Moreover, the VIF result in Table 6 implies that there is neither great nor robust collinearity among the explanatory variables because none of the VIFs are very high. This implies that there is no concern about multicollinearity within the selected explanatory factors used to explain the capital structure of UK financial institutions.

According to the results in Table 7, for standardized residuals, the mean value is very close to 0, and the standard deviation is close to 1. As for the minimum and maximum values, there are no values

Figure 1. Graphical normality test using histogram

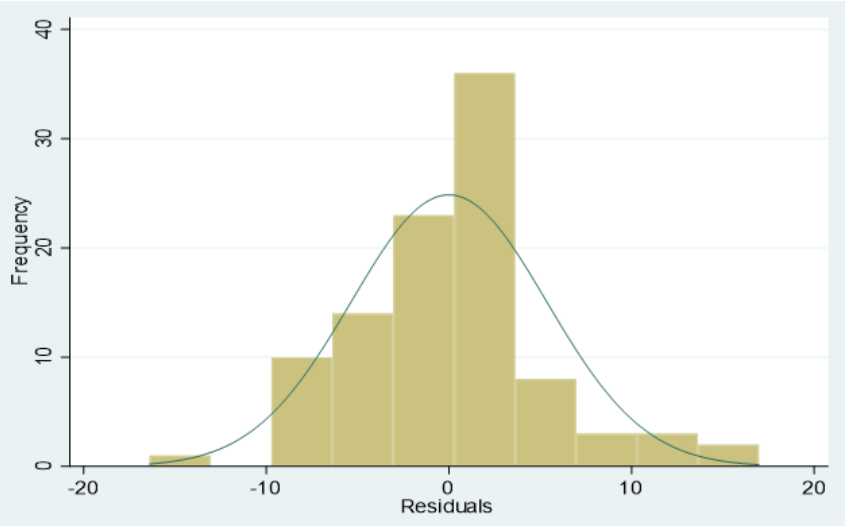

Table 4. Skewness/ Kurtosis tests for normality

				Joint test	
Variable	Obs	Pr(skewness)	Pr(kurtosis)	Adj chi2(2)	Prob>chi2
residual	100	0.1004	0.0685	5.77	0.0559

Table 5. Pair-Wise Correlation Matrix between Explanatory Variables

	LEV	SZ	GRWT	TAN	PROF	AG
LEV	1.0000					
SZ	0.1288	1.0000				
GRWT	0.0541	-0.1143	1.0000			
TAN	0.2079	0.0368	-0.0306	1.0000		
PROF	-0.4842	0.1271	-0.0291	-0.1355	1.0000	
AG	0.0015	0.1712	-0.0065	0.1607	-0.0694	1.0000

Notes: LEV refers to leverage (debt-to-equity ratio), SZ represents the size of the firm, GRWT refers to firm growth, TAN refers to tangibility of asset, AG means age of firm, PROF represents profitability.

more than 3.5 or lower than -3.5 (Robert, 2006). There are no significant outliers in our dataset, which has a range of values from -3. 324538 to 3.192999. Percentiles provide an idea of the distribution of the residuals. The results in Table 7 indicate that the residuals are roughly symmetrically distributed around 0. For example, the 25% percentile of -0.5900417 and 75% percentile of 0.5450673 are roughly equal in magnitude but opposite in sign, indicating that residuals are symmetric. Considering the metrics discussed above, there is no heteroskedasticity.

Table 6. Variable inflation factor (VIF)

Variable	VIF
SZ	1.07
AG	1.06
TAN	1.04
PROF	1.04
GRWT	1.01
Mean VIF	1.05

Table 7. Standardized residuals summary

standardized residuals				
	Percentiles	**Smallest**	**Mean**	**-0.0016**
1%	-2.557436	-3.324538	Std.dev.	1.00988
5%	-1.649063	-1.790334		
10%	-1.21714	-1.761796		
25%	-0.5900417	-1.745177		
50%	0.0913014			
75%	0.5450673	2.252638		
90%	0.8861434	2.467943		
95%	1.908905	2.740093		
99%	2.966546	3.192999		

4.2.3 Hypothesis Testing

4.2.3.1 Leverage With Profitability

The 1% level of significance is used to establish if the study's estimations regarding the correlation between profitability and the bank's leverage ratio are statistically significant. According to Table 8, the relationship between leverage and profitability is significant at the 1% level, and the relationship is negative; therefore, H1a is accepted. It implies that financially sound UK banks have a low debt to equity ratio. This finding aligns with the expectations of the Pecking Order Theory, which states that companies tend to prioritize internal funding over external sources when seeking capital (see Table 1). Additionally, this result aligns with the findings of previous research conducted by Titman & Wessels (1988), Rajan and Zingales (1995), and Booth *et al*. (2001). The evidence strongly supports the conclusion that profitable banks in the UK tend to maintain low debt to equity ratios and rely more on equity than debt when structuring their capital. This relationship between profitability and financial leverage is highly significant, with a 1% level of confidence.

4.2.3.2 Leverage With Tangibility

Research hypothesis two was formulated within the framework of the static trade-off theory to examine the association between tangibility and leverage. The second null hypothesis was accepted by the beta coefficient associated with tangibility (TAN), which demonstrated a favorable correlation between the capital structure of financial institutions in the UK and the level of tangibility.

In this investigation, it was observed that the coefficient associated with the tangibility variable displays a positive direction, but lacks statistical significance. This finding challenges the significance of tangibility as a relevant characteristic and contradicts the results of numerous prior studies. Nevertheless, the observed indication is in line with static trade-off theory and agency cost theory, both assert a favorable correlation between leverage and tangibility (see Table 1). The observed evidence implies that when it comes to funding their investments, firms with high levels of tangibility tend to prefer debt financing over equity. Except for the insignificant result, we have revealed a positive correlation between tangibility and the debt-to-equity ratio. This finding aligns well with the anticipated outcome and underlying premise that companies possessing higher proportions of fixed assets are more likely to utilize them as collateral for obtaining new loans, thereby favoring debt. As a result, it does not refute the theory that there is a positive correlation between leverage and tangibility.

4.2.3.3 Leverage With Size

Based on the static trade-off theory, the third hypothesis aims to calculate the link between size and leverage. The outcome of the beta coefficient analysis for size (SZ) confirmed the acceptance of the third null hypothesis, which also demonstrated a correlation between leverage and bank size in the UK.

The findings of this analysis revealed a positive correlation between size and bank leverage in the UK, which was statistically significant at the 10% level. These results indicate that larger UK banks tend to borrow more capital and have greater leverage ratios than smaller banks. To put it numerically, the debt-to-equity ratio increases by 0.72 units for every unit of size increase, providing all other influencing factors remain unchanged. The findings in Table 1 align with the predicted outcome of the static trade-off hypothesis. Significant empirical research has also discovered a favorable association between leverage and size. For instance, the research of Titman and Wessels (1988), Rajan and Zingales (1995), and Booth et al. (2001) showed a substantial and direct correlation between size and capital structure measure. The results of the size variable analysis indicate a statistically significant relationship, suggesting that the size of UK banks does play a major impact in shaping the debt ratio and capital structure.

4.2.3.4 Leverage With Growth

The capital structure and growth should be positively correlated, according to study hypothesis 4. This null hypothesis, however, was rejected in favor of the alternative hypothesis based on the regression analysis results associated with growth (GRWT). This indicates that there is a negative association between capital structure and growth characteristics. The unfavorable result supports STT and ACT but runs counter to POT. In conclusion, it is found that the effect of expansion on UK banks' capital structure issues is minimal.

4.2.3.5 Leverage With Age

The static trade-off theory served as the foundation for research hypothesis number five, which aimed to examine the connection between leverage and age. The beta coefficient indicated a negative correlation between capital structure and age of UK banks, providing evidence in favor of the fifth null hypothesis. Age is not a significant factor in identifying capital structure problems in UK banks, according to this study.

Overall, this study followed three capital structure theories to identify which one best explained the financial decisions made by the sample financial institutions. These theories were pecking order theory, static trade-off theory, and agency cost theory. Each of these ideas has distinctive features that aid in explaining the corporate capital structure. The static trade-off theory suggests that the optimal capital structure is determined by evaluating the costs associated with bankruptcy and the overall tax advantages derived from debt financing. Enterprises with sizable tangible assets will be allowed to use such assets as security for loans, which will allow those businesses to get more funding. Businesses that are bigger and more prosperous continue to have high debt ratios, whereas companies that are rapidly expanding need less external financing. The theory of pecking order suggests that

companies have a preference for using their own funds rather than seeking external financing, and they prefer using debt that carries some risk rather than equity. This preference arises from the belief that there exists a difference in knowledge between those within the company and those outside of it. On the other hand, the agency cost theory analyzes how companies make financial decisions within the framework of the relationship between agents and principals.

In conclusion, our empirical results are consistent with theoretical analysis, namely the UK financial institutions' capital structure choices, as judged by their size and tangibility, significantly support the Static trade-off concept. However, the unfavorable impact of aging on the ability to make informed decisions about capital structure presents a compelling argument against the Pecking order theory of capital structure. Conversely, the correlations between two of the five variables with leverage are consistent with the Agency Cost Hypothesis (size and tangibility). First, it is shown that the bank's leverage ratio and profitability are negatively connected. This result is consistent with POT predictions that businesses will often fund themselves internally before turning to external borrowing. Second, the positive coefficient of connection seen between the leverage and tangibility variables, as indicated in Table 8, provides empirical support for the three hypotheses, as they all predicted a positive association among the variables. The tangibility variable, therefore, encourages STT, POT, and ACT to follow the funding decisions of UK banks. Third, it is found that a UK bank's financial leverage benefits from scale. Theoretically, larger organizations often have higher borrowing capacity than smaller businesses, according to STT and ACT. Therefore, the analysis's conclusions are consistent with how STT and ACT are applied in UK financial institutions. Fourth, although it contradicts the application of POT, the weak and positive link between growth and capital structure supports STT and ACT. Fifth, age and leverage exhibit a marginally positive but insignificant relationship that favors POT but hurts STT.

Table 8. Firm-specific analysis of determinants of capital structure

Dependent variables	Coefficient values	T-statistics
	(1)	(2)
SZ_{it}	0.72*	2.07
$GRWT_{it}$	0.05	1.11
$TANG_{it}$	12.59	1.69
AG_{it}	-0.01	-1.59
$PROF_{it}$	-0.35***	-3.86
Number of observations = 100		
F – Statistics = 4.25		
Prob > F = 0.0016		
R-squared = 0.30		

Note. T-statistics in parentheses with ***, **, and * denoting significance at the 1%, 5%, and 10% levels.

5. CONCLUSION

For the aim of achieving the specified goal, we have created five hypotheses. To assess these theories, five distinct variables, profitability, tangibility, size, growth, and age, were picked from respectable prior capital structure research articles. In addition, the researcher has gathered yearly financial statements from the biggest UK banks for the last ten years (2011–2020). To analyze the data, this study employed a multivariate ordinary least squares model with correlation. One comprehensive measure of leverage used to evaluate the capital structure of banks is the debt-to-equity ratio. The dependent variable is thus regressed against the five previously mentioned explanatory variables.

Our research embarked on a journey to understand the management of information resources in UK financial institutions. We theorized that effective management of these resources could provide institutions with a clearer perspective on their internal determinants, enabling them to make informed decisions regarding their capital structure. As the study progressed, it became evident that understanding these determinants was crucial. The study's findings demonstrated that UK financial institutions possessed the key firm-specific drivers of capital structure size and profitability characteristics. Profitability is one of these factors demonstrated to be highly relevant at a 1% significance level. Additionally, we also reflect that while age and profitability had a negative association with capital structure, the other two factors, tangibility and size and expansion, had a positive relationship. The capital structure measure's negative correlation with the profitability variable consequently supports the Pecking Order Theory but runs counter to the Static Trade-Off Theory. This demonstrates that financially successful financial institutions in the UK keep a low debt-to-equity ratio and depend more on equity than loan sources when establishing their capital structures. Although there is a clear relationship between financial leverage and the tangibility variable, the researcher needed more statistical power. In other words, tangibility criteria are associated favorably but have no impact on the funding choices that banks make. This relationship is supported by all three capital structure theories. Furthermore, the size variable was shown to be a key driver of banks' financing practices at a substantial level of 10%, showing a positive association with financial leverage. Greater banks and financial institutions in the UK continue to have high levels of leverage. As a result, the relationship between size and financial leverage contradicts the Pecking order theory even if it supports the Static trade-off theory and Agency cost theory. It was also shown that the negative correlation between age and leverage played a very small role in the banks' decision to finance. The theory of the Perking Order capital structure is backed up by the inverse relationship between financial leverage and age.

The findings of the study contribute to the understanding of information resource management in UK banks in several ways. First, the study demonstrates that profitability is a significant factor influencing capital structure decisions in UK financial institutions. This implies that banks with higher profitability are more likely to maintain a lower debt-to-equity ratio and rely more on equity rather than loans when structuring their capital. This highlights the importance of effective management of financial information resources in optimizing capital structure decisions. Second, the study reveals that factors such as tangibility and size and expansion have a positive relationship with capital structure, while age and profitability have a negative association. This indicates that UK banks, particularly financially successful ones, prioritize maintaining low debt-to-equity ratios and rely more on equity financing. Effective management of information resources allows banks to assess these factors accurately and make informed financing choices that align with their strategic goals. Furthermore, the study indicates a negative correlation between the capital structure measure and profitability. This finding suggests that financially successful banks prefer equity financing over debt financing when establishing their capital structures. On the other hand, the negative correlation between age and leverage supports the theory of the Pecking Order capital structure, indicating that banks tend to reduce their reliance on debt financing as they mature. Lastly, the study highlights the significance of size as a key driver of banks' financing practices, with larger banks and financial institutions in

the UK having higher levels of leverage. This finding aligns with the Static Trade-Off Theory and the Agency Cost Theory, emphasizing the role of information resources in managing the financing decisions of larger financial institutions.

In light of the Resource-Based View (RBV), our findings underscore the intrinsic value of information resource management within financial institutions. RBV posits that firms gain and sustain competitive advantage through deploying valuable, rare, inimitable, and non-substitutable resources (Varadarajan, (2023). In this context, effective management of information resources, embodied by profitability and size determinants, is pivotal. The ability of banks to harness and leverage these internal resources optimally not only facilitates informed capital structure decisions but also fosters a strategic edge in the competitive landscape. Concurrently, drawing upon Information Processing Theory, the study illuminates how banks' information processing aptitudes significantly influence their financing decisions. Information Processing Theory elucidates that organizations or individuals must adeptly manage and process information to navigate complex environments and make strategic decisions (Wickens & Carswell, 2021). Therefore, the negative association observed between age and capital structure can be interpreted as a reflection of mature banks developing more sophisticated information processing capabilities, thereby influencing their approach to financing and capital structure.

By way of concluding the paper, we would like to point out a limitation of our analysis. First, our study is carried out with huge restrictions. Second, we exclude potential macroeconomic (external) factors that may have an impact on how a business chooses its financing mix due to a lack of time for the study project. Third, since only the top 10 UK banks will be considered to examine the ideal financial investment structure, the analysis results may be somewhat subjective. Fourth, the researcher did not incorporate primary data, such as interviews with these individuals, to assess the CEOs' and financial managers' understanding of capital structure and procedures around financing decisions. This research would have been significantly better if it could have included the existing practices of their financing decisions.

REFERENCES

Abeywardhana, , Y. D. (2015). Capital Structure and Profitability: An Empirical Analysis of SMEs in the UK. *Journal of Emerging Issues in Economics* [JEIEFB]. *Finance and Banking*, *4*, 1661–1675.

Abor, J. (2008). Determinants of the Capital Structure of Ghanaian Firms. African Economic Research Consortium.

Acedo-Ramírez, M. A., & Ruiz-Cabestre, F. J. (2014). Determinants of Capital Structure: United Kingdom Versus Continental European Countries. *Journal of International Financial Management & Accounting*, *25*(3), 237–270. doi:10.1111/jifm.12020

Adeoye, S. D. & Olojede, S. (2019). Effect of Capital Structure on Financial Performance of Listed Banks in Nigeria. *Asian Journal of Economics, Business and Accounting, 12,* 1-14.

Agarwal, Y. (2013). *Capital Structure Decisions: Evaluating Risk and Uncertainty*. John Wiley & Sons.

Ahsan, Z. B., Gupta, A., & Kar, A. K. (2023). The Effect of Countries' Independent Regulation on Cryptocurrency Markets. *Journal of Global Information Management*, *31*(1), 1–32. doi:10.4018/JGIM.323567

Amatya, K. (2020). *Determinants of Capital Structure in Canadian Non-Financial Firms: A Recent Study*.

Antoniou, A, Guney Y., & Paudyal, K. (2002). *The Determinants of Corporate Capital Structure: Evidence from European Countrie*s.

Benito, A. (2003). *The Capital Structure Decisions of Firms: Is There a Pecking Order?* Bank of Spain Document 0310.

Benito, A. (2003). The Capital Structure Decisions of Firms: Is there a Pecking Order? *Documentos de trabajo/ Banco de España, 0310.*

Bevan, A. A., & Danbolt, J. (2002). Capital Structure and its Determinants in the UK-a Decompositional Analysis. *Applied Financial Economics*, *12*(3), 159–170. doi:10.1080/09603100110090073

Bevan, A. A., & Danbolt, J. O. (2004). Testing for Inconsistencies in the Estimation of UK Capital Structure Determinants. *Applied Financial Economics*, *14*(1), 55–66. doi:10.1080/0960310042000164220

Bilgin, R., & Dinc, Y. (2019). Factoring as a Determinant of Capital Structure for Large Firms: Theoretical and Empirical Analysis. *Borsa Istanbul Review*, *19*(3), 273–281. doi:10.1016/j.bir.2019.05.001

Buferna, F., Bangassa, K., & Hodgkinson, L. (2005). *Determinants of Capital Structure Evidence from Libya.* Management School University of Liverpool, Liverpool, England.

Burney, S. M. (2008). *Inductive and Deductive Research Approach*. Research Gate. 10.13140/RG.2.2.31603.58406

Caenegem, R. C. (1988). *The birth of the English common law*. Cambridge University Press. doi:10.1017/CBO9780511607974

Chiaramonte, L., & Casu, B. (2017). Capital and Liquidity Ratios and Financial Distress. Evidence from the European Banking Industry. *The British Accounting Review*, *49*(2), 138–161. doi:10.1016/j.bar.2016.04.001

Collins, H. (2010). *Creative Research: The Theory and Practice of Research for the Creative Industries*. AVA Publications.

D'Amato, A. (2020). Capital Structure, Debt Maturity, and Financial Crisis: Empirical Evidence from SMEs. *Small Business Economics*, *55*(4), 919–941. doi:10.1007/s11187-019-00165-6

Dagher, J., Dell'Ariccia, M. G., Laeven, M. L., Ratnovski, M. L., & Tong, M. H. (2016). *Benefits and Costs of Bank Capital*. International Monetary Fund.

Damodaran, A. (2001). *Corporate Finance: Theory and Practice*. John Wiley & Sons.

Daria, G. (2022). *Biggest Banks in the UK* (Vol. 2022).

De Angelo, H., & Masulis, R. (1980). Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics*, *8*(1), 3–29. doi:10.1016/0304-405X(80)90019-7

De Bandt, O., Camara, B., Pessarossi, P. & Rose, M. (2014). Does the Capital Structure Affect Banks' Profitability? Pre-and Post-Financial Crisis Evidence from Significant Banks in France. *Débats économiques et financiers.*

Demirgüç-Kunt, A., Peria, M. S. M., & Tressel, T. (2020). The Global Financial Crisis and the Capital Structure of Firms: Was the Impact More Severe among SMEs and Non-Listed Firms? *Journal of Corporate Finance*, *60*, 101514. doi:10.1016/j.jcorpfin.2019.101514

Devereux, M. P., Maffini, G., & Xing, J. (2018). Corporate Tax Incentives and Capital Structure: New Evidence from UK Firm-Level Tax Returns. *Journal of Banking & Finance*, *88*, 250–266. doi:10.1016/j.jbankfin.2017.12.004

Diamond, D., & Rajan, R. (2000). A theory of bank capital. *The Journal of Finance*, *55*(6), 2431–2465. doi:10.1111/0022-1082.00296

Ebaid, I. E. (2009). The Impact of capital-structure Choice on Firm Performance: Empirical Evidence from Egypt. *The Journal of Risk Finance*.

Edim, N. O., Atseye, F. A., & Eke, F. A. (2014). Relationship between Capital Structure and firm's Performance: Theoretical Review. *Journal of Economics and Sustainable Development*, *5*, 72–76.

Fama, E., & French, R. (2002). Testing the Tradeoff and Pecking Order Predictions about Dividends and Debt. *Review of Financial Studies*, *15*(1), 1–33. doi:10.1093/rfs/15.1.1

Foerster, R. (2003). *Financial Management: A Primer* (5th ed.), W.W. Norton & Company, London, UK.

Forbes, W., & Hodgkinson, L. (2014). *Corporate Governance in the United Kingdom: Past, Present and Future*. Springer.

Frank, M. Z., & Goyal, V. K. (2003). Testing the Pecking Order Theory of Capital Structure. *Journal of Financial Economics*, *67*(2), 217–248. doi:10.1016/S0304-405X(02)00252-0

Gimber, R. A. & Rajan, A. (2019). *Bank funding costs and capital structure*. Bank of England. https://www.bankofengland.co.uk/working-paper/2019/bank-funding-costs-and-capital-structure

Gola, C., & Roselli, A. (2009). *The UK Banking System and its Regulatory and Supervisory Framework*. Springer. doi:10.1057/9780230235779

Graham, J. R. (2000). How big are the Tax benefits of Debt? *The Journal of Finance*, *55*(5), 1901–1941. doi:10.1111/0022-1082.00277

Gropp, R., & Florian, H. (2007). What can corporate finance say about banks' capital structures? *The Journal of Finance*, *21*, 1–31.

Harris, M., & Raviv, A. (1988). Corporate Control Contests and Capital Structure. *The Journal of Finance*, *45*, 321–349. doi:10.1111/j.1540-6261.1990.tb03693.x

Harris, M., & Raviv, A. (1990). Capital structure and the information role of debt. *The Journal of Finance*, *45*(2), 321–349. doi:10.1111/j.1540-6261.1990.tb03693.x

Harris, M., & Raviv, A. (1991). The theory of capital structure. *The Journal of Finance*, *46*(1), 297–355. doi:10.1111/j.1540-6261.1991.tb03753.x

Hoang, L. D., Viet, N. Q., & Anh, N. H. (2021). Trade-off theory and pecking order theory: Evidence from real estate companies in Vietnam. *Economics and Business Quarterly Reviews, 4*(2).

Howarth, D., & Quaglia, L. (2018). Brexit and the Battle for Financial Services. *Journal of European Public Policy*, *25*(8), 1118–1136. doi:10.1080/13501763.2018.1467950

Iavorskyi, M. (2013). The Impact of Capital Structure on Firm Performance: Evidence from Ukraine. Kyiv School of Economics, 36.

Ibrahim, S. S. (2019). The Impacts of Capital Structure on Bank Performance: A Case of Iraqi Private Banks. *Koya University Journal of Humanities and Social Sciences*, *2*(1), 118–123. doi:10.14500/kujhss.v2n1y2019.pp118-123

Jensen, M., & Meckling, W. H. (1976). Theory of the firms: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360. doi:10.1016/0304-405X(76)90026-X

Kalantonis, P., Kallandranis C., & Sotiropoulos, M. (2021). Leverage and Firm Performance: New Evidence on the Role of Economic Sentiment using Accounting Information. *Journal of Capital Markets Studies.*

Kayo, E. K., & Kimura, H. (2011). Hierarchical Determinants of Capital Structure. *Journal of Banking & Finance*, *35*(2), 358–371. doi:10.1016/j.jbankfin.2010.08.015

Khaki, A. R., & Akin, A. (2020). Factors Affecting the Capital Structure: New Evidence from GCC Countries. *Journal of International Students*, 13.

Khan, M. Y. (2008). *Financial Management: Text and Problems* (5th ed.). McGraw-Hill Publishing Company Limited.

Khan, M. Y., & Jain, P. K. (2006). *Management Accounting and Financial Analysis* (2nd ed.). McGraw-Hill Publishing Company Limited.

Kipesha, E. F., & James, J. M. (2014). Capital Structure and Firm Performance: Evidences from Commercial Banks in Tanzania. *Research Journal of Finance and Accounting*, *5*, 168–178.

Kumar, S., Colombage S., & Rao, P. (2017). Research on Capital Structure Determinants: A Review and Future Directions. *International Journal of Managerial Finance.*

Lartey, P. Y., Jaladi, S. R., & Afriyie, S. O. (2022). Theory of Capital Structure Decision: Overview of the Banking Industry. *Frontiers in Management and Business*, *3*(1), 167–177. doi:10.25082/FMB.2022.01.003

Le, T. N. L., Nasir, M. A., & Huynh, T. L. D. (2020). Capital Requirements and Banks Performance Under Basel-III: A Comparative Analysis of Australian and British Banks. *The Quarterly Review of Economics and Finance*.

Li, K., Niskanen, J., & Niskanen, M. (2018). Capital Structure and Firm Performance in European SMEs: Does Credit Risk make a Difference? *Managerial Finance*.

Lu, J., & Boateng, A. (2018). Board Composition, Monitoring and Credit Risk: Evidence from the UK Banking Industry. *Review of Quantitative Finance and Accounting*, *51*(4), 1107–1128. doi:10.1007/s11156-017-0698-x

Modigliani, F., & Miller, M. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, *48*, 261–275.

Modigliani, F., & Miller, M. (1963). Corporate income taxes and the cost of capital. *The American Economic Review*, *53*, 433–443.

Moradi, A., & Paulet, E. (2019). The Firm-Specific Determinants of Capital structure–An Empirical Analysis of Firms before and during the Euro Crisis. *Research in International Business and Finance*, *47*, 150–161. doi:10.1016/j.ribaf.2018.07.007

Mudany, J., Letting, N., & Gituro, W. (2020). Effects of Capital Structure on Performance: A Critical Review. *Journal of Finance and Accounting, 4.*

Myers, M.D. (2008). Qualitative Research in Business & Management.

Myers, S. C. (1977). Determinants of Corporate Borrowing. *Journal of Financial Economics*, *5*(2), 147–175. doi:10.1016/0304-405X(77)90015-0

Myers, S. C. (1984). The Capital Structure Puzzle. *The Journal of Finance*, *39*(3), 575–592. doi:10.2307/2327916

Myers, S. C. (2001). Capital Structure. *The Journal of Economic Perspectives*, *15*(2), 81–102. doi:10.1257/jep.15.2.81

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187–221. doi:10.1016/0304-405X(84)90023-0

Octavia, M., & Brown, R. (2010). Determinants of Bank Capital Structure in Developing Countries: Regulatory Capital Requirement Versus the Standard Determinants of Capital Structure. *Journal of Emerging markets, 15*, 50.

Opoku-Asante, K., Winful, E. C., Sharifzadeh, M., & Neubert, M. (2022). The Relationship between Capital Structure and Financial Performance of Firms in Ghana and Nigeria. *European Journal of Business and Management Research*, *7*, 236–244.

Ouenniche, J., & Carrales, S. (2018). Assessing Efficiency Profiles of UK Commercial Banks: A DEA Analysis with Regression-Based Feedback. *Annals of Operations Research*, *266*(1-2), 551–587. doi:10.1007/s10479-018-2797-z

Qiao, Q., & Lin, B. Q. (2023). Assessing the impact of Wind Power Investment Utilizing Electricity: Based on Demand Information in China. *Journal of Global Information Management*, *31*(1), 1–20. doi:10.4018/JGIM.323802

Rajan, R., & Zingales, L. (1995). What Do We Know about Capital Structure? Some Evidence from International Data. *The Journal of Finance*, *50*(5), 47–81. doi:10.1111/j.1540-6261.1995.tb05184.x

Rashid, C. A. (2018). Efficiency of Financial Ratios Analysis for Evaluating Companies' Liquidity. *International Journal of Social Sciences & Educational Studies*, *4*, 110.

Ross, S. A. (1977). The Determination of Financial Structure: The Incentive- Signalling Approach. *Journal of Economics*, *8*, 23–40.

Saeed, M. M., Gull, A. A., & Rasheed, M. Y. (2013). Impact of Capital Structure on Banking Performance (A Case Study of Pakistan). *Interdisciplinary Journal of Contemporary Research in Business*, *4*, 393–403.

Santos, M. C. (2021). *Does the Corporate Capital Structure Theory Apply to Banks?* Evidence from the Field.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research Methods for Business Students* (6th ed.). Pearson Education Limited.

Scotland, J. (2012). Exploring the Philosophical Underpinnings of Research: Relating Ontology and Epistemology to the Methodology and Methods of the Scientific, Interpretive, and Critical Research Paradigms. *English Language Teaching*, *5*(9), 9–16. doi:10.5539/elt.v5n9p9

Shyam-Sunder, L., & Myers, S. C. (1999). Testing Static Tradeoff against the Pecking Order Models of Capital Structure. *Journal of Financial Economics*, *51*, 219–244. doi:10.1016/S0304-405X(98)00051-8

Sovbetov, Y. (2014). *Relationship between Capital Structure & Profitability: Evidence from UK Banking Industry Over the Period of 2007-2012*. [MBA Thesis, London School of Commerce].

Staikouras, C. K., & Wood, G. E. (2004). The Determinants of European Bank Profitability. [IBER]. *The International Business & Economics Research Journal*, 3.

Titman, S. (1984). The Effect of Capital Structure on the Firm's Liquidation Decision. *Journal of Financial Economics*, *13*(1), 137–151. doi:10.1016/0304-405X(84)90035-7

Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance*, *43*(1), 1–19. doi:10.1111/j.1540-6261.1988.tb02585.x

Varadarajan, R. (2023). Resource advantage theory, resource based theory, and theory of multimarket competition: Does multimarket rivalry restrain firms from leveraging resource Advantages? *Journal of Business Research*, *160*, 113713. doi:10.1016/j.jbusres.2023.113713

Vernimmen, P., Quiry, P., & Le Fur, Y. (2022). *Corporate Finance: Theory and Practice*. John Wiley & Sons.

Wald, J. K. (1999). How Firm Characteristics Affect Capital Structure: An International Comparison. *Journal of Financial Research*, *22*(2), 161–187. doi:10.1111/j.1475-6803.1999.tb00721.x

Wickens, C. D., & Carswell, C. M. (2021). Information processing. Handbook of human factors and ergonomics, 114-158. Springer.

Wijaya, E., Asyik, N. F., & Fadrul, F. (2020). Capital Structure and Profitability of LQ45 Index in Indonesia: Pecking Order Theory Approach. *Journal of Applied Business and Technology*, *1*(2), 69–75. doi:10.35145/jabt.v1i2.32

Yeh, T.-L. (2011). Capital Structure and Cost Efficiency in the Taiwanese Banking Industry. *Service Industries Journal*, *31*(2), 237–249. doi:10.1080/02642060802710230

Yıldırım, D., & Çelik, A. K. (2021). Testing the pecking order theory of capital structure: Evidence from Turkey using panel quantile regression approach. *Borsa Istanbul Review*, *21*(4), 317–331. doi:10.1016/j.bir.2020.11.002

ENDNOTES

[1] The contrasting benefit of debt refers to the tax shield and the disciplinary role of debt in eliminating free cash flow (CF) problems.

[2] The cost of debt means bankruptcy costs and agency costs between shareholders and bondholders.

APPENDIX

Table 9. Tabulated links to data used for analysis

S/NO	Banks	Short Name	Links
1	HSBC Holdings	HSBC	https://www.annualreports.com/Company/hsbc-holding-plc
2	Lloyds Banking Group	LBG	https://www.lloyodsbankinggroup.com/investors/financial-downloads.html
3	Royal Bank of Scotland Group	RBSG	https://www.annualreports.com/Company/royal-bank-of-scotland
4	Barclays	BC	https://www.annualreports.com/Company/barclays
5	Standard Chartered	SC	https://www.annualeports.com/Company/standard-chartered-plc
6	Santander UK	SUK	https://www.annualreports.com/Company/banco-santander-sa
7	Nationwide Building Society	NBS	https://nationwide.co.uk/about-us/governance-reports-and-results/results-and-accounts
8	Schroders	SC	https://www.schroders.com/en/investor-relations/results-and-reports-and-presentations/
9	Close Brothers Group plc	CBG	https://www.annualreports.com/Company/close-brothers-group-plc
10	Coventry Building Society	CBS	https://www.coventrybuildingsociety.co.uk/member/financial-results.html

Source: Top ten banks official websites

Table 10. Computed data of banks from official websites

BANK	YR	SZ	GRWT	AG	TAN	PROF	LEV
HSBC	2011	14.75	3.95	145	0.80	18.36	14.39
HSBC	2012	14.81	8.92	146	0.78	24.86	13.70
HSBC	2013	14.80	-2.17	147	0.74	24.21	13.03
HSBC	2014	14.78	8.76	148	0.76	23.12	12.20
HSBC	2015	14.69	6.23	149	0.79	22.99	11.20
HSBC	2016	14.68	12.84	150	0.77	22.20	12.01
HSBC	2017	14.74	-1.78	151	0.73	22.10	11.83
HSBC	2018	14.75	-1.29	152	0.73	0.27	12.17
HSBC	2019	14.81	3.68	153	0.74	0.25	13.09
HSBC	2020	14.91	-2.47	153	0.68	3.76	13.56
LBG	2011	13.79	5.09	246	0.68	-16.87	19.83
LBG	2012	13.74	9.09	246	0.76	-3.30	19.69
LBG	2013	13.64	-4.97	247	0.80	-2.18	20.53
LBG	2014	13.66	-11.57	248	0.76	-1.51	16.13
LBG	2015	13.60	-5.05	249	0.88	2.96	16.17
LBG	2016	13.61	6.10	250	0.88	-6.99	15.87

continued on following page

Table 10. Continued

BANK	YR	SZ	GRWT	AG	TAN	PROF	LEV
LBG	2017	13.61	- 1.55	251	0.74	-14.89	15.53
LBG	2018	13.59	3.66	252	0.84	-16.81	14.89
LBG	2019	13.63	5.39	253	0.92	-31.24	13.84
LBG	2020	13.68	3.89	254	0.86	6.01	16.63
RBSG	2011	14.18	-0.79	284	0.80	0.61	18.81
RBSG	2012	14.07	3.26	285	0.76	0.70	20.61
RBSG	2013	13.84	-9.75	286	0.88	3.19	19.87
RBSG	2014	13.86	-25.92	287	0.90	3.02	19.87
RBSG	2015	13.61	-12.56	288	0.91	0.28	18.38
RBSG	2016	12.67	6.40	289	0.92	0.68	18.78
RBSG	2017	13.50	-8.41	290	0.82	0.22	19.60
RBSG	2018	11.46	-2.84	291	0.77	2.98	11.50
RBSG	2019	11.41	14.63	292	0.72	4.68	14.17
RBSG	2020	11.51	7.01	292	0.69	3.50	16.50
BC	2011	14.28	-1.41	321	0.66	4.17	22.99
BC	2012	14.23	10.98	322	0.87	2.75	22.70
BC	2013	14.11	1.46	323	0.70	1.15	19.52
BC	2014	14.12	2.44	324	0.74	1.32	19.57
BC	2015	13.93	1.05	325	0.76	3.41	16.00
BC	2016	14.01	7.10	326	0.72	3.53	16.00
BC	2017	13.94	2.06	327	0.84	3.23	16.17
BC	2018	13.94	-0.43	328	0.80	3.04	16.77
BC	2019	13.93	15.10	329	0.77	3.52	16.37
BC	2020	14.12	11.24	330	0.73	2.92	19.18
SC	2011	13.29	- 9.32	42	0.69	5.87	13.32
SC	2012	13.36	8.31	43	0.77	4.95	12.71
SC	2013	13.42	-5.98	44	0.72	5.30	13.40
SC	2014	13.50	-28.71	45	0.70	5.31	14.53
SC	2015	13.37	-21.24	46	0.65	1.22	12.20
SC	2016	13.38	-13.34	47	0.75	4.26	12.29
SC	2017	13.41	1.93	48	0.77	3.72	11.81
SC	2018	13.44	2.91	49	0.62	3.46	12.68
SC	2019	13.49	-11.86	50	0.75	3.80	13.22
SC	2020	13.58	3.23	51	0.80	4.82	14.55
SUK	2011	12.60	-1.46	1	0.73	3.54	22.49
SUK	2012	12.59	10.92	2	0.93	1.61	22.63
SUK	2013	12.51	1.36	3	0.72	2.13	20.59
SUK	2014	12.53	4.44	4	0.75	3.45	18.90
SUK	2015	12.55	7.68	5	0.84	3.11	16.97

continued on following page

Table 10. Continued

BANK	YR	SZ	GRWT	AG	TAN	PROF	LEV
SUK	2016	12.62	0.96	6	0.69	3.19	17.85
SUK	2017	12.66	6.98	7	0.91	2.72	18.42
SUK	2018	12.55	6.39	8	0.84	2.61	16.81
SUK	2019	12.55	13.74	9	0.70	2.66	16.59
SUK	2020	12.59	9.04	10	0.59	2.45	17.34
NBS	2011	12.15	5.70	127	0.90	2.28	29.20
NBS	2012	12.19	10.05	128	0.80	1.87	29.16
NBS	2013	12.16	-0.70	129	0.94	2.43	26.95
NBS	2014	12.15	-9.86	130	0.88	3.21	20.33
NBS	2015	12.18	-7.05	131	0.81	2.81	19.08
NBS	2016	12.25	2.53	132	0.85	3.24	18.12
NBS	2017	12.31	3.89	133	0.83	2.64	18.91
NBS	2018	12.34	5.74	134	0.81	2.23	17.47
NBS	2019	12.38	6.69	135	0.83	2.42	17.10
NBS	2020	12.42	5.78	136	0.75	2.21	18.14
SC	2011	9.54	1.55	207	0.60	15.30	6.30
SC	2012	9.59	7.59	208	0.66	12.10	6.09
SC	2013	9.75	-1.82	209	0.79	14.26	6.33
SC	2014	9.92	-6.53	210	0.80	14.47	6.98
SC	2015	9.80	0.00	211	0.83	14.28	5.47
SC	2016	9.95	3.67	212	0.82	14.85	5.66
SC	2017	10.02	-11.08	213	0.78	14.43	5.48
SC	2018	9.89	3.24	214	0.86	15.84	4.42
SC	2019	9.96	-14.53	215	0.77	15.69	4.53
SC	2020	9.98	9.42	216	0.80	15.36	4.30
CBG	2011	8.72	5.78	133	0.76	-8.47	31.90
CBG	2012	8.76	6.99	134	0.84	-11.51	32.60
CBG	2013	8.83	4.35	135	0.72	-8.38	33.79
CBG	2014	8.95	-4.30	136	0.87	-7.34	19.98
CBG	2015	8.98	-1.18	137	0.82	-10.12	19.66
CBG	2016	9.08	4.39	138	0.73	-6.49	20.03
CBG	2017	9.14	-0.59	139	0.81	-8.52	20.54
CBG	2018	9.24	3.86	140	0.72	-10.37	20.73
CBG	2019	9.26	7.67	141	0.73	-6.99	21.49
CBG	2020	9.31	2.94	142	0.67	13.22	6.64
CBS	2011	10.11	9.01	127	0.75	2.54	7.39
CBS	2012	10.20	3.82	128	0.70	2.16	7.26
CBS	2013	10.23	4.29	129	0.78	2.35	7.13
CBS	2014	10.35	8.71	130	0.68	2.40	7.39

continued on following page

Table 10. Continued

BANK	YR	SZ	GRWT	AG	TAN	PROF	LEV
CBS	2015	10.44	17.01	131	0.82	2.17	6.88
CBS	2016	10.55	8.70	132	0.64	2.01	6.98
CBS	2017	10.66	3.64	133	0.77	1.95	6.51
CBS	2018	10.74	3.93	134	0.86	1.90	6.60
CBS	2019	10.81	1.88	135	0.84	1.81	6.51
CBS	2020	10.85	4.61	136	0.75	1.44	22.34

Source: Independent calculations made by the researcher using financial statements.

Victor Chang is a Professor of Business Analytics at Aston University. He was a Professor of Data Science and IS at Teesside University between Sep 2019 & mid-May 2022. He was a Senior Associate Professor, Xi'an Jiaotong-Liverpool University between June 2016 & Aug 2019. Within 4 years, he completed Ph.D. (CS, Southampton) and PGCert (HE, Fellow, Greenwich) while working on several projects. He achieved 97% on average in 27 IT certifications. He won 29015 IEEE Outstanding Service Award, best papers in 2012, 2015 & 2018, 2016 European award: Best Project in Research, 2017 Outstanding Young Scientist and many awards since 2011. He is a leading expert on Big Data/Cloud/IoT/security. He is a visiting scholar/PhD examiner at several universities, an Editor-in-Chief of IJOCI & OJBD, former Editor of FGCS, Associate Editor of TII, JGIM, IJBSR & Expert Systems, Editor of Info Fusion, Sci Report & IDD, founding chair of international workshops and founding Conference Chair of IoTBDS, COMPLEXIS, FEMIB & IIoTBDSC. He was involved in projects worth more than £14 million in Europe and Asia. He published 3 books and edited 4 books. He gave 38 keynotes internationally as a top researcher.

Vincent Kozah graduated with MSc in Business Analytics, Aston University, UK. He completed MSc dissertation under Prof Chang's supervision. He is now working as a Business Manager in a bank in the UK.

Qianwen Ariel Xu is a PhD student under Prof Chang's supervision. She completed MSc in Business Analytics from Xi;an Jiaotong-Liverpool University and University of Liverpool. She has been working as a research assistant and has published many high-quality publications.

Yujie Shi graduated with PhD in Economics from the University of Liverpool in 2023. She was working with Prof Chang for 11 months between 2018 and 2019, and also recently in 2023.

Xihui Haviour Chen has been an Assistant Professor of Accountancy at Edinburgh Business School, Heriot-Watt University since May 2022. She is a visiting professor at the University of Economics in Katowice in Poland, and serves as an external examiner for the University of Northampton and Bloomsbury Institute on the Accounting and Financial Management subject. She is the first Chinese international student president of all UK Students' Unions. The focus of her research is interdisciplinary, and she is currently exploring the impact of disruptive technologies and digital transformation on corporate governance and management accounting practices. Xihui has presented her research at many top international conferences (BAM, BAFA, EAA, MFAIC, and ICGS) workshops, and research seminars across the globe. She has been published in leading peer-reviewed international journals and magazines (Technological Forecasting and Social Change, Financial Management Magazine). She is an efficient, organised, and responsible scholar who knows how to make things happen. Please contact her if you have any potential research collaborations or funding opportunities that match her skills and experience.

Jonathan Mills is a Senior Teaching Fellow at Aston University and he has an extensive work experience, especially in accounting and accounting education.