South African Journal of Business Management
ISSN: (Online) 2078-5976, (Print) 2078-5585

Can a pro-public orientation explain the holding of capital by G-SIBs?

Authors:
Cindy Ndebele[1]
Phillip de Jager[1]
Francois Toerien[1]

Affiliations:
[1]Department of Finance and Tax, Faculty of Commerce, University of Cape Town, Cape Town, South Africa

Corresponding author:
Phillip de Jager,
phillip.dejager@uct.ac.za

Dates:
Received: 01 Oct. 2022
Accepted: 15 Mar. 2023
Published: 16 May 2023

How to cite this article:
Ndebele, C., De Jager, P., & Toerien, F. (2023). Can a pro-public orientation explain the holding of capital by G-SIBs? *South African Journal of Business Management, 54*(1), a3652. https://doi.org/10.4102/sajbm.v54i1.3652

Purpose: We investigate the correlation between capital structure and a set of, mostly, standard capital structure determinants for a unique sample: Global Systemically Important Banks (G-SIBs).

Design/methodology/approach: We augment the standard set of regression determinants with a proxy measure of pro-public orientation (DataStream's Refinitiv Environmental, social and governance [ESG] scores). We expect to find that a more pro-public orientated G-SIB holds more capital. This is because very large and systemic banks underpin the functioning of society. The public, therefore, has a direct interest in bank safety with a better capitalised bank being a safer bank. On the other hand, shareholders of a safer bank suffer because of lower profitability.

Findings/results: Initial results indicated no relation between pro-public orientation and bank leverage; however, further analysis showed that bank leverage decreases as the governance component score increases. This suggests that the governance of G-SIBs is important for financial stability. Bank size was found to have no intermediation effect on the relationships, implying that our results are not because of a clustering among the largest banks. Correlations between the control variables and bank leverage provide support for the argument that bank leverage is not solely determined by regulations.

Originality/value: We extend recent work on social ratings and capital structure in non-financial firms to banks. Our results provide further support for the proposition that the drivers of the capital structures of non-financial firms also determine those of banks, weakening the argument that capital regulation is the sole determinant of bank capital structures. Our sample focuses attention on a core financial decision of very important, if not the most important, players in the global economy.

Keywords: bank capital; environmental, social and governance (ESG) score; global systemically important banks (G-SIBs); banks; capital structure.

Introduction

Banks are highly leveraged institutions and, while this is an inherent part of the business of banking, excessive leverage can have evident negative consequences that undermine the broader financial and economic systems. In fact, over-leverage in the banking industry was recognised as being the underlying cause of the recent Global Financial Crisis (GFC) (Basel Committee on Bank Supervision [BCBS], 2014, p. 1). Furthermore, high levels of leverage have been known to incentivise banks to take extreme risks and, consequently, threaten the solvency of these banks (Bhagat et al., 2015, p. 521; Li, 2017, p. 102). This problem is especially true for Global Systemically Important Banks (G-SIBs). As they are deemed to be too systemically important to fail and are protected by too-big-to-fail policies, they can always expect to be bailed out by the government. This creates a moral hazard situation where banks are incentivised to engage in higher risk activities in pursuit of greater returns, benefitting shareholders. Such risk-taking behaviour concentrates risks to the banking sector and thus affects the fragility of the entire financial system, making future crises more likely (Bongini et al., 2015, p. 562).

Central to the discussion on the soundness of banks and stability in the financial system is bank capital. The indefinite maturity of capital is particularly important as it provides a stable source of financing that allows banks to withstand financial and economic shocks (Berger et al., 1995, p. 408). Furthermore, as banks rely on the public's perception about their health and safety to stabilise core deposit funding, a strong capital base can also boost public confidence in these institutions and reduce the possibility of an infectious bank run (Taggart & Greenbaum, 1978, p. 159). As a result, the capital structures of banks are a key target for regulation, which has led to the

commonly held view that capital requirements are binding, making regulation the primary determinant of banks' choice of capital levels (Berger et al., 1995, p. 419). That is why most capital structure studies exclude banks (Chipeta & McClelland, 2018, p. 18; Ramjee & Gwatidzo, 2012, p. 58). However, recent empirical studies suggest that the standard cross-sectional determinants of the capital structures of non-financial firms also extend to banks. The most prevalent contribution in this regard has been from Gropp and Heider (2010, p. 587) whose findings lay the foundation for the study of bank capital structure within a general capital structure framework (Sorokina et al., 2017, p. 37). The work of Frank and Goyal (2009, p. 1) helps to identify variables that reliably explain bank capital structures. In the light of the systemic risk inherent in the banking sector, the importance of banks to global economic and social systems, as well as their unique financial features, there are strong grounds to study the capital structure of banks.

Like Sorokina et al. (2017, p. 36), this study extends the literature on the determinants of bank capital structure by adopting a model like those used in previous capital structure studies and augmenting it. We add a proxy measure for the pro-public orientation of G-SIBs. Our expectation is that a G-SIB that is more aware of its public utility role will take a safer approach by holding more capital, resulting in lower leverage. This is despite the negative effects of lower leverage on shareholder returns. The related literature on corporate social responsibility shows that a growing number of investors account for the social and environmental performance of firms when making investment decisions (El Ghoul et al., 2011, p. 2390; Hong & Kacperczyk, 2009, p. 16). These studies generally exclude banks; yet, it is exactly in banks that the contrast is starkest between what is best for the public and what is best for shareholders.

A panel of data is built that consists of capital structure determinants for 28 G-SIBs for the years 2009 until 2018. The determinant of interest is the Environmental, Social and Governance (ESG) score, or its components, from DataStream Refinitiv. The results from fixed effect (FE) regression models compensate for possible omitted cross-sectional differences and focus the attention on changes in G-SIB capital structure. Our results indicate that the capital structure of G-SIBs is not yet sensitive to the pro-public orientation of the banks as measured by the ESG score. It is only for the governance sub-component that we find a relationship. Bank size was found to have no intermediation impact on the relationships, implying that our results are not because of a clustering among the largest banks. Correlations between the control variables and bank leverage provide support for the argument that bank leverage is not solely determined by regulations.

This study makes three contributions to knowledge. Firstly, we focus on to extend the works of Pijourlet (2013) and Girerd-Potin et al. (2011) from non-financial firms to banks. Secondly, the results provide further support for Gropp and Heider (2010, p. 587) and Teixeira et al. (2014, p. 34) who propose that the drivers of the capital structures of non-financial firms also determine those of banks, weakening the argument that capital regulation is the sole determinant of bank capital structures. Thirdly, we focus attention on a small but important component of the global financial infrastructure, the G-SIBs, and show that they could more fully incorporate a pro-public orientation in their decision making.

The remainder of this paper is structured as follows. The following literature review section discusses the state of knowledge on banks' capital structure choices. Furthermore, the paper discusses the concept of pro-public orientation in the banking industry and presents theoretical and empirical arguments that motivate the expectation of a relationship between the pro-public orientation of banks and their capital structures. The literature review section ends by presenting the hypotheses that will be tested. The next section presents the data and method that will be used and thereafter, follows the results and findings of the regression tests. Finally, the last section concludes.

Literature review

Theoretical background

The capital structure decision of firms is one of the most researched areas of finance, yet the debate as to how it really works is far from settled. In broad terms, the decision is thought to be either a trade-off between the costs and benefits of debt (the so-called trade-off theory of capital structure) or a behavioural issue where managers have superior information relative to other market participants (the main theories of capital structure here are the pecking order theory and the market timing theory). These theories often provide opposing predictions of how capital structure will react to causative variables. However, over the years, capital structure literature has agreed on a common set of variables that have been observed to influence leverage levels. These are formally referred to as the determinants of capital structure.

Rajan and Zingales (1995, p. 1451) identified the four core firm-specific factors as firm size, asset tangibility and/or collateral, profitability, and growth (market-to-book ratio). According to Frank and Goyal (2003, p. 223), these four factors have survived various tests and, therefore, play an important role in explaining the capital structure decisions of firms. We will now briefly discuss each of the factors mentioned:

- Firm size: The relationship between the size of a firm and leverage is typically viewed based on its ability to diversify its business operations and in raising finance. However, there are conflicting theoretical expectations regarding the effect of firm size on leverage. In line with the trade-off theory, Titman and Wessels (1988, p. 6) argue that larger firms face lower risks of bankruptcy or financial distress as they are usually more diversified, and this allows them to take on more debt without the concern of defaulting on future debt payments. Under the pecking order theory, financing costs increase with higher

information asymmetries; the higher the asymmetries, the greater the risk to outside investors, and this is reflected in the price of issued securities. Rajan and Zingales (1995, p. 1457) note that larger firms have lower informational asymmetries and are therefore expected to be less leveraged as they incur lower costs in issuing new equity. In addition, large firms tend to have credible reputations within debt markets and are thus able to borrow easily and inexpensively because of lower information costs (Frank & Goyal, 2003, p. 224). Conversely, Marsh (1982, p. 123) argues that because of issuance costs and pronounced difficulties in accessing capital markets, small companies often depend on bank loans for funding. This is supported by Titman and Wessels (1988, p. 6) who state that the cost of issuing securities is related to the size of a firm and suggest that small firms may prefer debt to equity because of the higher expected costs of issuing new equity and to some extent also of issuing long-term debt. This suggests that small firms will not only be more leveraged, but that they will prefer short-term debt over long-term debt because of the lower transaction costs associated with the former.

- Asset tangibility: According to Titman and Wessels (1988, p. 3), the asset structure of companies influences their capital structure decisions. Tangible assets such as property and machinery are generally visible to outside investors and hence easier to value than non-physical assets (Frank & Goyal, 2009, p. 9). This ease of valuation lowers distress costs and suggests that the greater the fraction of a company's tangible assets, the higher the company's liquidation value. Furthermore, tangible assets often serve as collateral in financing arrangements that reduces the agency costs of total debt and thus encourages borrowing (Rajan & Zingales, 1995, p. 1451). Campello and Giambona (2013, p. 1) extend the argument on collateral by considering the capacity of creditors to repossess assets when their debtors become delinquent. They find that assets that can be repossessed and easily disposed of offer more security to debt providers and so they are more willing to supply funds. Moreover, they report that generic assets such as land and buildings better support the capacity for borrowing as these assets can be redeployed. Altogether, these arguments suggest that leverage is positively correlated with the tangibility of corporate assets.
- Profitability: Although the financial performance of firms has been observed to drive their financing decisions, the effect of profitability on leverage also remains ambiguous. Profitability is a measure of asset productivity (Barton et al., 1989, p. 40) and is synonymous with the firm's ability to generate and retain income. Consequently, the pecking order theory predicts that profitable firms will be less leveraged as they are more likely to rely on internal cashflows to finance their assets. Debt is only issued when internal reserves have been depleted. This is consistent with the findings of Shyam-Sunder and Myers (1999, p. 221) who state that the firm's debt levels are driven by the need for external finance and tend to grow with available investment opportunities. The more the opportunities, the greater the level of debt to cover the shortfall in cashflows initially met by retained earnings. Fama and French (2002, p. 4) also find that leverage levels are generally low for more profitable firms with few investment opportunities. Likewise, findings from Titman and Wessels (1988, p. 2), Rajan and Zingales (1995, p. 1451) and Myers (2001, p. 89) suggest a negative profitability–leverage relationship. On the other hand, the trade-off theory predicts that a positive relationship should exist between leverage and profitability as it posits that savings from the debt tax shield can lower income tax liabilities. This tax benefit is more valuable to profitable firms who are subject to higher taxes liabilities – thus, in order to reduce their tax expenses, firms may take on more leverage (Frank & Goyal, 2003, p. 224; 2009, p. 7). Furthermore, the large amounts of free cashflows generated by highly profitable firms increase the agency costs of the conflict between managers and shareholders. To reduce these costs and the cashflows available for management spending, firms will issue more debt (Jensen, 1986, p. 324).
- Growth: A firm's capacity to finance future opportunities is affected by its growth rate (Barton et al., 1989, p.41). Growing firms have large financing needs because of the positive net present value (NPV) opportunities available to them. This places a greater demand than can be met on internal cashflows and as a result firms often resort to external capital to fund the growth. As the pecking order theory assumes that firms prefer to issue the safest security first when the need for external funding arises, it predicts that high growth firms will be more leveraged because of the reluctance to issue equity and implies that expected growth will be negatively related to long-term debt levels as growing firms will prefer short-term debt as the safer security. However, the trade-off theory counters this viewpoint and instead argues that firms with high market-to-book ratios, which is often used as the proxy for growth opportunities (Frank & Goyal, 2009, p. 8), are unlikely to take on debt as the chances of financial distress and the associated costs increase with expected growth. Myers (1977, p. 149) supports this stance through an elaborate discussion on the high agency costs that arise from the sub-optimal behaviours of high growth firms. Furthermore, Hovakimian et al. (2001, p. 2) argue that firms consist of both tangible and non-tangible assets in the form of growth opportunities. These opportunities are mostly funded by issuing equity to take advantage of the perceived value of their growth prospects whereas physical assets are funded using mostly debt. Frank and Goyal (2003, p. 224) also emphasise the limitations placed on these firms' ability to accept positive NPV projects, causing them to pass up profitable investments. In general, empirical studies conclude that the relation between expected future growth and leverage is negative.

Although not as reliable as the factors discussed above, several other factors have emerged in previous well-known capital structure studies as explanatory variables of firms' capital

structure. These include dividends, asset risk and taxes. Less is known about the determinants of banks' capital structure.

Bank capital structure

Banks have often been excluded from capital structure literature because of the belief that bank capital structure is primarily driven by regulation (Sorokina et al., 2017, p. 36). A few recent papers have started to question that narrative.

Gropp and Heider (2010, p. 587) hypothesised that mispriced deposit insurance and capital regulation are secondary determinants of bank capital structure and that, instead, the standard cross-sectional determinants of non-financial firms also explain banks' capital structure, except for banks that hold levels of capital that are close to the regulatory minimum. Using a sample of 200 large, publicly listed American and European banks over the period 1991–2004, they find that the sign and significance of the effect of the standard determinants observed under empirical studies on the capital structure of non-financial firms also apply to banks. Furthermore, they refute the notion that the high levels of discretionary capital observed in the banking industry can be explained by the buffers held by banks to guard against falling below the minimum capital requirements. In a similar study, Teixeira et al. (2014, p. 34) extend Gropp and Heider (2010, p. 587)'s study by examining banks' excess equity capital based on the observation that, on average, banks hold capital more than the regulatory minimum. They extend the period used by Gropp and Heider (2010, p. 587) from 2004 to 2010 and based on a larger sample of 560 American and European banks, they also find that factors that determine the capital structure of non-financial firms play a similar role in explaining banks' capital structures. Further investigation on the determinants of banks' equity capital reveals that the buffer view of banks' capital structure is also not validated. Overall, these studies relegate capital regulation and the buffer view of capital to secondary importance and suggest that standard capital structure determinants explain the capital structures of banks.

The engagement of large international banks in controversial and socially irresponsible practices during the GFC caused the erosion of public trust in these institutions because of the negative effects imposed on the economy and society (Esteban-Sanchez et al., 2017, p. 1102). Therefore, there is scope and motivation for these large banks to have engaged in pro-public activities after the GFC.

Pro-public orientation of banks

Unlike non-financial firms, the systemic effects posed by the actions of banks are what differentiate them from other firms and limiting this systemic effect is important for society (Stulz, 2016, p. 47). It has already been established that the safety and financial soundness of the banking industry and the wider financial system generates benefits for society. To fulfil their financial intermediation role, banks rely substantially on the funds provided by society. For this reason, they are subject to intense public scrutiny and are required to provide feedback on their activities to the public more often than other industries (Wu & Shen 2013, p. 3530). In response to the increasing pressure to acknowledge their social responsibility, banks are progressively engaging in voluntary disclosures of non-financial information via published sustainability reports to provide feedback on how they are faring as corporate citizens. We expect that increased pro-public disclosure by large banks will reduce information asymmetry and reduce the cost of funding. For example, Bank of America links sustainable growth (and growth supported by too little bank capital would be unsustainable) with the concept 'sharing our success with our communities', the definition of which culminates in a promise to fulfil all their ESG commitments (Bank of America, 2022). Our hypotheses, therefore, follow:

> H_0: There is no relationship between a bank's pro-public orientation and its leverage.
>
> H_1: The relationship between a bank's pro-public orientation and its leverage is negative.

The Basel Committee (2013, p. 3) notes that the recent GFC was triggered by the failure and impairment of several large banks. Moreover, Chih et al. (2010, p. 117) suggest that larger financial firms are likely to be more socially responsible as they are subject to stricter public scrutiny. Likewise, Wu and Shen (2013, p. 3537) argue that larger banks are more involved in corporate social responsibility activities as they are better resourced to do so. The importance of bank stability goes hand in hand with the size of banks and as the activities and decisions of larger banks have been observed to have wider-reaching consequences, it would be beneficial to examine whether the size of banks mediates the relationship between pro-public orientation and bank leverage.

Therefore, a second alternative hypothesis may be formulated as follows:

> H_2: Bank size mediates the predicted relationship between a bank's pro-public orientation and its leverage.

Sample selection, data and method

Sample selection

This study examines whether pro-public orientation is a determinant of bank capital structure as suggested by previous theories and empirical works. To conduct the study, the required data are obtained from the Thomson Reuters Datastream, Bloomberg and World Bank databases, for the period 2009–2018. The selected years allow for the examination of the period immediately after the GFC, which is especially relevant as it corresponds with the period during which concerns about the social performance of the banking industry escalated. The sample adopted for the study consists of all the banks classified as G-SIBs because of their importance from a financial system stability, economic development and more recently sustainability perspective. As discussed in previous sections, the resilience and ability of these institutions to deal with shocks have significant implications for the proper functioning of the broader financial and economic systems. This explains why the regulatory framework includes special

and additional provisions for these banks. Based on this rationale and in accordance with Gropp and Heider's use of a sample of large systematically relevant commercial banks, the selected sample is considered to be more meaningful for the study than a random sample of banks. Every year in the month of November, the Financial Stability Board publishes an updated list of G-SIBs in consultation with national authorities and the BCBS. As at November 2018, 29 banking institutions were identified as G-SIBs. However, because of the absence of ESG score data for one of the banks (Groupe BPCE), only 28 of these banks make up the sample for the study. Although the sample size of 28 might be small, the combined assets of the G-SIBs account for a majority of global banking activity. In addition, the selected sample is deemed appropriate for the purposes of this study as it is largely interested in the pro-public orientation of banks that have a significant impact on society. Table 1 lists the names and head office regions of the G-SIBs.

Data

The variables used in this study are those commonly used in bank capital structure studies. Leverage is used as the dependent variable to define capital structure. According to Gropp and Heider (2010, p. 598), leverage can either be measured in terms of book value or market value, and although both measures have been used interchangeably in previous capital structure studies and yielded similar results, the distinction between market and book bank leverage is especially important for banks as regulation is imposed on book bank capital. Nonetheless, the authors find that the difference between market and book bank leverage is insignificant (Gropp & Heider, 2010, p. 600). This is also consistent with Teixeira et al. (2014, p. 44)'s assertions about the negligible difference between market and book bank leverage. In this study, leverage is measured in market values as it has the advantage of being forward-looking (Frank & Goyal, 2009, p. 2).

TABLE 1: List of Global Systemically Important Banks as at November 2018.

Bank name	Country of origin	Region
Agricultural Bank of China	China	Asia-Pacific (7)
Bank of China		
China Construction Bank		
Industrial & Commercial Bank of China		
Mitsubishi UFJ FG	Japan	
Mizuho FG		
Sumitomo Mitsui FG		
Barclays	United Kingdom	Europe (13)
HSBC		
Standard Chartered		
BNP Paribas	France	
Groupe BPCE		
Groupe Crédit Agricole		
Société Générale		
Deutsche Bank	Germany	
UniCredit Group	Italy	
ING Bank	Netherlands	
Santander	Spain	
Credit Suisse	Switzerland	
UBS		
Bank of America	USA	North America (9)
Bank of New York Mellon		
Citigroup		
Goldman Sachs		
JP Morgan Chase		
Morgan Stanley		
State Street		
Wells Fargo		
Royal Bank of Canada	Canada	

Source: Financial Stability Board

UFJ, United Financial of Japan; Mizuho FG, Mizuho Financial Group; HSBC, Hongkong and Shanghai Banking Corporation Limited; BNP, Banque Nationale de Paris; BPCE, Banque Populaire Caisse d'Epargne; ING, Internationale Nederlanden Groep; UBS, Unione di Banche Svizzere.

The key independent variable in this study is a bank's pro-public orientation. Environmental, social and governance disclosure scores or ratings are generally used as proxies for corporate social responsibility as they are readily available (Esteban-Sanchez et al., 2017, p. 1103). Our concept of pro-public orientation is likely to overlap to a large extent with corporate social responsibility and, therefore, we follow Esteban-Sanchez et al. (2017, p. 1103) in using the Refinitiv Datastream ESG scores. Refinitiv Datastream ESG scores rank firms based on public data reported by companies on their performance across the three ESG dimensions and according to 10 main categories that correspond with each of these dimensions. The 10 categories and their descriptions are presented in Table 1-A1. Company data used to generate the scores is sourced from firms' annual reports, stock exchange filings, corporate social responsibility reports and news media (Refinitiv, 2019, p. 3).

Following Gropp and Heider (2010, p. 596), additional independent variables include bank size, profitability, tangibility, growth, dividends, asset risk and tax. These variables represent a set of factors that have been observed to explain the capital structure of banks and are thus used to control for the various effects that might confound the relationship between ESG score and bank leverage. Their effect on leverage has already been explained previously. Furthermore, Teixeira et al. (2014, p. 38) note that it is important to control for macroeconomic variables as banks are presumed to be highly exposed to the economic activities in their respective countries considering the roles they play in economic and financial systems. Consequently, the study includes gross domestic product (GDP) growth and inflation data obtained from the World Bank database as further explanatory variables. Table 2 provides a summary of all the variables used in the study, including their measures, sources of data and their expected relationship with bank leverage according to the predictions of the literature on bank capital structure.

Method

To examine the link between ESG score and bank capital structure, this study employs a multiple regression analysis of panel data based on 280 bank-year observations. The use of panel data allows for the control of variables that cannot be measured or observed in strictly cross-section or time series data and helps to account for the heterogeneity that typically exists in panel data (De Jager, 2008, p. 56). There are two

TABLE 2: Summary of variables used in the study.

Variables	Measure	Data source	Expected effect on LEV
Dependent variables			
LEV	1 minus (market value of equity/market value of assets)	Computed using data obtained from Bloomberg	Not available
Key independent variable			
ESG	ESG Score	Datastream	-
ESG Dimensions:			
ENV	Environment Dimension Score		
SOC	Social Dimension Score		
GOV	Governance Dimension Score		
Control variables			
Bank-specific factors:			
SIZE	Natural log of book value of total assets	Computed using data obtained from Bloomberg	+
PROF	Return on assets (pre-tax profits + interest expenses over the book value of assets)		-
TANG	Ratio of tangible assets to total assets		+
Growth	Ratio of market-to-book value of assets		-
ARISK	Annualised standard deviation of daily stock returns × (market value of equity/market value of the bank)		-
DIV	Assumes a value of 1 if the bank paid dividends in a given year, and 0 otherwise		-
TAX	Effective tax rate		+
Macroeconomic variables:			
GDP Growth	Annual % change in GDP	World Bank	+
INF	Annual % change in average CPI		

LEV, Leverage; ENV, Environmental; ESG, Environmental, Social and Governance; SOC, Social; GOV, Governance score; SIZE, Bank Size; PROF, Profitability; TANG, Asset Tangibility; GROWTH, Bank Growth; ARISK, Asset Risk; DIV, Dividend Dummy; TAX, Taxation; GDP, Gross Domestic Product; INF, Inflation.

estimation techniques that can be used to model panel data: the fixed effects (FE) or random effects (RE) models. The FE model assumes that unobserved variables and observed variables are associated, whereas the RE model assumes that unobserved variables are not correlated with the observable variables. The Durbin-Wu Hausman specification test (Hausman test) is used to determine which of the two models is more appropriate to apply to the data. In addition, as in Gropp and Heider (2010, p. 596) and Teixeira et al. (2014, p. 36), a lag of one year between bank leverage and all the explanatory variables, except the dividend dummy and macroeconomic variables, is applied to address reverse causality endogeneity issues. This means that bank leverage data were collected from 2010 to 2018, while data for the independent variables were gathered from 2009 to 2017.

Following Sorokina et al. (2017, p. 36) and based on previous standard capital structure research, a new financial management model is proposed that includes ESG score as an explanatory variable of bank capital structure in addition to the traditional explanatory variables. Two separate regression models are used to test the hypotheses formulated in this study. The first model tests the null (H_0) and first alternative hypotheses (H_1), while the second model tests the second alternative hypothesis (H_2). To test H_2, the first model is modified to interact the ESG score and size variables to capture the effect of bank size on the relationship predicted under H_1. A significant result for the interacting variables will support this hypothesis. Furthermore, the link between ESG score and bank leverage is further analysed by disaggregating the ESG variable in both models into its component parts.

The models are thus defined as:

$$LEV_{ict} = \beta_0 + \beta_1 ESG_{ict-1} + \beta_2 \ln(SIZE)_{ict-1} + \beta_3 PROF_{ict-1} + \beta_4 TANG_{ict-1} + \beta_5 GROWTH_{ict-1} + \beta_6 ARISK_{ict-1} + \beta_7 DIV_{ict} + \beta_8 TAX_{ict-1} + \beta_9 GDP_{ict} + \beta_{10} INF_{ict} + \mu_{ict} \quad [Eqn\ 1]$$

$$LEV_{ict} = \beta_0 + \beta_1 ESG_{ict-1} + \beta_2 \ln(SIZE)_{ict-1} + \beta_3 PROF_{ict-1} + \beta_4 TANG_{ict-1} + \beta_5 GROWTH_{ict-1} + \beta_6 ARISK_{ict-1} + \beta_7 DIV_{ict} + \beta_8 TAX_{ict-1} + \beta_9 GDP_{ict} + \beta_{10} INF_{ict} + \beta_{11} ESG*SIZE_{ict} + \mu_{ict} \quad [Eqn\ 2]$$

Where β_0 is the constant term, βn is the coefficient of independent variables and the subscripts i, c and t denote the i^{th} bank in the c^{th} country at time t, respectively. X_{ict-1} represents a set of one-year lagged bank-specific factors, and μ_{ict} is the error term including bank specific intercepts. The equations of the models will be estimated using Stata 15 Statistical Analysis Software. The results and related discussions are presented in the next section.

Ethical considerations

This article followed all ethical standards for research without direct contact with human or animal subjects.

Results

Descriptive statistics

A summary of the descriptive statistics for bank leverage, ESG score and the control variables is provided in Table 3.

A review of the descriptive statistics shows that the average leverage of the banks in the sample is 94.74%, with a minimum leverage of 85.97% and a maximum leverage of 99.51% indicating that in one year, one of the banks was almost entirely financed by debt. The corresponding standard deviation of 0.0328 suggests that most leverage values are relatively close to the average. This is consistent with the expectation and common observation of a highly leveraged banking industry as presented on Figure 2-A1, which shows the average leverage ratios of the G-SIBs over the sample period. In terms of size, the average bank size during the period under review was 14.86. The standard deviation of 1.8 for this control variable suggests that the sample exhibits some variation in the size of the banks despite the selection of G-SIBs that are generally assumed to be too-big-to-fail. However, it is important to note that the designation of a bank as a G-SIB is not solely based on its size. This may explain the dispersion in the size of the banks. Bank size is considered to be important in the study

TABLE 3: Descriptive statistics.

Variable	*N*	Mean	Standard deviation	Minimum	Median	Maximum
LEV	279	0.9474	0.0328	0.8597	0.9544	0.9951
ESG	277	0.7681	0.1237	0.3000	0.7900	0.9500
SIZE	280	14.8556	1.8124	11.9700	14.2471	19.5422
PROF	280	0.0179	0.0107	-0.0076	0.0159	0.0744
TANG	280	0.9875	0.0147	0.8971	0.9929	0.9999
GROWTH	279	0.9835	0.0210	0.9170	0.9789	1.0517
ARISK	278	0.0155	0.0137	0.0029	0.0118	0.1393
DIV	280	0.8786	0.3272	0	1	1
TAX	249	0.3447	0.7373	0.0009	0.2549	11.3458
GDP	280	0.0332	0.1129	-0.0562	0.0184	0.9400
INF	280	0.0137	0.0123	-0.0135	0.0151	0.0555

LEV, Leverage; ESG, Environmental, Social and Governance score; SIZE, Bank Size; PROF, Profitability; TANG, Asset Tangibility; GROWTH, Bank Growth; ARISK, Asset Risk; DIV, Dividend Dummy; TAX, Taxation; GDP, Gross Domestic Product; INF, Inflation.

TABLE 4: Summary statistics of environmental, social and governance scores.

ESG dimension	*N*	Mean	Standard deviation	Minimum	Median	Maximum
Environmental	277	0.8553	0.1137	0.4000	0.8900	0.9900
Social	277	0.7605	0.1691	0.1600	0.7900	0.9800
Governance	277	0.6797	0.1747	0.1700	0.7300	0.9600

ESG, Environmental, social and governance.

as it is expected to influence the predicted relationship between ESG and bank leverage.

Regarding profitability, the sampled banks exhibited an average return on assets of 1.79% during the years 2009–2018, with a minimum and maximum return on assets of −0.76% and 7.44%, respectively. The average asset risk was 1.55%, with a standard deviation of 0.0137 and a minimum and maximum assets risk of 1.18% and 13.93%, respectively. The statistics on profitability and asset risk suggest that the G-SIBs experienced low and relatively stable returns during the sample period. The asset structure of the banks in the sample was represented by an average of 98.7% implying that a majority of bank book assets are made up of tangible assets. The standard deviation of 0.015 further implies that this is true for most of the banks. Furthermore, the average market-to-book ratio, which measures the growth potential of the banks, was 0.9835, with a minimum of 0.917 and a maximum of 1.052. This indicates that, in general, these banks' market values are close to the book value of their assets and hence the lower growth that is expected by the markets.

As the main variable of interest in this study, the average ESG score of the G-SIBs in the sample (which is our proxy for pro-public orientation) was 76.81%, with a minimum and maximum of 30% and 95%, respectively. The standard deviation of 0.1237 indicates that the reported scores of the banks are not too far off from each other. It is useful to further analyse the ESG scores by comparing the summary statistics of the individual scores of the three dimensions that make up the combined ESG scores. These statistics are summarised in Table 4.

The average scores of the individual ESG dimensions appear to be fairly close to each other, with the governance dimension exhibiting the highest variability.

Correlation table

The correlation matrix provided in Table 5 shows the correlations between bank leverage (dependent variable) and the pre-specified explanatory variables. A review of the correlations allows for an analysis of the strength and direction of the relationship between these variables on a univariate basis as well as the possible identification of any multicollinearity issues among the independent variables.

The main correlation between bank leverage and ESG is negative, providing preliminary support for the direction of the relationship between the two variables as predicted in the first hypothesis. However, the coefficient is statistically insignificant, and, therefore, the relationship might not exist. A graphical representation of this correlation is presented on Figure 2-A2. We did find a statistically significant relationship between the social component of the overall ESG score and bank leverage, which is not tabulated to save space. A significant negative correlation between ESG and size can be observed, which implies that the larger the bank the lower its ESG disclosure score. This may have implications for the interaction term between the two variables under the second hypothesis. Overall, the signs of the coefficients and the correlations between bank leverage and the control variables are consistent with those findings typically observed in standard capital structure literature.

Based on the correlation matrix above, there appears to be no multicollinearity issues. This was later confirmed by variance inflation factor tests.

Regression results

Table 6 and Table 7 show the results of the regressions on the determinants of bank capital structure for the specified regression models. These models were first estimated using the pooled ordinary least squares (OLS) and then using FE regression techniques. For the Pooled OLS models, the Ramsey Regression Equation Specification Error Test (Ramsey-RESET) for omitted variable bias indicated that there were unobserved individual effects as the null hypothesis of no omitted variables was rejected as deduced from the test statistic of 13.48, which was significant at the 1% level. The Hausman test indicated that FE were appropriate and not RE. The use of FE regression techniques has the advantage of refining our identification strategy in that FE effectively demeans the data and the observed correlations become correlations between demeaned observations. This implies that deviations in capital structure, from the long-term average of a specific bank, become the subject of the investigation rather than the absolute value of the capital structure. Furthermore, like Gropp and Heider (2010, p. 596), robust standard errors clustered at the bank level were used to account for heteroskedasticity and autocorrelation.

The results from Equation 1 show that ESG has a negative but insignificant impact on the leverage of the banks in the

TABLE 5: Correlation matrix (Pearson).

Variables	LEV	ESG	SIZE	PROF	TANG	GRWTH	ARISK	DIV	TAX	GDP	INF
LEV	1	-	-	-	-	-	-	-	-	-	-
ESG	-0.043†	1	-	-	-	-	-	-	-	-	-
SIZE	0.339***	-0.475***	1	-	-	-	-	-	-	-	-
PROF	-0.217***	-0.230***	-0.144	1	-	-	-	-	-	-	-
TANG	0.529***	-0.258***	0.489***	0.164***	1	-	-	-	-	-	-
GROWTH	-0.700***	0.077	-0.255***	0.236***	-0.180**	1	-	-	-	-	-
ARISK	-0.587***	0.087	-0.324***	0.157	-0.451***	0.346***	1	-	-	-	-
DIV	-0.375***	-0.193**	0.151**	0.172	-0.124**	0.201***	0.228***	1	-	-	-
TAX	0.106*	-0.082	0.114*	-0.151**	0.057	-0.051	-0.050	0.001	1	-	-
GDP	-0.192***	-0.437***	0.223***	0.306***	0.221***	0.149***	-0.181***	0.152**	-0.223***	1	-
INF	-0.114**	-0.172***	-0.131	0.279***	-0.019	-0.023	-0.118**	0.117*	-0.178***	0.373***	1

LEV, Leverage; ESG, Environmental, Social and Governance score; SIZE, Bank Size; PROF, Profitability; TANG, Asset Tangibility; GROWTH, Bank Growth; ARISK, Asset Risk; DIV, Dividend Dummy; TAX, Taxation; GDP, Gross Domestic Product; INF, Inflation.

†, denotes that statistical significance was found between LEV and components of ESG.

***, denotes significance at 1%; **, denotes significance at 5%; *, denotes significance at 10%.

sample. While the negative sign of the coefficient supports the expected direction of the relationship between ESG and bank leverage, the null hypothesis that there is no relationship between ESG and bank leverage cannot be rejected because of the lack of statistical significance. Moreover, the low estimated coefficient of –0.03 suggests that ESG performance accounts for very little, if any, of the variation in bank leverage. These results are inconsistent with Pijourlet (2013, p. 17) who finds for non-banks a significant negative relationship between the two variables using the aggregate ESG score. Similarly, Girerd-Potin (2011:34) initially find for non-banks an insignificant negative relation, but after accounting for the distribution in the aggregate social rating their results become significant.

A possible explanation for the weak significance of the ESG coefficient could arise from the measurement of ESG using the aggregate score. It could be that the banks perhaps respond to specific social concerns. Therefore, to gain a better understanding of the relationship between ESG and leverage, the ESG scores used as in Equation 1 were substituted by the scores of the individual ESG dimensions, that is, the ENV, SOC and GOV scores. This allowed for an analysis of the ESG dimensions that banks are likely to account for in their capital structure decisions. The results of the disaggregated ESG scores are presented in Table 6 under Equation 1(a). The results show that, although the coefficients of the environmental and social dimensions remain insignificant, the sign of the coefficient between the governance dimension and bank leverage is negative and statistically significant at 5%. Moreover, only the governance and environmental dimensions produce the predicted negative sign of the coefficient.

The significant negative relationship between the governance dimension of the ESG score and bank leverage is not surprising given that, under the Refinitiv ESG scoring methodology, the specific ESG strategies of companies are reflected in the governance dimension score (see Appendix 1). According to the methodology, the governance dimension reflects a company's actions to communicate that it integrates social responsibility into its daily operations and decision-making processes (Refinitiv, 2019, p. 16). Interestingly, Laeven (2013, p. 65) also notes that the recent GFC has been linked to failures and weaknesses in the governance systems of banks, particularly with regard to their risk management processes. The results obtained, thus, make intuitive sense and imply that the governance dimension could be more relevant for banks than the other two dimensions. A similar assertion is made by Pijourlet (2013, p. 17) who, after failing to obtain a significant result between the environment dimension and leverage, states that investors may be less concerned about environmental policies than assumed. Overall, the results suggest that banks with sound governance systems will be less leveraged than banks with poor governance practices in place.

The link established between the governance structures of banks and capital structure could be instrumental in restoring public confidence in the banking system. As previously pointed out by Wu and Shen (2013, p. 3531), pro-public orientation can be linked to banks through their reputations. Good governance systems encourage corporate accountability and greater transparency, which in turn have a beneficial influence on the reputation of banks and their relations with stakeholders. Moreover, greater transparency reduces informational asymmetries between a firm's insiders and its external stakeholders, which allows for better communication and thus helps banks to remain reputable (Cui et al., 2018, p. 549). According to Berger et al. (2016:731), effective governance systems are also useful in predicting bank failures. Therefore, the observed relationship could help to reduce the risk of another financial crisis through sound risk management processes that control for excessive risk taking by banks, especially those that are deemed to be systemically important. As overleverage in the banking sector is viewed as a key risk to financial and economic stability, such governance systems could be a safeguard for the economy and society.

However, it should be noted that the estimated coefficient values of the governance variable suggest that it has less explanatory power than most of the control variables included in the regression models. A possible reason is

TABLE 6: Fixed effects regression results for Equation 1.

Explanatory variables	Dependent variable (Leverage)	
	Equation 1	Equation 1(a)
Constant	2.201***	2.170***
	(0.265)	(0.273)
ESG	-0.0299	-
	(0.0230)	-
ENV	-	-0.00260
	-	(0.0198)
SOC	-	0.0126
	-	(0.0151)
GOV	-	-0.0229**
	-	(0.00982)
SIZE	-0.000517	-0.00385
	(0.00903)	(0.00993)
PROF	0.317	0.394
	(0.256)	(0.239)
TANG	-0.926***	-0.873***
	(0.286)	(0.281)
GROWTH	-0.318***	-0.304***
	(0.109)	(0.103)
ARISK	-0.184**	-0.197**
	(0.0832)	(0.0741)
DIV	-0.00769***	-0.00873***
	(0.00216)	(0.00215)
TAX	0.00105**	0.0241
	(0.000419)	(0.0471)
GDP	0.0265	0.00100**
	(0.0486)	(0.000404)
INF	0.382***	0.363***
	(0.109)	(0.107)
R-squared	0.329	0.343
F [prob.]	24.17 [0.0000]	26.43 [0.0000]
Number of banks	28	28
Number of observations	220	220

ESG, Environmental, Social and Governance score; ENV, Environment Dimension Score; SOC, Social Dimension Score; GOV, Corporate Dimension Score Governance; SIZE, Bank Size; PROF, Profitability; TANG, Asset tangibility; GROWTH, Growth; ARISK, Asset risk; DIV, Dividend Payment; TAX, Taxation; GDP, GDP Growth; INF, Inflation.

Clustered standard errors in parentheses ()

For Equation 1(a), $LEV_{ict} = \beta_0 + \beta_1 ENV_{ict-1} + \beta_2 SOC_{ict-1} + \beta_3 GOV_{ict-1} + \beta_4 \ln(SIZE)_{ict-1} + \beta_5 PROF_{ict-1} + \beta_6 TANG_{ict-1} + \beta_7 GROWTH_{ict-1} + \beta_8 ARISK_{ict-1} + \beta_9 DIV_{ict} + \beta_{10} TAX_{ict-1} + \beta_{11} GDP_{ict} + \beta_{12} INF_{ict} + \mu_{ict}$

***, denotes significance at 1%; **, denotes significance at 5%; *, denotes significance at 10%

TABLE 7: Fixed effects regression results for Equation 2.

Explanatory variables	Dependent variable Leverage	
	Equation 2	Equation 2(a)
Constant	2.253***	2.196***
	(0.277)	(0.298)
ESG	-0.0244	-
	(0.0191)	-
ENV	-	-0.00917
	-	(0.0266)
SOC	-	0.0208
		A(0.0162)
GOV	-	-0.0194**
	-	(0.00791)
SIZE	-0.00114	-0.00402
	(0.0109)	(0.0116)
PROF	0.323	0.384
	(0.244)	(0.231)
TANG	-0.947***	-0.877***
	(0.291)	(0.298)
GROWTH	-0.337***	-0.322**
	(0.119)	(0.116)
ARISK	-0.179**	-0.205**
	(0.0849)	(0.0831)
DIV	-0.00786***	-0.00987***
	(0.00242)	(0.00306)
TAX	0.00101**	0.0429
	(0.000419)	(0.0656)
GDP	0.0248	0.00105**
	(0.0505)	(0.000499)
INF	0.354***	0.349***
	(0.104)	(0.115)
ESG*SIZE	-0.000582	-
	(0.00117)	-
ENV*SIZE	-	0.000707
	-	(0.00152)
SOC*SIZE	-	-0.000541
	-	(0.000835)
GOV*SIZE	-	-0.000722
	-	(0.00109)
R-squared	0.343	0.362
F [prob.]	20.65 [0.0000]	54.19 [0.0000]
Number of banks	28	28
Number of observations	220	220

ESG, Environmental, Social and Governance score; ENV, Environment Dimension Score; SOC, Social Dimension Score; GOV, Corporate Dimension Score Governance; SIZE, Bank Size; PROF, Profitability; TANG, Asset tangibility; GROWTH, Growth; ARISK, Asset risk; DIV, Dividend Payment; TAX, Taxation; GDP, GDP Growth; INF, Inflation.

Clustered standard errors in parentheses ()

For Equation 2(a), $LEV_{ict} = \beta_0 + \beta_1 ENV_{ict-1} + \beta_2 SOC_{ict-1} + \beta_3 GOV_{ict-1} + \beta_4 \ln(SIZE)_{ict-1} + \beta_5 PROF_{ict-1} + \beta_6 TANG_{ict-1} + \beta_7 GROWTH_{ict-1} + \beta_8 ARISK_{ict-1} + \beta_9 DIV_{ict} + \beta_{10} TAX_{ict-1} + \beta_{11} GDP_{ict} + \beta_{12} INF_{ict} + \beta_{13} ENV*SIZE_{ict} + \beta_{14} SOC*SIZE_{ict} + \beta_{15} GOV*SIZE_{ict} + \mu_{ict}$

***, denotes significance at 1%; **, denotes significance at 5%; *, denotes significance at 10%.

provided by Girerd-Potin et al. (2011, p. 36) who argue that the application of the pro-public orientation concept to the capital markets is a relatively recent phenomenon, and as current leverage levels are the result of past capital structure decisions and evolve rather slowly, it will take time for pro-public orientation strategies to be fully reflected in capital structures. It could thus be deduced that as banks continue to address societal concerns about the overleveraged banking industry by adjusting their capital structures, governance and perhaps even aggregate ESG score will have greater explanatory power for future leverage levels.

Further review of the coefficients of the control variables used in Equation 1 shows that most of the explanatory variables considered show statistical significance, which is consistent with the recent literature on bank capital structure. Tangibility, growth, dividend dummy and inflation are significant at 1%, while asset risk and tax are significant at the 5% level. These variables retain their statistical significance under Equation 1(a), except for tax and GDP becomes significant at the 5% level. In addition, all the coefficients have the expected sign, except for size, profitability and tangibility. However, the coefficients of the size and profitability variables are insignificant; hence no reasonable conclusion can be drawn regarding their relation to leverage. The negative coefficient of the tangibility variable is consistent with the pecking order theory. Overall, the explanatory variables included in the regression models collectively account for roughly a third of the change in bank leverage, based on the R-squares of 32.9% (Equation 1) and 34.3% (Equation 1[a]). This suggests

that regulation is not the sole determinant of bank capital structure. This is further supported by the F-tests on the joint significance of all the explanatory variables on bank leverage, which generate statistical significance at the 1% level. The results from Equation 2 regarding the second hypothesis are shown in Table 7.

Equation 2 includes an interaction term between ESG and bank size to identify any interaction effects between the two variables. The results show that there is an insignificant interaction between ESG and size when ESG is measured in aggregate terms. As in Equation 1, each of the three ESG dimensions is interacted with the size variable to produce the results in Equation 2(a); however, insignificant interactions are still found between each of the ESG dimensions and size. This implies that the size of a bank has no effect on the link between ESG and leverage and thus invalidates the second hypothesis. Nevertheless, the inclusion of the interaction terms between the ESG dimensions and size does not change the direction and significance of the relationships observed in Equations 1 and 1(a) as most of them remain stable. Most importantly, the negative and significant relationship between the governance dimension and bank leverage also remains intact.

The insignificance of the interaction terms between the ESG scores and the individual ESG dimension scores with the size variable is in contrast to the findings of Chih et al. (2010, p. 124), who argue that larger financial firms are expected to be more corporate social responsible as they are highly visible and so are naturally subject to greater public scrutiny. In addition, larger banks are thought to be better resourced to engage in more pro-public activities than their smaller counterparts and are therefore expected to exercise better social responsibility. The finding from our study could be distorted by the fact that the G-SIBs used in the sample represent some of largest banks globally, so any interaction with the size variable is unlikely to produce the expected effect. Bank size is highly relevant to the stability of the banking system as the failure or distress of larger banks is likely to be more material than the failure of smaller banks; hence larger banks have more reason to be mindful of societal concerns regarding their capital structures and take these concerns into consideration in their capital decisions.

In summary, we did not find statistically significant results for the expected relationship between ESG score and capital structure. However, we did find results for the influence of the corporate governance component of ESG score on capital structure. Also, the influence of the control variables was significant with the implication that we support the scant literature that claims bank capital structure is not fully determined by regulation and remains sensitive for the standard determinants.

Conclusion and limitations

Guided by the increasing importance of corporate social responsibility in the banking industry and the recent empirical findings on the applicability of the standard capital structure determinants to banks, this study set out to examine the capital structures of a sample of 28 G-SIBs, with a focus on the ESG score as a possible determinant of their capital structure. The results show that there is no relation between the aggregate ESG score and bank leverage. However, when the ESG score is unpacked further, a significant negative relation was found between the governance dimension of ESG and bank leverage, suggesting that the governance dimension could be more important for bank capital structures than the environmental and social dimensions. Overall, the finding suggests that, to some extent, pro-public orientation is indeed a determinant of the capital structure of G-SIBs and thus provides insight into how they are adapting to societal standards after the GFC. Despite the greater public scrutiny of these banks, bank size was found to have no effect on the predicted relationship.

The results of this study have important implications for the regulation of banks and especially, G-SIBs. Since the GFC, the BCBS has embarked on several reforms to enhance the resilience of the banking industry (BCBS, 2013, p. 2), including higher capital requirements and the introduction of leverage ratios. The results of this study could be incorporated into these reforms, provided they are based on negotiation and mutual agreement between banks, regulators and other relevant stakeholders. This is because banks are likely to be more socially responsible if there are fair regulations in place to encourage such behaviour. This should help to improve bank stability and that of the wider financial system as well as prevent future financial crises. However, it is important to note that such policies rest on the recognition that a pro-public orientation is in the long-term interest of both the banking system and society at large.

The following limitation should be considered when interpreting the results. We relied on the use of ESG scores to measure the pro-public orientation of the G-SIBs. However, these ratings are disclosure oriented and do not necessarily reflect how firms actually perform in terms of pro-public behaviour. Some banks may be inconsistent in their disclosure processes and, thus, their pro-public activities may not be captured in the ESG scores, reducing the reliability of the score as a measure of pro-public orientation. It also needs to be kept in mind that the ESG score might be a noisy proxy for our concept of pro-public orientation. Our sample is a small 28 G-SIBs that we amplified by collecting panel data for 280 bank-year observations. This remains a small sample that is argued to be acceptable because we do not intend to generalise beyond the G-SIBs – our study was focused on what the G-SIBs are doing.

Nevertheless, the findings from this study suggest that there is scope for further research in the capital structure determinants of banks beyond regulatory rules. Future studies would be well served by splitting up the capital held by banks into a minimum portion required by regulations

and a discretionary portion chosen by each individual bank (for example, see Lubberink, 2022). The discretionary portion of capital held will exhibit much more variation, which should be useful for finding statistically significant correlations with possible causes. The relationship between the ESG score of G-SIBs and their leverage is likely to strengthen in future as the popularity of ESG increases and the Basel Accords strengthen public accountability of large banks.

Acknowledgements

The article is based on the Master's dissertation of the first author at the University of Cape Town. Given that foundation, all authors contributed towards the writing of the draft article, applying statistical techniques, analysing the results and writing, reviewing and editing the article.

Competing interests

The authors have declared that no competing interest exists.

Authors' contributions

All authors contributed to the article, including writing the draft, collecting data, applying statistical techniques, analysing the results and writing, reviewing and editing the article.

Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

The data were obtained from public and commercial sources and are available from the corresponding author on reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

References

Bank of America. (2022). *Delivering responsible growth*. Retrieved from https://about.bankofamerica.com/en/our-company/responsible-growth

Bae, K.H., Kang, J.K., & Wang, J. (2011). Employee treatment and firm leverage: A test of the stakeholder theory of capital structure. *Journal of Financial Economics, 100*(1), 130–153. https://doi.org/10.1016/j.jfineco.2010.10.019

Barton, S.L., Hill, N.C., & Sundaram, S. (1989). An empirical test of stakeholder theory predictions of capital structure. *Financial Management, 18*(1), 36–44. https://doi.org/10.1016/j.jfineco.2010.10.019

Basel Committee on Banking Supervision (BCBS). (2013). Global systemically important banks: Updated assessment methodology and the higher loss absorbency requirement. Basel Committeeon Banking Supervision. Retrieved from https://www.bis.org/publ/bcbs255.pdf

Basel Committee on Banking Supervision. (2014). Basel III leverage ratio framework and disclosure requirements. Basel Committeeon Banking Supervision. Retrieved from https://www.bis.org/publ/bcbs270.pdf

Berger, A.N., Herring, R., & Szegö, G.P. (1995). The role of capital in financial institutions. *Journal of Banking and Finance, 19*(3–4), 393–430. https://doi.org/10.1016/j.jfineco.2010.10.019

Berger, A.N., Imbierowicz, B., & Rauch, C. (2016). The roles of corporate governance in bank failures during the recent financial crisis. *Journal of Money, Credit and Banking, 48*(4), 729–770. https://doi.org/10.1111/jmcb.12316

Bhagat, S., Bolton, B., & Lu, J. (2015). Size, leverage, and risk-taking of financial institutions. *Journal of Banking and Finance, 59*(C), 520–537. https://doi.org/10.1016/j.jbankfin.2015.06.018

Bongini, P., Nieri, L., &Pelagatti, M. (2015). The importance of being systemically important financial institutions. *Journal of Banking and Finance, 50*, 562–574. https://doi.org/10.1016/j.jbankfin.2014.07.006

Campello, M., & Giabona, E. (2013). Real assets and capital structure. *Journal of Financial & Quantitative Analysis, 48*(5), 1–37. https://doi.org/10.1017/S0022109013000525

Chih, H.L., Chih, H.H., & Chen, T.Y. (2010). On the determinants of corporate social responsibility: International evidence on the financial industry. *Journal of Business Ethics, 93*(1), 115–135. https://doi.org/10.1007/s10551-009-0186-x

Chipeta, C., & McClelland, D. (2018). In search of conclusive evidence on the trade-off and pecking order theories of capital structure: Evidence from the Johannesburg Stock Exchange. *Investment Analysts Journal*, 47(1), 15–30. https://doi.org/10.1080/10293523.2017.1412608

Cui, J., Jo, H., & Na, H. (2018). Does corporate social responsibility affect information asymmetry? *Journal of Business Ethics, 148*(3), 549–572. https://doi.org/10.1007/s10551-015-3003-8

De Jager, P. (2008). Panel data techniques and accounting research. *Meditary Accounting Research, 16*(2), 53–68. https://doi.org/10.1108/10222529200800012

El Ghoul, S., Guedhami, O., Kwok, C., & Mishra, D.R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking and Finance, 35*(9), 2388–2406. https://doi.org/10.1016/j.jbankfin.2011.02.007

Esteban-Sanchez, P., De la Cuesta-Gonzalez, M., & Paredes-Gazquez, J.D. (2017). Corporate social performance and its relation with corporate financial performance: International evidence in the banking industry. *Journal of Cleaner Production, 162*, 1102–1110. https://doi.org/10.1016/j.jclepro.2017.06.127

Fama, E.F., & French, K.R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of Financial Studies, 15*(1), 1–33. https://doi.org/10.1093/rfs/15.1.1

Frank, M.Z. & Goyal, V.K. (2003). Testing the pecking order theory of capital structure. *Journal of Financial Economics, 67*(2), 217–248. https://doi.org/10.1016/S0304-405X(02)00252-0

Frank, M.Z., & Goyal, V.K. (2009). Capital structure decisions: Which factors are reliably important? *Financial Management, 38*(1), 1–37. https://doi.org/10.1111/j.1755-053X.2009.01026.x

Girerd-Potin, I., Jimenez-Garces, S., & Louvet, P., (2011). The link between social rating and financial capital structure. *Finance, 32*, 9–52. https://doi.org/10.3917/fina.322.0009

Gropp, R., & Heider, F. (2010). Determinants of banks capital stucture. *Review of Finance, 14*(4), 587–622. https://doi.org/10.1093/rof/rfp030

Hong, H., & Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics, 93*(1), 15–36. https://doi.org/10.1093/rof/rfp030

Hovakimian, A., Opler, T., & Titman S. (2001). The debt-equity choice. J*ournal of Financial and Quantitative Analysis, 36*(1), 1–24. https://doi.org/10.2307/2676195

Jensen, M. (1986). The agency cost of free cashflow, corporate finance and take overs. *American Economic Review, 76*(2), 323–329.

Laeven, L. (2013). What's so special about banks? A*nnual Review of Financial Economics, 5*, 63–92. https://doi.org/10.2307/2676195

Li, J. (2017). Accounting for banks, capital regulation and risk-taking. J*ournal of Banking and Finance, 74*, 102–121. https://doi.org/10.2307/2676195

Lubberink, M. (2022). Max headroom: Discretionary capital buffers and bank risk. *International Review of Financial Analysis, 84*(2022), 102402. https://doi.org/10.1016/j.irfa.2022.102402

Malik, M. (2015). Value-enhancing capabilities of PRO-PUBLIC ORIENTATION: A brief review of contemporary literature. *Journal of Business Ethics, 127*(2), 419–438. https://doi.org/10.1016/j.irfa.2022.102402

Marsh, P. (1982). The choice between equity and debt : An empirical study. *Journal of Finance, 37*(1), 121–144. https://doi.org/10.1016/j.irfa.2022.102402

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

Myers, S.C. (2001). Capital structure. *Journal of Economic Perspectives, 15*(2), 81–102. https://doi.org/10.1016/0304-405X(77)90015-0

Pijourlet, G. (2013). *Corporate social responsibility and financial decisions*. European Financial Management Association Working Paper. 26, pp. 1–37. Retrieved from https://efmaefm.org/0efmameetings/efma%20annual%20meetings/2013-Reading/papers/EFMA_avril_2013.pdf

Ramjee, A., & Gwatidzo, T. (2012). Dynamics in capital structure determinants in South Africa. *Meditari Accountancy Research, 20*(1), 52–67. https://doi.org/10.1016/0304-405X(77)90015-0

Rajan, R.G., & Zingales, L. (1995). What do we know about capital structure ? Some evidence from international data. *Journal of Finance, 50*(5), 1421–1460. https://doi.org/10.1111/j.1540-6261.1995.tb05184.x

Refinitiv. (2019). *Environmental, Social and Governance (ESG) scores from Refinitiv*. Retrieved from https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/esg-scores-methodology.pdf

Sharfman, M.P., & Wood, C.S. (2008). Environmental risk management and the cost of capital. *Strategic Management Journal, 29*(6), 569–592. https://doi.org/10.1002/smj.678

Shyam-Sunder, L., & Myers, S.C. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics, 51*(2), 219–244. https://doi.org/10.1016/S0304-405X(98)00051-8

Sorokina, N.Y., Thornton Jr., J.H., & Patel, A. (2017). Why do banks choose to finance with equity? *Journal of Financial Stability, 30*, 36–52. https://doi.org/10.1016/j.jfs.2017.04.002

Stulz, R.M. (2016). Risk management, governance, culture and risk taking in banks. *Federal Reserve Bank of New York Economic Policy Review, 22*(1), 43–60.

Taggart, R.A., & Greenbaum, S.I. (1978). Bank capital and public regulation. *Journal of Money, Credit and Banking, 10*(2), 158–169. https://doi.org/10.1016/j.jfs.2017.04.002

Teixeira, J., Silva, F., Fernandes A., & Alves, A. (2014). Banks' capital, regulation and the financial crisis. *North American Journal of Economics and Finance, 28*, 33–58. https://doi.org/10.1016/j.jfs.2017.04.002

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

Wu, M.W., & Shen, C.H. (2013). Corporate social responsibility in the banking industry: Motives and financial performance. *Journal of Banking and Finance, 37*(9), 3529–3547. https://doi.org/10.1016/j.jbankfin.2013.04.023

Appendix start on the next page →

Appendix 1

TABLE 1-A1: Refinitiv Environmental, social and governance dimensions, categories and category definitions.

ESG Dimension	Category	Category definitions
Environmental	Resource use	Performance and capacity to reduce the use of materials, energy or water.
	Emissions	Commitment to and effectiveness in reducing environmental emissions.
	Innovation	Reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed products.
Social	Workforce	Effectiveness towards job satisfaction, healthy and safe workplace, maintaining diversity and equal opportunities and development opportunities for its workforce.
	Community	Commitment to being a good citizen, protecting public health and respecting business ethics.
	Human rights	Effectiveness in respecting fundamental human rights conventions.
	Product responsibility	Capacity to produce quality goods and services, incorporating the customer's health and safety, integrity and data privacy.
Governance	Management	Commitment to and effectiveness in following best practice corporate governance principles.
	Shareholders	Effectiveness in the equal treatment of shareholders and the use of anti-takeover devices.
	CSR strategy	Reflects a company's practices to communicate that it incorporates the economic (financial), social and environmental dimensions in its day-to-day decision-making processes.

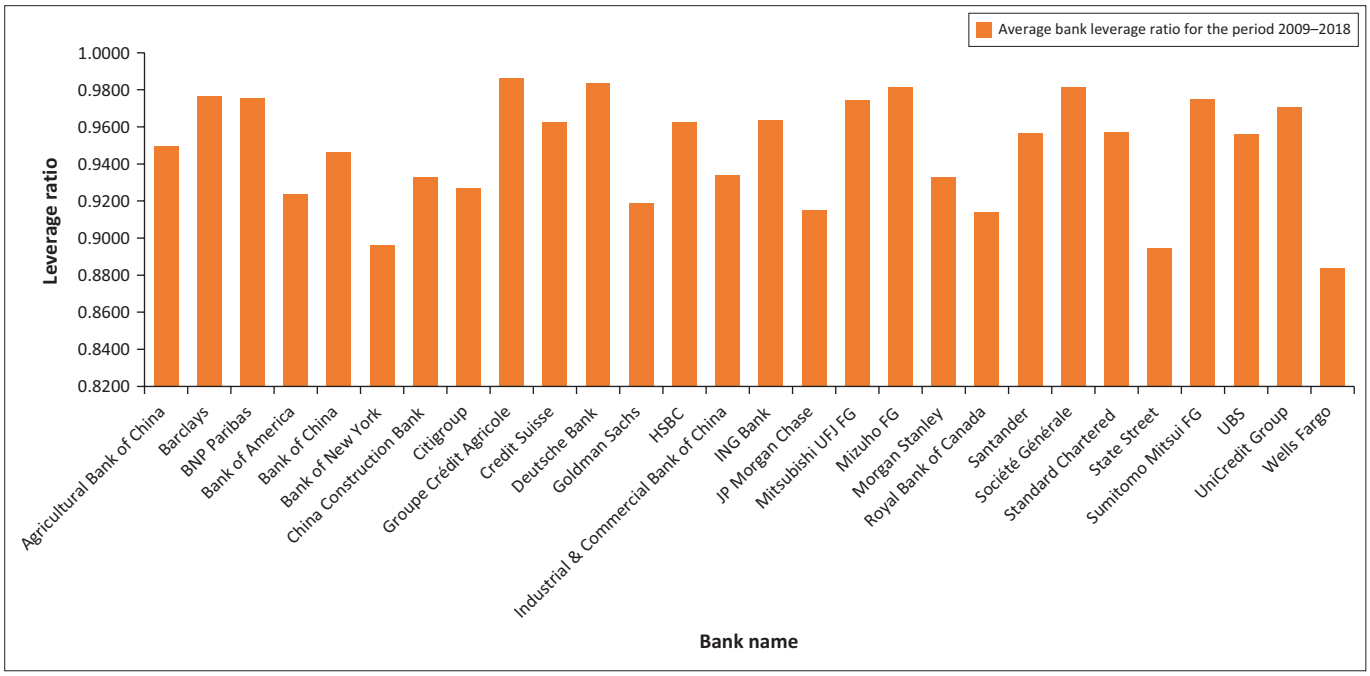

FIGURE 1-A1: Average leverage ratios of the Global Systemically Important Banks for the period 2009–2018.

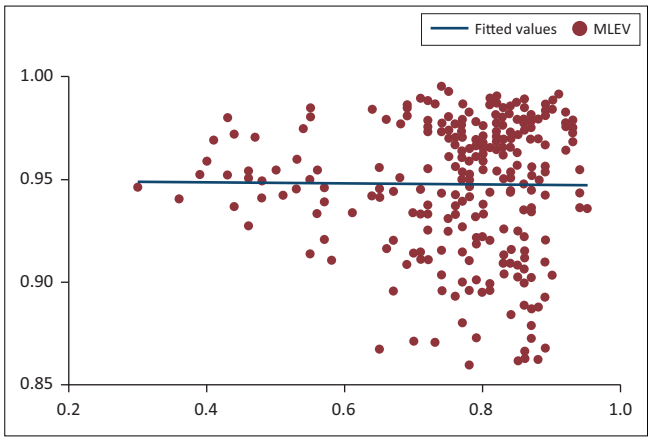

FIGURE 2-A1: Graphical representation of the correlation between bank leverage and PRO-PUBLIC ORIENTATION.

TABLE 2-A1: Results from the pooled ordinary least squares, fixed effects and random effects regression techniques (Equation 1).

Variables	Regression techniques		
	Pooled OLS	RE	FE
Constant	0.748**	1.156***	2.201***
	(0.286)	(0.202)	(0.265)
ESG	0.0101	-0.0167	-0.0299
	(0.0215)	(0.0176)	(0.0230)
SIZE	0.00142	0.00259	-0.000517
	(0.00184)	(0.00223)	(0.00903)
PROF	-0.106	0.111	0.317
	(0.336)	(0.269)	(0.256)
TANG	0.769***	0.235	-0.926***
	(0.258)	(0.205)	(0.286)
GRWTH	-0.570***	-0.464***	-0.318***
	(0.165)	(0.113)	(0.109)
ARISK	-0.591**	-0.170*	-0.184**
	(0.275)	(0.0894)	(0.0832)
DIV	-0.0198**	-0.0176*	-0.00769***
	(0.00734)	(0.00920)	(0.00216)
TAX	-0.208**	-0.0572	0.0265
	(0.0758)	(0.0348)	(0.0486)
GDP	0.00222**	0.00151***	0.00105**
	(0.000977)	(0.000481)	(0.000419)
INF	0.270	0.454***	0.382***
	(0.164)	(0.108)	(0.109)
R-squared	0.613	0.208	0.329
OV test	13.48 [0.0000]	-	-
Wald test	-	133.42 [0.0000]	-
F-test	-	-	24.17 [0.0000]
Number of observations	220	220	220
Number of banks	28	28	28

ESG, Environmental, Social and Governance; SIZE, Bank Size; PROF, Profitability; TANG, Asset Tangibility; GROWTH, Bank Growth; ARISK, Asset Risk; DIV, Dividend Dummy; TAX, Taxation; GDP, Gross Domestic Product; INF, Inflation; Pooled OLS, pooled least squares regression model; Constant, constant; RE, random effects regression model; FE, fixed effects regression model.

Clustered standard errors in parentheses ().

***, denotes significance at 1%; **, denotes significance at 5%; *, denotes significance at 10%.