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Degree Project

Master's level

Optimal Capital Structure: The Impact of Equity and Debt Ratios in Maximising Profitability

A Panel Data Study of Swedish Savings Banks' Financial Strategies

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Abstract:

This thesis investigates the impact of capital structure on the profitability of 58 Savings Banks in Sweden from 2014 to 2020, focusing on the balance between debt and equity. Utilizing panel data regression, the study examines how debt-to-asset ratios and equity ratios affect key profitability metrics such as net interest margin, return on equity, and return on assets. Key findings indicate a negative correlation between debt ratios and both return on assets and equity, suggesting that higher debt levels may impede profitability. Conversely, a positive relationship is observed between equity ratios and return on assets, while return on equity decreases as equity ratios increase. The study also explores the influence of bank size, finding a negative relationship with profitability, which highlights the efficiency of smaller, more regionally-focused banks. Additionally, macroeconomic factors such as GDP growth show a positive correlation with profitability, whereas higher unemployment rates tend to reduce profitability. The study and the results provide valuable insights into the financial strategies that can enhance the performance of Savings Banks, emphasizing the need for a balanced approach to capital structuring within the context of prevailing economic conditions.

Keywords: Savings Banks, capital structure, profitability, debt ratio, equity ratio, return on equity, return on asset, net margin interest, trade-off theory, pecking order theory, Modigliani and Miller, panel data.

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1. Introduction

This thesis commences with a thorough exploration of its foundational premise, setting the stage for a deep dive into the study's scope. It presents an expansive overview of the current research and debates within the field, simultaneously shedding light on the research gaps this investigation aims to fill. Following a detailed exposition of the problem's background, the narrative sharpens its focus, outlining the study's aims and introducing the pivotal research question. This chapter is brought to a close by carefully delineating the limitations that frame the research, ensuring a precise and focused inquiry.

1.1 Background

Banks are pivotal to the financial ecosystem, playing a crucial role in driving economic growth and enhancing societal welfare. The profitability of these institutions extends beyond their individual success, impacting the broader societal landscape. In an environment marked by increasing regulatory pressures, the financial health of banks is essential for maintaining systemic stability and enabling the flow of capital to various sectors (Goldberg and Reed, 2022). Research in the field of bank lending underscores the critical nature of banks in the credit market; any hindrance to their ability to efficiently allocate credit directly affects economic dynamism. A profitable bank is better equipped to fulfil its lending obligations, thereby supporting the stability and integrity of the broader financial system (European Central Bank, 2021). This relationship has been highlighted especially in light of recent economic challenges, emphasizing the importance of robust banking operations for sustained economic growth and development (Authority, Swedish Financial Supervisory, 2021).

Banks, central to the economic infrastructure, are deeply interconnected with the health of various sectors, with their performance affected by macroeconomic forces which places them in a dynamic environment where they constantly adapt to changes in the capital landscape (European Central Bank, 2021). The pursuit of profitability often clashes with the need for regulatory compliance, designed to enhance the safety of the financial system. Following the 2008 financial crisis and subsequent challenges in the Eurozone, European banks have faced stringent regulations, notably Basel III. Introduced by the Basel Committee on Banking Supervision, Basel III focuses on strengthening bank capital requirements by increasing capital buffers, highlighting the importance of the equity ratio (Andrén, Eriksson and Hansson, 2015). These regulatory measures have narrowed banks' financial freedom, limiting

their ability to shape capital structures and leverage for growth European Central Bank, 2021).

This thesis explores the unique role of Savings Banks in Sweden, financial institutions deeply integrated into the local community and driven by a mission to support society and its broader development (Sparbankernas Riksförbund, 2020). The significant social contribution of Savings Banks underscores the need for financial stability, highlighting the importance of maintaining a balanced capital structure to withstand economic fluctuations. Given the distinctive financial characteristics of banks and the regulatory frameworks affecting their capital structures, it is vital to examine the relationships among capital structure, macroeconomic variables, and profitability (International Monetary Fund, 2009). Existing research on this topic presents diverse conclusions. For instance, Berger (1995) identified a positive relationship between equity ratios and profitability in US banks from 1983-1989. In contrast, Trujillo-Ponce (2013) found that more profitable Spanish banks during 1999-2009 tended to leverage significantly. Gatsi (2012) contributed to the discussion by demonstrating that, in Ghana's public banks from 2000 to 2010, current liabilities were positively associated with profitability, while long-term liabilities were negatively correlated, emphasizing the dominance of current liabilities in bank financing strategies. Moreover, Zampara et al. (2017) investigated Greek banks, revealing that unemployment adversely affects profitability, whereas GDP growth per capita has a positive effect, underscoring the influence of macroeconomic and industry-specific factors.

1.2 Objective

In a landscape where leading theoretical frameworks and empirical findings appear to diverge, and where there is a noted scarcity of research focused on the banking sector. Additionally, since existing research on Savings Banks and their capital structures reveals notable gaps, there arises a compelling need to explore the relationship between capital structure and macroeconomic variables in relation to the profitability of Savings Banks in Sweden. This study aims to closely examine the capital structure of 58 Savings Banks over the period from 2014 to 2020, with data on a monthly basis, alongside Sweden's macroeconomic conditions, to uncover how these factors collectively influence the profitability of these banks.

1.3 Research Question

What are the impacts of capital structure choices and macroeconomic conditions on the profitability of Swedish Savings Banks between 2014 and 2020?

1.4 Disposition of the Study

This study begins with chapter 1, *Introduction*, which explains the background, objective, and research question of the study. Followed by, chapter 2, *Background*, which provides an understanding of the unique form of Savings Banks in Sweden. Chapter 3, *Literature Review*, examines the literature on factors affecting bank profitability. Chapter 4, *Theoretical Framework,* explains the theory of optimal capital structure. Further, chapter 5, *Data and Method,* outlines the research approach, the data used, and the regression model for the analysis. Chapter 6 presents the *Empirical Results*, followed by chapter 7, *Discussion*, which interprets these results in the context of the theoretical framework and literature. Finally, chapter 8, *Conclusion*, presents the conclusions, discusses implications, and suggests areas for future research.

2. Background

This chapter aims to give fundamental background knowledge and bring light to the distinctive organisational form of Savings Banks, detailing their operations, objectives, and functions. Moreover, it will offer an overview of the general financing mechanisms of banks and the regulatory frameworks with which they must comply.

2.1 Savings Banks in Sweden

Savings Banks in Sweden represent a distinct identity of a financial institution, characterised by a business model deeply rooted in local communities. These banks are not only crucial for providing capital in their areas of operation but also play a significant role in fostering societal development over the long term (Sparbankernas Riksförbund, 2020).

Savings Banks in Sweden operate under the Savings Banks Law (1987: 619), which outlines, among other provisions, the governance structure and the election process for governing bodies. A distinctive feature of this law is the system of principals, which significantly contributes to the banks' local roots and the perception of them as entities contributing to the local community (Sparbankernas Riksförbund, 2020). The principals of a Savings Bank are tasked with appointing the Board, approving financial statements and profit allocations, and making decisions regarding the bank's regulations. Principals, primarily local stakeholders, play a crucial role in overseeing the management of the Savings Bank and act as de facto representatives of its customers, embodying the bank's commitment to promoting a healthy and sustainable economy for as many individuals as possible (Sparbankernas Riksförbund, 2020). Furthermore, the Savings Banks are dedicated to ensuring that a portion of their surplus is allocated and distributed to enhance the well-being of citizens in the regions and activity areas where the banks operate. This approach ensures that a part of the banks' profit supports but does not supplant municipal services. Collectively, the 58 savings banks and 24 ownership foundations represented by The National Association of Savings Banks (Sparbankernas Riksförbund), an advocacy group, contribute over half a billion SEK annually to various projects and local initiatives across the country, reinforcing their commitment to community development and support (Sparbankernas Riksförbund, 2020).

The Savings Bank, as a corporate entity, operates without owners and shares a similar structure to that of a Foundation. Unlike traditional companies with shareholders who expect dividends, a Savings Bank's profit is directed, alongside ensuring the bank's operational security, towards socially beneficial activities within its service area. This profit supports a range of community-oriented initiatives, including education, sports, research, culture, and local business development. Such contributions underscore the Savings Banks' mission: to act as community-focused institutions that significantly enhance the quality of life for residents in their operational regions. This ethos of making a tangible difference locally defines the core purpose of the Savings Banks' existence (Sparbankernas Riksförbund, 2021).

2.2 Banking Capital and Liquidity Management

Banks operate with a distinctive financing model, characterised by current and non-current assets. This structural composition exposes them to potential rapid outflows of capital, heightening the risk of financial distress, while their generally low ratio of equity to non-current assets limits their capacity to absorb losses. The critical function of banks within the economy, coupled with these inherent risks, necessitates stringent regulatory oversight and standards for capital adequacy. Regulatory authorities require banks to maintain a minimum level of capital and loss-absorbing capacity to mitigate operational risks, a concept referred to as capital adequacy. This regulatory framework has been refined over the years, notably through the introduction and evolution of the Basel Accords. From Basel I established in the late 1980s to the current Basel III framework instituted in 2008, these international standards impose specific capital and liquidity requirements. These requirements were designed to bolster banks' ability to withstand credit losses and diminish the threat of systemic financial crises (Finansinspektionen, 2016).

Following the global financial crisis in 2008, Sweden adopted more rigorous capital standards. The assessment of an appropriate capital buffer was identified as a critical component and should correspond with the bank's exposure to risk, ensuring it possesses the resilience to endure predetermined levels of losses. This approach to capital and liquidity management becomes crucial for maintaining the solvency and stability of individual banking institutions and the broader financial system (Finansinspektionen, 2016).

Major banks in Sweden employ a relatively uniform financing strategy. Traditionally, these institutions have relied on public deposits as their primary funding source for lending activities. Nonetheless, the Swedish banking sector experiences a deposit shortfall, meaning the volume of domestic deposits falls short of the total lending needs. To bridge this gap, banks resort to market financing, predominantly through the issuance of securities. This deposit shortfall reflects the savings habits of the Swedish public and the banks' financing preferences, influenced by regulatory mandates concerning liquidity and capital adequacy (Eidestedt, Forsman and Ünlü, 2020). Since this study focuses on Savings Banks, a network of smaller, locally oriented banks, an analysis of their annual reports will reveal a predominant reliance on deposit-based financing. Consequently, the liabilities of these Savings Banks are primarily, or in some instances entirely, composed of short-term debt obligations. Given this composition, this study will not differentiate between short-term and long-term liabilities but will instead assess the overall debt ratio of Savings Banks.

3. Literature Review

This section provides a comprehensive literature review of empirical studies examining profitability and the optimal capital structure. Seeking to uncover key determinants for an optimal capital structure, this review will systematically cover previous research concerning profitability, bankruptcy, interest rates, bank size and growth, factors that have historically been shown to affect banks' profitability. Each subsection will explore relevant studies, offering an understanding of how these factors interplay to affect financial outcomes.

3.1 Profitability – Comparing higher debt to higher equity ratios

The theory by Modigliani and Miller (1958), on the irrelevance of capital structure to a company's value and return has been extensively explored in numerous articles and essays, which have examined its merits and limitations. Despite its foundational impact, in recent years, critiques have emerged (Harris & Raviv, 1991; Holmström & Tirole, 1989). These critiques argue that the theory's assertion of capital structure independence does not align with contemporary financial realities. While Modigliani and Miller (1963) theoretically demonstrated a positive link between debt levels and both company value and shareholder returns (profitability), empirical evidence across both the banking sector and non-financial firms has shown mixed results, indicating inconsistencies with the theory's predictions.

Given the regulatory environment in which banks operate, Modigliani and Miller's concept of an optimal total debt ratio for capital structure is rendered partially inapplicable. Investigating this further, Shome et al. (1989) analysed banks from 1974-1983 and discovered a positive correlation between banks' market value and capital adequacy, challenging Modigliani and Miller's hypothesis. In a separate study focusing on non-financial corporations in the US from 1962-2009, Strebulaev and Yang (2013) observed that debt-free corporations tended to be more profitable. Similarly, Bexell and Johansson (2013) examined Swedish companies between 2002-2011, finding that a higher equity ratio was associated with increased profitability. Additionally, Mehran and Thako (2011) conducted an analysis on cross-sectional data concerning bank acquisitions to determine factors influencing banks' value. Their findings indicated that a higher equity ratio positively impacted banks' total value, with interpretations grounded in the Pecking Order Theory.

Berger et al. (2006) investigated the banking industry in the US from 1990-1995, and the influence of the total debt ratio on profitability efficiency, specifically accounting for potential reverse causality from profitability efficiency to indebtedness. Their findings highlighted a significant positive link between the total debt ratio and profitability efficiency, albeit with a marginally declining positive trend, without identifying a concave relationship. Notably, this study encompassed banking institutions. Hirschey and Wichern (1984) focused on American firms listed in the Fortune 500 in 1977, exploring the impact of increased total liabilities on financial metrics such as return on equity and return on total capital. They concluded that a rise in total liabilities correlates negatively with both return on equity and return on total capital.

Gill et al. (2011) contributed to the discourse within the U.S. market, examining the service and manufacturing sectors. Their research assessed the impact of short-term, long-term, and total debt ratios on return on equity. The results indicated a significant positive relationship between both short-term and total debt ratios with profitability, whereas the long-term debt ratio exhibited a non-significant positive correlation. Gatsi (2012) on the other hand, examined the relationship between capital structure and bank profitability in Ghana from 1997 to 2006. Utilising panel data analysis, the study found that short-term debts, long-term debts, and total liabilities had an insignificant impact on return on equity within the Ghanaian banking sector. Additionally, the research revealed a significant negative association between bank size and profitability, measured by return on equity and net interest margin, suggesting that larger banks may face lower margins due to scale inefficiencies. The study also observed that profitable banks in Ghana leaned towards less debt and relied more on internal financing, aligning with the Pecking Order Theory (Gatsi, 2012).

Bank financing exhibits distinct differences from that of non-financial companies, notably through their ability to leverage customer deposits, thus relying heavily on current liabilities for operational funding. While general capital structure theories apply to banks, their unique attributes necessitate a deeper exploration to highlight the effects of capital structure on profitability. Banks' capacity to create long-term customer relationships depends on their access to current financing options like short-term liabilities, which is crucial for meeting

immediate customer needs (Goddard et al., 2006). Short-term liabilities offer advantages to banks, such as avoiding the constraints associated with long-term financing, which might dictate maintaining specific equity ratios or limiting participation in certain high-risk activities. Studying profitability determinants in Belgium, France, Italy, and the UK using panel data econometrics from 1993-2001, Goddard et al. (2006) highlighted that firms with high liquidity are better positioned to manage unforeseen expenses, directly influencing profitability. Goddard et al. (2006) also established a positive correlation between liquidity and profitability, underscoring the value of current liabilities.

Investigating the role of capital in financial institutions in the US from 1940-1993 by econometric modelling of historical financial data, Berger et al. (1995) further validated the significance of indebtedness, demonstrating its role in pressuring firms to generate cash flow to sustain operations and prevent bankruptcy. Their findings suggest that indebtedness fosters a drive for more diligent work and investment decisions. Flannery (1994) pointed out that higher levels of indebtedness incentivise asset monitoring, thereby generating value for the bank. This effect arises because a bank with greater indebtedness typically has lower absolute equity, potentially enabling management to hold a larger equity stake. However, Flannery (1994) also noted the costs associated with short-term liabilities, such as higher administrative expenses due to frequent renewals and the interest rate risk stemming from maturity mismatches between assets and liabilities, which could necessitate costly hedging strategies. Flannery (1994) concluded that banks can optimise capital by balancing the benefits and downside of both short- and long-term liabilities, aiming to maximise value.

3.2 Bankruptcy

Robichek and Myers (1966) challenged the Modigliani and Miller perspective on indebtedness by highlighting the imperfections of capital markets and the adverse effects of high debt ratios. They noted that the likelihood of incurring significant bankruptcy costs escalates with increased indebtedness, primarily because bankruptcies can be lengthy and expensive proceedings. Andrade and Kaplan (1998) further explored bankruptcy costs, finding that these could account for 10-20% of a company's market value. In the context of banks, bankruptcy expenses may include the costs associated with transferring ownership to creditors, decreased revenues from credit risk-sensitive instruments, and the loss of skilled

employees (Berger et al., 1995). They further, emphasised the importance of differentiating between economic distress and financial distress, along with the specific costs each incurs. Financial distress leads to bankruptcy costs, which affect both indebted and debt-free companies alike. However, the financial burden is considerably higher for companies with debt, as they face the compounded impact of both financial and economic distress.

3.3 Interest rates

Bank profitability is intricately linked to interest income from loans issued and the costs of financing, making the impact of interest rates a critical area of study. The lending rates set by banks are influenced by Central Bank policy adjustments, borrower credit risk, and competitive dynamics, while their reliance on short-term financing exposes them to fluctuations in short-term interest rates. Flannery (1981) conducted a study to determine the impact of market interest rates on the profitability of 30 major banks in the US during 1959-1978. By using an econometric model specified as a partial adjustment process to measure the response of bank revenues and costs to changes in market interest rates, it was found that profitability was unaffected due to the banks' practice of matching the maturities of their assets and liabilities. To further validate these findings, Flannery (1983) conducted a subsequent study focusing on smaller banks from 1960-1978. This research noted that despite short-term revenue volatility in response to market interest rate changes, the long-term impact on profitability was negligible. Conversely, Hancock (1985) explored how monetary policy mechanisms impact bank profitability, concluding that profitability tended to increase with higher interest rates.

3.4 Bank Size and Growth

Economies of scale occur when a company's operational costs grow slower than its size, allowing it to boost profitability through better access to capital markets and lower borrowing costs (Hughes & Mester, 2013). Further, Hughes and Mester (2013) highlighted that economies of scale significantly influence banks' profitability by reducing operational risks and risk management costs, particularly noting that larger banks benefit more extensively. However, they contended that these benefits are less about cost efficiencies and more due to

technological advancements through diversification and the spread of fixed costs which do not escalate with the bank's growth.

The impact of company size on profitability, however, is debated. For instance, Berger et al. (2006) and Mehran (1995) identified a negative correlation between size and profitability, whereas Maury (2006) and Yilmaz et al. (2005) found a positive association. Chang et al. (2009) explored the determinants influencing capital structure choices, analyzing data from 1988-2003. They concluded that growth potential plays a critical role in shaping a company's capital structure, suggesting that firms with significant growth opportunities should minimize debt. Their findings also indicated that profitable companies tend to reduce their debt levels, using earnings to repay obligations, and identified a negative correlation between profitability and indebtedness.

3.5 Macroeconomic Factors

Akhtar (2012) explored the dynamics between business cycles and capital structure, categorizing the cycles into four phases: boom, downturn, recession, and recovery. This analysis focused on non-financial US companies from 1950 to 2010 that maintained positive equity throughout. Akhtar found that the stage of the business cycle significantly influences a company's borrowing behaviour, concluding that firms tend to increase borrowing during recessions or periods of reflation, whereas borrowing decreases during booms or upward trends. Zampara et al. (2017) similarly, investigated the impact of macroeconomic and industry-specific variables on the profitability of Greek banks from 2001 to 2014. Incorporating external factors like GDP growth per capita and the unemployment rate into their study, they discovered that both variables were statistically significant: unemployment negatively influenced bank profitability, while GDP growth per capita positively affected it. Furthermore, Dietrich and Wanzenried (2009) analyzed the profitability of 453 commercial banks in Switzerland from 1999 to 2008, further corroborating the relationship between macroeconomic conditions and bank profitability. Their findings indicated that both GDP growth and GDP growth per capita positively influenced profitability metrics, such as return on assets and return on equity, underscoring the broader relevance of macroeconomic health to banking sector performance.

4. Theoretical Framework

This chapter offers a comprehensive overview of the prevailing framework, incorporating aspects of contemporary financial theory, aiming to provide a clear understanding of the theories pertinent to this study.

4.1 Modigliani and Miller

The seminal work of Modigliani and Miller (1958) laid the groundwork for understanding corporate capital structures and financing strategies. Their report introduced two propositions that have significantly influenced subsequent research in the field. The first proposition, while based on unrealistic assumptions, suggests that companies have two primary means of raising capital: debt and equity. According to this theory, the cost of capital remains constant regardless of the mix of debt and equity financing, implying that a company's market value is independent of its capital structure. The second proposition extends this argument, asserting that the market value of a company is unaffected by its capital structure, even when taxes are not considered. It posits a positive correlation between a company's level of debt and the expected return to shareholders, indicating that increased financial leverage, and thus higher risk, can lead to greater returns for equity holders (Modigliani & Miller, 1958).

In a subsequent refinement of their initial theory, Modigliani and Miller (1963), acknowledged the presence of taxes in the real world, diverging from their earlier, tax-exempt model. This revised theory revolves around the premise that corporations can enhance their interest expenses and leverage ratios to act as a tax shield, thereby decreasing their taxable income through deductions. This reduction in taxable income translates to improved financial outcomes for the companies. The incorporation of tax effects into the capital structure demonstrated that increased levels of debt could enhance a company's value. Consequently, Modigliani and Miller's (1963) revised framework suggests that to attain an optimal capital structure, a company should maximise its debt financing. The rationale behind this is that the tax benefits derived from higher levels of indebtedness elevate a company's value above that of firms with lower leverage ratios. According to this adjusted model, companies are encouraged to seek as much debt as possible, leveraging the tax shield effect to boost their overall value (Miller & Modigliani, 1963).

4.2 Trade-off Theory

The Trade-off Theory, articulated by Kraus and Litzenberger (1973), posits an ideal balance between a company's debt and equity. This theory examines the benefits of a high leverage ratio, such as reduced tax obligations, against the downside, notably the increased risk of financial distress. According to Myers (1984), as a company's level of debt escalates, so too does the likelihood of bankruptcy and the associated costs of potential or actual insolvency. The theory suggests that a company reaches its optimal leverage ratio when the cost of this increased risk surpasses the tax savings conferred by high levels of debt. Beyond this point, additional borrowing is not advised, as shown in Figure 1. Myers (1984) further elaborates on the costs of adjusting the debt-to-equity ratio, acknowledging that a company's capital structure is dynamic, and influenced by dividends, earnings, and losses. These adjustment costs help explain why firms may not always maintain their debt and equity at theoretically optimal levels.

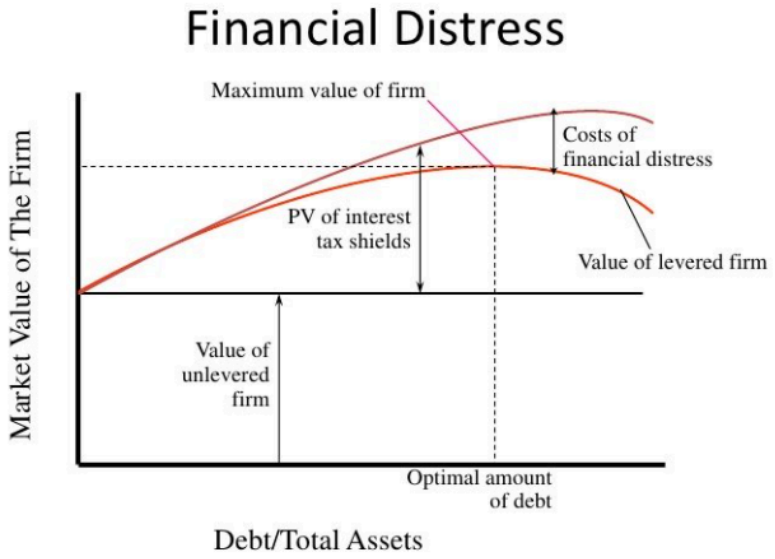

Figure 1 – Trade-off Theory of Capital Structure. The optimal capital structure occurs at the juncture where the anticipated benefits of the debt ratio perfectly counterbalance the associated costs, thereby maximising the company's value. Source: (Bradley, Jarrell, & Kim, 1984)

From the Trade-off Theory, it emerges that a positive relationship exists between the debt ratio and profitability, provided the benefits of increased indebtedness exceed the associated downside. This theory enhances the comprehension of the pros and cons associated with high

levels of debt, although it stops short of pinpointing the exact moment when companies attain their optimal debt ratio (Myers, 1984).

4.3 Pecking Order Theory

While the Trade-off Theory posits an ideal debt ratio that companies aim to achieve by balancing benefits against the downside, the Pecking Order Theory adopts a behavioural approach to capital structure management. This theory suggests that firms prioritise financing sources based on a hierarchy when seeking new capital. Initially, companies prefer using internally generated funds; if external financing becomes necessary, they opt for the least risky options first, favouring debt over new equity issuance. This preference is attributed to information asymmetry between company management and investors, with management typically having more comprehensive knowledge about the company's prospects (Asquith & Mullins, 1986).

According to Asquith and Mullins (1986), firms prefer debt financing as issuing new equity can lead to a decline in share price. This phenomenon occurs because new equity offerings may signal to investors that management considers the company's stock to be overvalued, as Myers and Majluf (1984) explain. Thus, a new equity issuance could lead to a lower valuation of shares by the market, anticipating management's insider knowledge of the company being overvalued. Brealey (2019) elaborates that the most profitable companies tend to borrow the least, relying instead on internal financing due to their sufficient internally generated capital for investment. Less profitable firms, lacking adequate internal funds, resort to debt financing. When these firms reach their debt limits, they then consider raising new capital through equity in the stock market (Brealey, 2019).

5. Data and Method

This chapter outlines the methodology employed for data collection, processing, and analysis. It introduces and justifies the variables incorporated into the study. Subsequently, the analytical approach adopted for this research is detailed, culminating in the specification of the chosen regression model.

5.1 Data and Descriptive Statistics

The data for this thesis were sourced from the National Association of Savings Banks (Sparbankernas Riksförbund), which compiles data from financial reports to create annual summary reports for all Savings Banks in Sweden. This study encompasses all Savings Banks in Sweden, totalling 58 institutions, over the period from 2014 to 2020. A detailed summary table listing all the Savings Banks included in the study is available in Appendix 1. Additionally, data on GDP growth and the unemployment rate were obtained from Ekonomifakta (2021).

Table 1 provides a concise summary of the variables used in this study, along with their abbreviations and descriptive statistics, including mean value, standard deviation, minimum value and maximum. These variables encompass various financial metrics and macroeconomic indicators relevant to analysing Savings Banks' profitability and operational dynamics.

Table 1. Descriptive Statistics

Variables	Abbreviations	Obs.	Mean	Std. Dev.	Min	Max
Net Interest Margin	NIM	406	1.634	0.344	0.015	2.79
Return on Equity	ROE	406	6.136	2.56	-9.234	17.94
Return on Asset	ROA	406	0.96	0.368	-0.41	2.024
Debt to Asset Ratio	DAR	406	84.091	5.752	66.716	93.77
Equity Ratio	ER	406	15.864	5.762	5.69	33.207
Interest Rate	IR	406	2.338	0.845	0	11
Bank Size	BS	406	8.331	0.897	6.613	11.443
Loan Size	LS	406	7.986	0.916	6.087	11.237
Customer Base	CB	401	10.063	0.851	8.511	12.974
GDP growth	GDP	406	0.661	1.943	-3.52	3.4
Unemployment Rate	UR	406	7.2	0.666	6.3	8.3

As presented in Table 1, all financial metrics are observed across 406 instances, based on monthly data between 2014-2020, except the Customer Base (CB), observed across 401 months. Furthermore, the Net Interest Margin (NIM) shows an average of 1.634% with a variability (standard deviation) of 0.344%, ranging from a low of 0.015% to a high of 2.79%. Return on Equity (ROE) has an average value of 6.136%, a standard deviation of 2.56%, and values ranging from -9.234% to 17.94%. Return on Asset (ROA) appears with an average of 0.96%, a standard deviation of 0.368%, and ranges from -0.41% to 2.024%. Debt to Asset Ratio (DAR) shows an average of 84.091%, with a standard deviation of 5.752%, and values between 66.716% and 93.77%. The dataset reveals relatively low average values in these metrics, partly due to several banks exhibiting negative returns on equity and total capital. Specifically, the DAR averages 84.09%, with a notable standard deviation of 5.75%, indicating significant variance in debt levels both across different banks and over time within the same institutions. Equity Ratio (ER) has a mean of 15.864%, standard deviation of 5.762%, and spans from 5.69% to 33.207%. Interest Rate (IR) on loans has an average rate of 2.338%, variability of 0.845%, and ranges from 0% to a peak of 11%. A significant change in interest rate is observed over the period studied, indicating substantial change in the macroeconomic environment. Bank Size (BS) reflects an average logarithmic value of 8.331 with a standard deviation of 0.897, and values ranging from 6.613 to 11.443. Loan Size (LS)

records an average of 7.986, with a standard deviation of 0.916, ranging from 6.087 to 11.237. Customer Base (CB) shows an average of 10.063 and a variability of 0.851, ranging from 8.511 to 12.974. Lastly, the Unemployment Rate (UR) averages 7.2% with a standard deviation of 0.666% and ranges from 6.3% to 8.3%. This statistical summary serves to illustrate the comprehensive data analysis that underpins the study, providing a baseline understanding of the range and typical values for each metric evaluated.

5.2 Variables

Profitability

The focal point of this analysis is the profitability of Savings Banks, operationalized as the dependent variable in this thesis. To assess profitability, we utilize three primary metrics: *Net Interest Margin* (NIM), *Return on Equity* (ROE), and *Return on Assets* (ROA).

Net Interest Margin is a critical financial metric for banks, indicating profitability by highlighting the percentage difference between the revenue generated from lending activities and the costs associated with deposits and borrowings. Essentially, it evaluates the disparity between the average rates applied to loans and those paid on deposits (Busch & Memmel, 2015). Alongside NIM, ROA and ROE are employed as comprehensive measures of profitability. Despite the extensive research on capital structure, there remains no consensus on its impact on profitability. Thus, this study aims to shed light on the relationship between debt ratio and profitability within the context of Swedish Savings Banks. The profitability indicators are calculated annually, based on the following formulas:

$$Net\ Interest\ Margin = \frac{Net\ Interest\ Income}{Total\ Earning\ Asset} \quad (1)$$

$$Return\ on\ Equity = \frac{Annual\ Net\ Income}{Equity} \quad (2)$$

$$Return\ on\ Asset = \frac{Annual\ Interest\ Income}{Total\ Asset} \quad (3)$$

Equity Ratio

The *Equity Ratio* (ER) serves as an independent variable in this study and is expressed as a percentage. This ratio is uniformly calculated across all Savings Banks, ensuring consistent application and comparability. Following the methodology of Berger (1995), who utilized the equity ratio as an explanatory variable for profitability, this study defines the equity ratio using the formula below:

$$Equity\ Ratio = \frac{Equity}{Total\ Capital} \tag{4}$$

Debt to Asset Ratio

Total debt is evaluated in proportion to total assets, as outlined by Ax et al., (2015). The *Total Debt to Asset Ratio* (DAR) is similarly calculated relative to total assets to assess its impact on bank profitability. This variable has been examined in prior research, including a study by Gatsi (2012):

$$Debt\ to\ Asset\ ratio = \frac{Total\ debt}{Total\ Asset} \tag{5}$$

Furthermore, this study incorporates the squared value of the Debt to Asset Ratio (DAR^2) to explore potential non-linear relationships between leverage and profitability, offering a more nuanced understanding of how varying levels of indebtedness affect a bank's financial performance.

Bank size

The significance of *Bank Size* (BS) in relation to profitability has been extensively explored in the banking sector, with notable contributions from Hughes and Mester (2013) and Gatsi (2012). Building on their research, this thesis quantifies bank size through the natural logarithm of total assets as recorded on the balance sheet:

$$Bank\ size = ln(Total\ Asset) \tag{6}$$

Loan size

Loan Size (LS) is included as a control variable, represented by the natural logarithm of the absolute value of loans issued. This transformation aims to minimize systematic errors. Given that lending activities are a crucial revenue stream for banks, exploring the relationship between profitability and loan size is of interest. Additionally, this control variable serves to enhance the explanatory power of the model.

$$Loan\ size\ =\ ln(Loan\ Size) \tag{7}$$

Interest rate

A control variable in this study is the average lending *Interest Rate* (IR) specific to each Savings Bank. This inclusion aims to determine whether variations in interest rates across different years and banks influence their profitability.

Customer base

The *Customer Base* (CB), defined as the number of customers for each Savings Bank, presents an intriguing aspect for investigation and thus serves as a control variable in this study. To diminish systematic errors, this variable will be transformed into its logarithmic value.

$$Customer\ base\ =\ ln(Customer\ base) \tag{8}$$

GDP growth

Gross Domestic Product (GDP) growth is a critical factor influencing banks' long-term functionality and reflects the overall economic health and expansion within a country (Andrén, Eriksson, & Hansson, 2015; Fregert & Jonung, 2014). Its impact on the financial sector, particularly Savings Banks, is significant, suggesting a probable effect on their financial performance. Recognizing its importance, Zampara et al. (2017) have previously examined GDP growth as an independent variable in analyzing profitability. Building on this research, this study incorporates GDP growth as a control variable to assess its influence on bank profitability.

Unemployment rate

The *Unemployment Rate* (UR) serves as a macroeconomic indicator of significance, included by Zampara et al. (2017) as an explanatory variable in their research. This study also considers the unemployment rate for its potential impact on banks. Specifically, unemployment directly correlates with the population's loan-to-value ratio in Sweden, presenting a sensitive aspect of financial calculation that could heighten the risk of credit losses for banks (Hultkrantz & Söderström, 2011).

5.3 Regression Model and Method

Drawing upon the theoretical framework discussed in Section 3 and informed by prior research, this thesis formulates the following regression model to estimate the relationship between capital structure and profitability:

$$Profitability_{it} = \beta CapitalStructure_{it} + \gamma X_{it} + \mu_i + \mu_t + \varepsilon_{it} \qquad (9)$$

where $i = 1,\ldots,58$ represents the individual Savings Banks, and t = 2014,…,2020 enotes the time period. The dependent variable, $Profitability_{it}$, reflects the profitability of Savings Banks, measured through Net Interest Margin, Return on Equity, and Return on Assets. The primary independent variable, $CapitalStructure_{it}$, refers to the banks' capital structure, operationalized via the Equity Ratio and Debt to Asset Ratio. X_{it} embodies a vector of time-varying characteristics specific to each Savings Bank and macroeconomic control variables. μ_i represents bank-specific fixed effects, μ_t accounts for time-fixed effects, and ε_{it} is the idiosyncratic error term. The coefficient of interest β elucidates the impact of the capital structure on the profitability of Savings Bank.

This study employs various panel data methodologies to estimate the regression model outlined in Equation (9). The analysis begins with the pooled Ordinary Least Squares (OLS) method as an initial benchmark. However, if there exists unobserved heterogeneity among the Savings Bank that correlates with the variables of interest, pooled OLS results may be skewed due to omitted variable bias. To address potential biases and limitations associated

with pooled OLS, this study explores alternative panel data models. Panel data combines cross-sectional and time-series datasets, enabling a comprehensive analysis of heterogeneity across Savings Banks, a dimension not possible through the singular use of time-series or cross-sectional data alone. This approach enhances the analysis in several ways: it is more informative, reduces collinearity among independent variables, more accurately reflects dynamic changes, and allows for the identification and measurement of effects unobservable in purely time-series or cross-sectional frameworks (Verbeek, 2012).

As an advancement from pooled OLS, this study adopts a random-effects (RE) panel model specification. The random-effects model posits that while there is no unique intercept for each bank, it assumes any influence on the dependent variable not explicitly included in the model is encapsulated within an error term. This error term is envisioned as comprising two components: one specific to each bank and invariant over time, and another that is temporally uncorrelated. Consequently, the underlying assumption is that these effects are independently and identically distributed across all banks (Verbeek, 2012). The applicability of a random-effects model hinges on the assumption that these unobserved effects are independent of the model's explanatory variables. To ascertain the suitability of the random-effects approaches for our dataset, this study employs a Hausman specification test.

The fixed-effects (FE) model specification within panel data analysis addresses the scenario where unobserved effects specific to each Savings Bank are correlated with the explanatory variables. This model specification effectively manages the inherent heterogeneity among entities, in this context, banks within the dataset. By allocating a unique intercept to each bank, the FE model captures bank-specific traits that may influence other measured variables but are challenging to quantify directly. Such characteristics could include unique aspects of the municipalities in which the banks operate, leading to systematic variations in the observed metrics of the selected variables. This bank-specific intercept remains consistent across time but differs among banks, ensuring that otherwise unobservable bank-specific factors are incorporated into the analysis.

Certain omitted variables may remain constant over time yet differ across entities (Savings Banks), or they may be uniform across entities but fluctuate over time. The panel regression

methodology designed to account for these variations employs a combined entity and time-fixed effects specification. Consequently, this thesis adopts the entity and time-fixed effects model to assess its effectiveness in explaining the observed data comprehensively.

Due to the strong correlation between the total debt ratio (DAR) and the equity ratio (ER), presented in Appendix 2, each regression model excludes one of these variables to avoid influencing the results. Consequently, the regression analyses are conducted twice, each time omitting one of the correlated variables to ensure the integrity and accuracy of the findings.

This study conducts a series of diagnostic tests to evaluate the appropriateness of the model specifications. To assess the normality of the dataset, a Skewness/Kurtosis test is utilized. Ideally, a normal distribution exhibits a skewness of zero and a kurtosis of three. This test measures deviations from these values by comparing the dataset's skewness to zero and its kurtosis to three. Additionally, a multicollinearity test is performed to examine the correlations among all variables. As Verbeek (2012) points out, significant correlations between explanatory variables can lead to unreliable regression outcomes and inflated standard errors. Essentially, high multicollinearity makes it challenging to isolate the individual impacts of correlated variables on the dependent variable. Furthermore, this study includes a heteroskedasticity test to determine whether the variance of the residuals (standard errors) remains constant across the dataset. Variations in residual variance can impact the efficiency and reliability of regression estimates.

6. Empirical Result

This chapter presents results obtained from the analysis of regression models that were applied to the datasets mentioned earlier. The data has been carefully scrutinized, and the outcomes derived from the models provide valuable insights into the empirical findings.

6.1 Regression Results of Net Interest Margin

Table 2 provides an analysis of profitability, as indicated by the Net Interest Margin (NIM), in relation to the total debt ratio (DAR) and other control variables identified in the study.

Table 2. Regression result of Net Interest Margin (NIM) as the dependent variable. This regression excludes the total Debt to Asset Ratio (DAR).

VARIABLES	Y1 Pooled OLS	Y1 Random effect	Y1 Fixed effect	Y1 Entity & Time Fixed effect
DAR	-0.10	0.01	0.05	0.21*
	(0.09)	(0.11)	(0.15)	(0.12)
DAR2	0.00	-0.00	-0.00	-0.00*
	(0.00)	(0.00)	(0.00)	(0.00)
BS	-1.12***	-1.01***	-1.14***	-0.11
	(0.17)	(0.24)	(0.27)	(0.35)
LS	0.85***	0.69***	0.49	0.64**
	(0.15)	(0.22)	(0.31)	(0.25)
Cust	0.14*	0.18*	0.25	0.24
	(0.08)	(0.10)	(0.16)	(0.15)
IR	0.06*	0.03	0.01	-0.02
	(0.03)	(0.02)	(0.02)	(0.02)
GDP	0.01	0.01	-0.00	0.15***
	(0.01)	(0.01)	(0.01)	(0.03)
UR	0.12***	0.12***	0.10***	0.36***
	(0.03)	(0.03)	(0.03)	(0.07)
Constant	6.51*	1.54	1.02	-16.70**
	(3.66)	(5.05)	(6.93)	(6.75)
Observations	401	401	401	401
R-squared	0.31		0.25	0.34
Number of panel		58	58	58

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

This exploration is facilitated through the employment of four distinct regression models: the Pooled OLS model (POLS), the Random Effect model (REM), the Fixed Effect model (FEM), and the Entity and Time Fixed Effect model (ETFEM). Each of these models presents a different angle on the dataset, with the R-squared values, a metric that quantifies the proportion of variance in the dependent variable explained by the independent variables, ranging from 25% to 34%. Among these, the ETFEM stands out with the highest R-squared value, suggesting it offers the most comprehensive explanation by incorporating both bank-specific and time-specific factors, which are not simultaneously considered in the other models.

The FEM uniquely assigns an intercept to each bank, accounting for individual bank characteristics while omitting time-specific variations. In contrast, the REM presumes that any influence on the dependent variable not explicitly included in the model is accounted for in the error term, which is composed of both time-independent individual effects and time-correlated components. This setup implies a generalization across banks, as the model does not allocate unique intercepts for each institution. Despite the sophisticated methodologies applied, all models exhibit a relatively modest degree of explanatory power, and many of the independent variables do not significantly influence the dependent variable. This could be attributed to a limited number of observations or the absence of other pertinent variables that might explain the variability in NIM more accurately.

Interestingly, while the POLS model suggests a negative correlation between DAR and profitability, the consensus across all models is that the relationship is either insignificant or mildly positive at the 10% level in the case of ETFEM. This implies that an increase in the debt ratio by one percentage point could potentially enhance NIM by 21 percentage points. Conversely, bank size exhibits a statistically significant negative impact on NIM across all models except ETFEM, indicating that larger banks might experience a slight reduction in NIM. Moreover, lending appears to positively influence NIM across all models, with ETFEM showing a positive but not statistically significant relationship. This suggests a generally positive impact of increased lending on profitability. A noteworthy finding across the models is the positive effect of the unemployment rate on NIM, particularly emphasized in the ETFEM model, where a one-percentage-point increase in unemployment is associated with a

0.32 percentage point increase in NIM at a 1% significance level. This observation highlights the intricate dynamics between macroeconomic conditions and bank profitability, underscoring the nuanced insights that can be garnered from a detailed regression analysis such as that presented in Table 3.

Table 3. Regression result of Net Interest Margin (NIM) as the dependent variable. This regression excludes the Equity Ratio (ER).

VARIABLES	Y1 Pooled OLS	Y1 Random effect	Y1 Fixed effect	Y1 Entity & Time Fixed effect
ER	0.01***	0.01	-0.01	-0.01
	(0.00)	(0.01)	(0.01)	(0.01)
BS	-1.06***	-1.03***	-1.14***	-0.35
	(0.16)	(0.23)	(0.26)	(0.32)
LS	0.78***	0.71***	0.55*	0.71***
	(0.14)	(0.22)	(0.30)	(0.25)
Cust	0.15**	0.18*	0.24	0.23
	(0.08)	(0.09)	(0.16)	(0.15)
IR	0.06*	0.03	0.01	-0.01
	(0.03)	(0.02)	(0.02)	(0.02)
GDP	0.01	0.01	0.00	0.13***
	(0.01)	(0.01)	(0.01)	(0.03)
UR	0.11***	0.12***	0.10***	0.32***
	(0.03)	(0.03)	(0.03)	(0.07)
Constant	1.64***	1.67***	3.73*	-5.52*
	(0.33)	(0.41)	(2.09)	(3.25)
Observations	401	401	401	401
R-squared	0.31		0.25	0.34
Number of panel		58	58	58

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3 further examines the relationship between profitability, represented by Net Interest Margin (NIM), and the equity ratio (ER), alongside other control variables identified within the study. Similar to the approach in Table 2, various regression models are employed to elucidate this relationship. However, the explanatory power of these models, as indicated by the R-squared values, remains relatively modest. Notably, the majority of the coefficients across these models exhibit statistical insignificance, except outcomes from the OLS model.

The resemblance in results between Table 3 and Table 4 stems from the close association between the regressions presented in both tables. The primary distinction lies in the

substitution of the DAR with the ER as the main explanatory variable. This change yields similar outcomes due to the inverse relationship often observed between DAR and ER. Among the various models, the POLS model uniquely demonstrates statistically significant results, revealing a positive correlation between the equity ratio and NIM, significant at the 1% level.

In line with findings from Table 2, bank size continues to exhibit a negative impact on NIM, with a statistical significance at the 1% level. Another notable observation from both tables is the consistent positive effect of the unemployment rate on NIM, which remains statistically significant at the 1% level in the current regression analysis. The number of customers also positively influences NIM across different models, albeit at varying levels of significance. Meanwhile, GDP growth shows a minimal positive effect on NIM; however, these effects do not achieve statistical significance in the examined models. The parallel outcomes observed in Tables 2 and 3 underscore the intricate dynamics between bank-specific characteristics, macroeconomic indicators, and profitability, with specific emphasis on the differential impact of equity ratios as opposed to debt ratios on banks' net interest margins.

6.2 Regression Results of Return on Equity

Table 4 presents the regression analysis with ROE as the dependent variable, examining its relationship with the DAR and other control variables.

Table 4. Regression result of Return on Equity (ROE) as the dependent variable. This regression excludes the total Debt to Asset Ratio (DAR).

VARIABLES	Y2 Pooled OLS	Y2 Random effect	Y2 Fixed effect	Y2 Entity & Time Fixed effect
DAR	-2.06***	-2.27***	-2.30**	-2.21**
	(0.48)	(0.69)	(0.87)	(0.87)
DAR2	0.01***	0.01***	0.01**	0.01**
	(0.00)	(0.00)	(0.01)	(0.01)
BS	-3.33***	-4.94***	-5.84***	-4.56*
	(1.14)	(1.67)	(2.15)	(2.55)
LS	3.22***	4.04***	4.35***	3.44*
	(1.01)	(1.27)	(1.55)	(1.82)
CB	0.79	1.58*	1.51	1.54
	(0.65)	(0.92)	(1.17)	(1.12)
IR	0.17	0.15	0.12	-0.02
	(0.19)	(0.18)	(0.19)	(0.13)
GDP	0.01	-0.06	-0.12	0.05
	(0.09)	(0.10)	(0.11)	(0.25)
UR	-0.20	-0.26	-0.30	-0.67
	(0.20)	(0.18)	(0.19)	(0.52)
Constant	78.60***	87.86***	97.04***	95.57*
	(19.67)	(27.44)	(35.70)	(49.22)
Observations	401	401	401	401
R-squared	0.29		0.05	0.17
Number of panel		58	58	58

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Four distinct regression models are applied, yielding explanation degrees (R-squared values) ranging from 17% to 29%. Among these, the ETFEM model, despite its ability to integrate both bank-specific and temporal characteristics, demonstrates a relatively modest explanatory power of 17%. The limited explanatory capacity of these models, coupled with numerous statistically insignificant variables, suggests that the findings should be approached with caution. Contrary to the results observed with NIM, ROE consistently exhibits a negative correlation with DAR across all models. This relationship is statistically significant at the 1%

level for both the POLS and REM and at the 5% level for the FEM and ETFEM. A similar pattern emerges with DAR squared (DAR2), indicating a positive but marginal effect.

Bank size is found to negatively impact ROE across all models, though the level of significance varies. Lending, on the other hand, shows a positive association with ROE in each model, albeit with differing degrees of significance. The number of customers also positively influences ROE, with this effect reaching statistical significance only in the REM model, albeit weakly. The analysis of the IR and GDP growth reveals inconsistent effects on ROE, with no coefficients reaching statistical significance. This contrasts with the NIM regression, where GDP growth displayed a very low positive effect. Interestingly, unlike the positive correlation with NIM, the unemployment rate exhibits a negative yet statistically insignificant relationship with ROE across all models.

This regression analysis, focusing on ROE, underscores distinct dynamics in how various factors, particularly debt ratio and bank size, influence banks' return on equity, suggesting a nuanced interplay between bank financial structure and profitability metrics.

Table 5. Regression result of Return on Equity (ROE) as the dependent variable. This regression excludes the Equity Ratio (ER).

VARIABLES	Y2 Pooled OLS	Y2 Random effect	Y2 Fixed effect	Y2 Entity & Time Fixed effect
ER	-0.17***	-0.12***	0.03	0.06
	(0.02)	(0.04)	(0.10)	(0.09)
BS	-1.47	-3.61**	-4.16*	-1.88
	(1.03)	(1.60)	(2.17)	(2.32)
LS	1.27	2.52**	3.83**	3.13*
	(0.85)	(1.13)	(1.59)	(1.82)
CB	0.98	1.87*	1.68	1.67
	(0.65)	(0.97)	(1.23)	(1.13)
IR	0.13	0.12	0.12	-0.04
	(0.17)	(0.17)	(0.19)	(0.13)
GDP	0.02	-0.07	-0.07	0.25
	(0.09)	(0.10)	(0.12)	(0.23)
UR	-0.21	-0.28	-0.21	-0.27
	(0.20)	(0.18)	(0.20)	(0.50)
Constant	2.33	0.92	-5.98	-18.33
	(2.30)	(3.71)	(16.07)	(23.80)
Observations	401	401	401	401
R-squared	0.25		0.03	0.15
Number of panel		58	58	58

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 expands upon the framework used in Table 4, with a key alteration in the regression model: the substitution of the Debt to Asset Ratio (DAR) with the ER as the primary independent variable. This modification is informed by the results of the multicollinearity test in Table 3, which identified DAR and ER as inversely related. The regression employs four distinct models, yielding explanation degrees (R-squared values) that range from a mere 3% to 25%. The POLS model demonstrates the highest explanatory power, accounting for 25% of the variability in the dependent variable. The ETFEM explains 15%, while the FEM offers the least explanation at just 3%. Notably, the REM features the most significant coefficients in this set of analyses. This regression illustrates a negative correlation between ROE and ER, which is statistically significant at the 1% level in both the POLS and REM models. Conversely, the FEM and ETFEM models depict a positive but not statistically significant relationship between these variables. Bank size and the unemployment rate negatively impact ROE, whereas the number of customers and the average interest rate exert a positive influence. The effect of GDP growth on ROE varies by model, and lending is positively

correlated with ROE across different models, albeit with varying levels of significance. This nuanced examination, distinguishing itself by the inclusion of ER instead of DAR, underscores the complexity of the relationships between bank profitability measures and key financial ratios. The varied effects observed across different regression models highlight the importance of choosing an appropriate model based on the specific nature of the variables and the desired focus of the analysis.

6.3 Regression Results of Return on Total Asset

Table 6 assesses the profitability of banks, measured as ROA, in relation to DAR and various control variables. The regression analysis utilizes four different models to explore these relationships.

Table 6. Regression result of Return on Total Asset (ROA) as the dependent variable. This regression excludes the total Debt to Asset Ratio (DAR).

VARIABLES	Y3 Pooled OLS	Y3 Random effect	Y3 Fixed effect	Y3 Entity & Time Fixed effect
DAR	0.05	-0.04	-0.13	-0.14
	(0.07)	(0.08)	(0.09)	(0.12)
DAR2	-0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
BS	-0.02	-0.25	-0.32	-0.31
	(0.14)	(0.17)	(0.22)	(0.34)
LS	0.11	0.25*	0.40**	0.23
	(0.13)	(0.14)	(0.17)	(0.24)
CB	-0.00	0.09	0.27	0.28*
	(0.09)	(0.14)	(0.22)	(0.15)
IR	0.01	0.01	0.02	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)
GDP	0.03***	0.02*	0.02**	0.03
	(0.01)	(0.01)	(0.01)	(0.03)
UR	-0.04	-0.04*	-0.04	-0.14**
	(0.02)	(0.02)	(0.02)	(0.07)
Constant	0.17	3.96	4.90	8.07
	(2.94)	(3.49)	(3.59)	(6.58)
Observations	401	401	401	401
R-squared	0.40		0.19	0.34
Number of panel		58	58	58

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The POLS model in this particular regression exhibits a higher degree of explanatory power at 40%, which is relatively substantial compared to earlier regressions, though it is still considered low in econometric terms. A significant number of the coefficients across these models turned out to be statistically insignificant, suggesting that the findings should be approached with caution. In the regressions conducted in Table 6, except for the POLS model, all other models indicate a negative relationship between DAR and ROA. However, these results are not statistically significant. Positive impacts on ROA were observed from lending, customer base, and GDP growth, indicating that these factors tend to enhance profitability. Conversely, bank size and the unemployment rate are shown to negatively affect ROA, reflecting potential challenges larger banks might face and the broader economic implications of higher unemployment rates. The average interest rate and the number of customers exhibit variable effects on ROA depending on the regression model applied, highlighting the complexity of these relationships and the varying influence of financial conditions on bank profitability.

Table 7 examines the profitability of Savings Banks, quantified through the Return on Total Assets (ROA) and explores its correlation with the equity ratio (ER) alongside various control variables. This analysis utilizes four distinct regression models to illuminate the dynamics between ROA and the chosen variables. Notably, the POLS model achieves a relatively high degree of explanation at 40%, marking an improvement in explanatory power compared to earlier analyses, though it remains modest in econometric terms. A significant portion of the coefficients derived across the different models turn out to be statistically insignificant, introducing a degree of uncertainty to the interpretation of these results.

Table 7. Regression result of Return on Total Asset (ROA) as the dependent variable. This regression excludes the Equity Ratio (ER).

VARIABLES	Y3 Pooled OLS	Y3 Random effect	Y3 Fixed effect	Y3 Entity & Time Fixed effect
ER	0.04***	0.04***	0.05***	0.05***
	(0.00)	(0.00)	(0.01)	(0.01)
BS	-0.10	-0.26	-0.27	-0.21
	(0.13)	(0.16)	(0.22)	(0.31)
LS	0.18	0.25**	0.40**	0.22
	(0.11)	(0.12)	(0.17)	(0.24)
CB	-0.01	0.09	0.27	0.28*
	(0.09)	(0.14)	(0.22)	(0.15)
IR	0.01	0.01	0.02	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)
GDP	0.03***	0.02*	0.03**	0.03
	(0.01)	(0.01)	(0.01)	(0.03)
UR	-0.04	-0.04*	-0.03	-0.13*
	(0.03)	(0.02)	(0.02)	(0.07)
Constant	0.02	-0.18	-3.24	-1.65
	(0.30)	(0.49)	(2.66)	(3.15)
Observations	401	401	401	401
R-squared	0.40		0.19	0.34
Number of panel		58	58	58

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Contrasting with findings from previous tables, all models in Table 7 consistently indicate a statistically significant positive relationship between the equity ratio and profitability, as measured by ROA, at the 1% level. This suggests that, with 99% confidence, an increase in the total equity ratio positively influences the Return on Total Assets for Savings Banks. Additionally, lending, the customer base, and GDP growth all exhibit a positive impact on profitability in this analysis, mirroring trends observed in Table 6. Conversely, an increase in the unemployment rate is associated with a negative effect on the profitability of Savings Banks, as evidenced by the regression outcomes in Table 7. This comprehensive analysis highlights the intricate interplay between bank financial structures, macroeconomic variables, and profitability metrics, underscoring the significance of the equity ratio as a determinant of financial performance in the banking sector.

7. Discussion

This study analyzes the impact of total debt ratios and equity ratios on profitability, measured through three distinct variables, for Savings Banks in Sweden, underscoring the complexity of pinpointing the exact factors influencing optimal capital structure and the reasons behind varying outcomes. Beyond the optimal capital structure, profitability can also be attributed to bank-specific characteristics and macroeconomic factors, as well as the adept management of available capital. Given the unique financing landscape of banks, which includes the use of deposits among other sources, the results suggest that deposits may not always be utilized efficiently, potentially impacting profitability adversely, aligning with Goddard et al. (2006), who found that liquidity management is crucial for profitability. Specifically, the analysis of profitability, as measured by return on equity, in relation to the total debt ratio, indicates a statistically significant negative relationship, similar to findings by Gatsi (2012) and Hirschey & Wichern (1984), but conflicting with Modigliani & Miller (1963) and Gillet al. (2011), who found positive impacts of debt. Similarly, a negative correlation was observed between the equity ratio and profitability for Savings Banks, which aligns with the nuanced relationships noted by Berger et al. (2006) but contrasts with Berger (1995), who found a positive relationship. Although the study aimed to estimate net interest margin as a proxy for profitability in connection with both the total debt ratio and the equity ratio, the regression outcomes varied across the different models employed.

Furthermore, this study shows an unexpected finding that bank profitability was negatively impacted by size during the analysed period. This is contrary to the anticipated benefits that larger banks might enjoy due to economies of scale, particularly in terms of risk management. Theoretically, such economies of scale should reduce the proportion of fixed costs relative to a bank's revenue, thereby diminishing risk, leading to lower financing costs, and, ultimately, improved financial outcomes. Hughes and Mester (2013) have indeed identified evidence of economies of scale within the banking sector, suggesting that larger institutions should theoretically benefit from their size. However, the findings of this study suggest otherwise, aligning with Berger et al. (2006) and Maury (2006), who also noted a negative correlation between size and profitability, but conflicting with Hughes and Mester (2013). One possible explanation for this paradoxical relationship between bank size and profitability could be the

unique position of smaller banks, which are often deeply embedded in their local regions with a strong, loyal customer base. Their smaller scale may afford them greater flexibility in managing the crises, and their local ties may foster a sense of trust with customers, effectively lowering the risk of failure. This scenario implies that the advantages traditionally associated with larger banks, such as reduced per-unit costs and enhanced operational efficiencies, may be offset by the agility and community trust enjoyed by smaller institutions.

This study shows that the average interest rate on lending exhibits a slight, though not statistically significant, positive impact on bank profitability. This aligns with Flannery's (1983) findings, which observed a similar relationship between market interest rates and profitability among smaller banks. Interestingly, Flannery (1981) concluded that market interest rates had no substantial effect on bank profitability due to banks' practices of matching the maturities of their assets and liabilities. This past conclusion might highlight the nuanced results observed in this study, particularly within the ETFEM model, which indicated a marginally negative correlation between profitability and lending rates. This model accounts for bank-specific and temporal factors, underscoring the complexity of how interest rates influence profitability. Given that lending activities are a primary revenue stream for banks, it is logical to anticipate a positive contribution to profitability from the lending rates, even if the effect observed in this study is minimal. Additionally, the positive correlation between the size of the customer base and profitability underscores the intuitive notion that a larger clientele, engaging with the bank's services, enhances the bank's financial performance. This suggests that customer relationships play a crucial role in driving the profitability of Savings Banks, complementing the findings on the impact of lending rates, as observed by Goddard et al. (2006).

The interplay between macroeconomic factors and bank profitability has been the subject of thorough investigation in previous research. This study narrows its focus to a subset of macroeconomic variables, specifically, the unemployment rate and GDP growth in Sweden, to assess their influence on the profitability of Savings Banks. A significant negative correlation between the unemployment rate and profitability has been observed, suggesting that higher unemployment rates, which may lead to reduced economic activity among the populace, directly affect bank earnings negatively. This finding aligns with Zampara et al.

(2017), who also found that unemployment negatively influenced bank profitability. However, the extent of unemployment's impact appears to be limited, possibly due to the resilient nature of banks' primary revenue stream from lending. Even in the face of rising unemployment, the obligation to repay existing loans persists, allowing banks to sustain their earnings. Nevertheless, an increase in unemployment also raises the risk of loan defaults, presenting a potential loss scenario for banks. This study corroborates those results, with a twist, it focuses on Savings Banks, which differ from commercial banks in their operational scope and scale. The relationship between GDP growth and profitability, particularly return on equity, is positive but not statistically significant, whereas profitability measured in return on total assets shows a robustly significant positive relationship. This aligns with Dietrich & Wanzenried (2009), who demonstrated that GDP growth positively influences profitability. This indicates that heightened economic activity, leading to increased investments and borrowing, boosts bank earnings. The modesty of this positive correlation could stem from the typically smaller size of Savings Banks compared to commercial banks, which might limit their capacity to extend large corporate loans.

8. Conclusion

This study aimed to examine the impact of capital structure, the optimal balance between debt and equity ratio, on the profitability of 58 Savings Banks in Sweden from 2014 to 2020 and to explore the influence of macroeconomic factors on profitability. The central objective was to ascertain the effects of the total debt ratio and equity ratio on profitability by utilizing panel data regression. The findings support that increases in the total debt ratio negatively impact profitability, whereas the increase in the equity ratio has a positive influence. However, these results should be interpreted cautiously due to the lack of statistical significance in some estimations. An unexpected outcome is the negative correlation between bank size and profitability. This can be attributed to the agility and focus of smaller, regionally-oriented banks, which operate more efficiently by leveraging their comparative advantages compared to larger, more diversified counterparts. Additionally, the study uncovered significant macroeconomic influences on profitability. There is a positive association with GDP growth and a negative relationship with the unemployment rate. These findings underscore the complex interplay between a bank's capital structure, its operational scale, and prevailing economic conditions, and their collective impact on profitability.

This study analyses the dynamics affecting the financial performance of Savings Banks in Sweden and contributes to a better understanding of optimal capital structure. It is underlined that the insights obtained cannot be generalised to the whole banking sector due to the unique characteristics and operational context of Savings Banks, which this study has been limited to. By concentrating on a number of selected variables, this study guides through the difficulties arising from different accounting practices among these institutions. Such an approach, while insightful, limits the depth of analysis of the nuances between short-term and long-term liabilities. The study is therefore limited to examining the overall debt ratio in the capital structure, avoiding a breakdown into short-term and long-term debt. This limitation is necessary due to the lack of consistent data and variations in financial reporting. A recommendation for future research is therefore to extend the analysis to a broader sample of financial institutions, a larger number of variables and more geographical regions. Such an extension would facilitate a more generalisable understanding of how different factors affect the profitability of financial institutions over time.

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Appendix

Appendix 1. Savings Banks

Table 10. Summary Savings Banks

Savnings Banks in Sweden	
1. Sparbanken Skåne AB	30. Tjörns Sparbank
2. Sparbanken Sjuhärad AB	31. Skurups Sparbank
3. Sparbanken Nord	32. Södra Dalarnas Sparbank AB
4. Varbergs Sparbank AB	33. Södra Hestra Sparbank
5. Sparbanken Alingsås AB	34. Markaryds Sparbank
6. Sörmlands Sparbank	35. Sölvesborg Mjällby Sparbank
7. Sparbanken Rekarne AB	36. Fryksdalens Sparbank
8. Sparbanken i Enköping	37. Kinda-Ydre Sparbank
9. Sparbanken Skaraborg AB	38. Vadstena Sparbank
10. Falkenbergs Sparbank	39. Ålems Sparbank
11. Roslagens Sparbank	40. Häradssparbanken Mönsterås
12. Orusts Sparbank	41. Sparbanken Tranemo
13. Sparbanken i Karlshamn	42. Valdemarsviks Sparbank
14. Sparbanken Västra Mälardalen	43. Åse Viste Sparbank
15. Westra Wermlands Sparbank	44. Vimmerby Sparbank
16. Hälsinglands Sparbank	45. Lekebergs Sparbank
17. Sparbanken Lidköping AB	46. Åtvidabergs Sparbank
18. Sala Sparbank	47. Ivetofta Sparbank i Bromölla
19. Bergslagens Sparbank AB	48. Sidensjö Sparbank
20. Sparbanken Eken AB	49. Högsby Sparbank
21. Tjustbygdens Sparbank AB	50. Ekeby Sparbank
22. Dalslands Sparbank	51. Bjursås Sparbank
23. Ulricehamns Sparbank	52. Snapphanebygdens Sparbank
24. Ölands Bank AB	53. Norrbärke Sparbank
25. Sparbanken Tanum	54. Mjöbäcks Sparbank
26. Laholms Sparbank	55. Sparbanken Boken
27. Leksands Sparbank	56. Lönneberga-Tuna-Vena Sparbank
28. Tidaholms Sparbank	57. Virserums Sparbank
29. Sparbanken Göinge AB	58. Sparbanken Gotland

Appendix 2. Matrix of Correlations

Table 11. Matrix of correlations

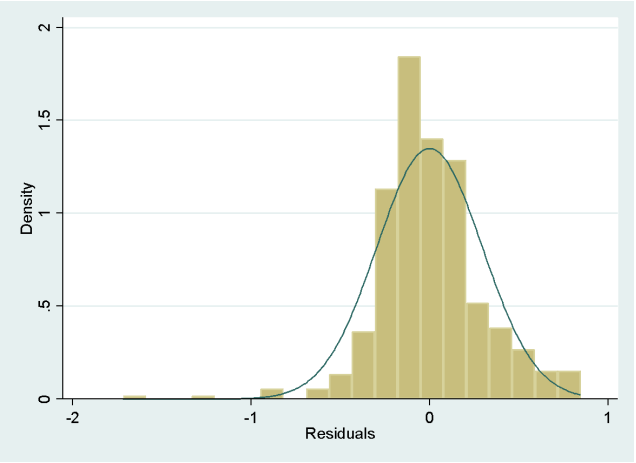
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) NIM	1.000											
(2) ROE	0.017	1.000										
(3) ROA	-0.015	0.321	1.000									
(4) DAR	-0.006	0.420	-0.574	1.000								
(5) DAR2	-0.007	0.428	-0.575	0.999	1.000							
(6) ER	0.009	-0.422	0.574	-0.999	-0.998	1.000						
(7) IR	0.317	-0.014	-0.078	0.066	0.064	-0.064	1.000					
(8) BS	-0.413	0.218	0.195	-0.030	-0.026	0.036	-0.342	1.000				
(9) GDP	0.110	0.012	0.223	-0.124	-0.123	0.122	0.173	-0.123	1.000			
(10) UR	0.220	-0.051	-0.138	0.023	0.023	-0.020	0.213	-0.023	-0.372	1.000		
(11) Cust	-0.341	0.274	0.164	0.048	0.053	-0.044	-0.272	0.957	0.011	-0.009	1.000	
(12) LS	-0.393	0.243	0.174	0.016	0.018	-0.010	-0.351	0.994	-0.116	-0.035	0.960	1.000

Appendix 3. Normality Tests

Normality test of regression for NIM

Skewness/Kurtosis tests for Normality

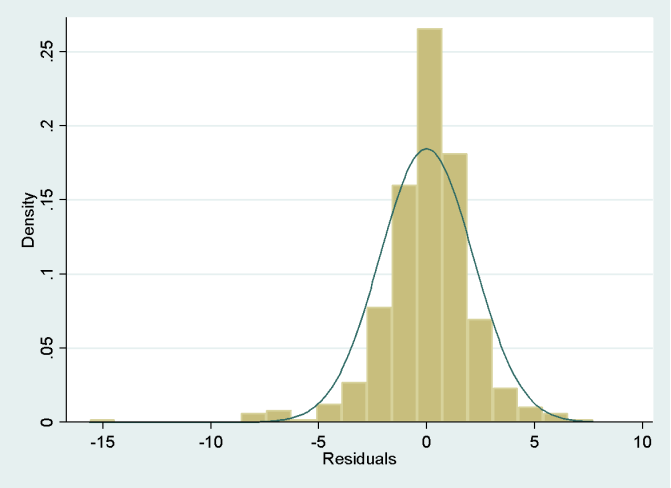
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
resid	406	0.0196	0.0000	36.96	0.0000



Normality test of regression ROE

Skewness/Kurtosis tests for Normality

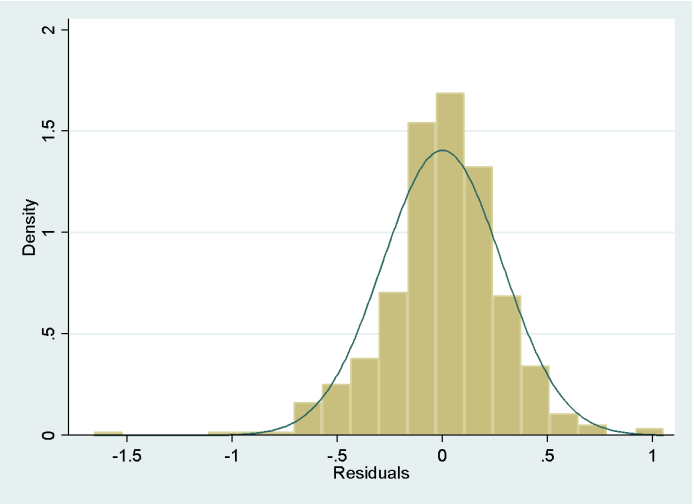
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
resid	406	0.0000	0.0000	.	0.0000



Normality test of regression ROA

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
resid	406	0.0000	0.0000	43.95	0.0000



Appendix 3. Heteroscedasticity

Test of heteroscedasticity of regression – Table 2

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2(43) = 93.57

Prob > chi2 = 0.0000

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	93.570	43	0.000
Skewness	17.650	8	0.024
Kurtosis	2.680	1	0.102
Total	113.900	52	0.000

Test of heteroscedasticity of regression – Table 3

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2(35) = 85.08

Prob > chi2 = 0.0000

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	85.080	35	0.000
Skewness	18.260	7	0.011
Kurtosis	2.880	1	0.090
Total	106.210	43	0.000

Test of heteroscedasticity of regression – Table 4

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2(43) = 59.10

Prob > chi2 = 0.0519

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	59.100	43	0.052
Skewness	10.120	8	0.257
Kurtosis	1.950	1	0.162
Total	71.170	52	0.040

Test of heteroscedasticity of regression – Table 5

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2(35) = 53.12

Prob > chi2 = 0.0254

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	53.120	35	0.025
Skewness	7.720	7	0.358
Kurtosis	2.070	1	0.150
Total	62.910	43	0.025

Test of heteroscedasticity of regression – Table 6

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2(43) = 64.58

Prob > chi2 = 0.0182

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	64.580	43	0.018
Skewness	9.050	8	0.338
Kurtosis	2.060	1	0.152
Total	75.690	52	0.018

Test of heteroscedasticity of regression – Table 7

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2(35) = 60.76

Prob > chi2 = 0.0044

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	60.760	35	0.004
Skewness	8.850	7	0.264
Kurtosis	2.120	1	0.145
Total	71.730	43	0.004