

CHAPTER ONE

Cash Flow Risk Management and Sustainable Financial Performance of Listed Commercial Banks in Sri Lanka

Madushanka R.M.V. & Amarasinghe A.A.M.D.

Department of Accountancy and Finance, Faculty of Management Studies
Sabaragamuwa University of Sri Lanka
malith@mgt.sab.ac.lk

Abstract

This study examines the impact of cash flow risk management practices on the sustainable financial performance of listed commercial banks in Sri Lanka from 2014 to 2023, using a quantitative approach and dynamic panel data analysis. Key metrics—operating cash flow to total assets (TAR), liquidity coverage ratio (LCR), cash flow from operations to net income (OIR), and loan-to-deposit ratio (LDR)—were analysed as proxies for cash flow risk management, while sustainable growth rate (SGR) represented financial performance. The Random Effects (RE) model, validated by the Hausman test, was identified as the most suitable analytical framework for this study. The results indicate that TAR has a positive influence on sustainable financial performance, highlighting the importance of operational cash flow. OIR exhibited minimal impact, whereas LCR and LDR showed no significant correlation with financial performance. The findings underscore the importance of effective cash flow management in promoting long-term financial sustainability. The study recommends that bank managers improve their cash flow management practices, and regulators enforce stricter benchmarks to ensure banks effectively manage risks, particularly in volatile economic environments.

Keywords: *Cash Flow Risk Management Practices, Sustainable Financial Performance, Commercial Banks.*

1. Introduction

The banking sector in Sri Lanka plays a critical role in the country's financial system, contributing to economic growth, development, and stability (Wijesinghe & Pallearachchi, 2022). It encompasses both local and foreign banks, with significant evolution driven by economic localisation and globalisation (Nandalal, 2021). The Central Bank of Sri Lanka (CBSL) oversees the sector by regulating licensed commercial banks, maintaining financial stability, and implementing monetary policies.

Ownership diversity characterises the sector, with state-owned banks, such as the Bank of Ceylon and People's Bank, dominating the market and supporting government initiatives, while private banks, including Commercial Bank of Ceylon and Hatton National Bank, lead in innovative financial services. Additionally, international banks such as HSBC and Standard Chartered offer global banking services (Central Bank of Sri Lanka, 2018; KPMG Sri Lanka, 2021).

Recent measures to enhance efficiency and competitiveness include financial liberalisation, the adoption of new technologies, and improved corporate governance practices, as directed by the Central Bank of Sri Lanka (CBSL, 2020). However, challenges such as economic fluctuations, political instability, and global crises, including the COVID-19 pandemic, have occasionally threatened the sector's stability, necessitating restructuring efforts post-civil war and adaptive strategies during the pandemic (Jayamaha, 2008; Central Bank of Sri Lanka, 2020). Technological advancements have significantly transformed the industry, with digital platforms, mobile banking, and automated teller machines (ATMs) improving customer satisfaction and reducing costs (Gunawardene, 2017). Furthermore, financial inclusion initiatives, including microfinance, small and medium enterprise (SME) loans, and agricultural lending, aim to serve rural and underserved populations, fostering equitable economic development (Blancher et al., 2019).

Cash flow risk management involves tools and techniques to monitor and mitigate potential adverse changes in cash movements. Effective practices ensure banks maintain liquidity for short-term needs and safeguard against long-term default risks. Methods like Value at Risk (VaR), Cash Flow at Risk (CFaR), and scenario analysis are commonly employed to address these risks (Astuti & Gunarsih, 2021; Oral & CenkAkkaya, 2015).

Sustainable finance incorporates environmental, social, and governance (ESG) considerations into financial decisions to ensure long-term profitability and sustainability. Effective cash flow risk management supports this by enabling banks to fund sustainable initiatives even during economic distress. Integrating cash flow management with ESG principles enhances stakeholder confidence, strengthens the bank's reputation, and fosters sustainable growth (Lins, Servaes & Tamayo, 2017).

Sri Lanka's banking sector, comprising domestic and foreign banks, has remained relatively stable despite economic fluctuations. However, rising non-performing loans (NPLs) indicate potential liquidity stress. By June 2020, NPLs for commercial banks had increased to 5.3% from 4.9% in March, while specialised banks had seen a rise from 6.6% to 7.1%, signalling challenges in managing cash flow risks (Central Bank of Sri Lanka, 2020).

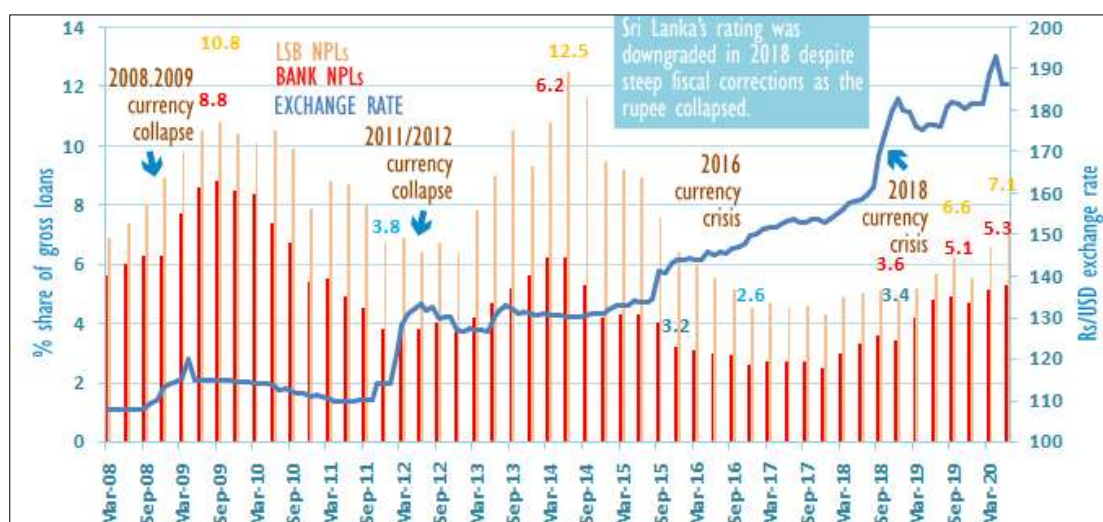


Figure 1.1: NPLs and Exchange Rate Volatility in Sri Lanka's Banking Sector (2008-2020)

Source: Central Bank of Sri Lanka

The COVID-19 pandemic intensified liquidity pressures in Sri Lanka's banking sector due to moratoria and reduced economic activities. The Central Bank of Sri Lanka (2023) highlighted that banks with robust cash flow risk management successfully maintained liquidity and supported clients during this period. Digitalisation has significantly improved cash flow management in Sri Lankan banks, enabling more efficient transaction processing and enhanced cash flow monitoring. This has led to improved overall performance for banks that adopt digital channels (Habeeb & Wickramasinghe, 2019).

Despite progress, many Sri Lankan banks continue to rely on traditional risk management methods, which are increasingly inadequate given the complexities of modern financial products and the global economic challenges they face. This is particularly concerning as ESG considerations demand more advanced cash flow management practices (Fernando & Basnayake, 2022). From a theoretical perspective, Stakeholder Theory emphasises that banks must address the interests of all stakeholders, not just shareholders, to ensure longevity and sustainable performance (Freeman & McVea, 2001). Effective cash flow risk management aligns with this principle by fulfilling obligations to depositors, investors, and society as a whole. Similarly, Agency Cost Theory highlights the conflict between stockholders and managers, suggesting that unchecked managers may harm financial stability. Robust cash flow risk management mitigates agency risks by implementing transparent processes and controls (Jensen & Meckling, 1976).

1.1. Research Problem

Cash flow risk management is a persistent challenge for Sri Lanka's banking sector, a cornerstone of the nation's economic stability and development (Gowthaman, 2022). Despite

reforms and sectoral growth, listed commercial banks continue to face difficulties in maintaining effective cash flow management (Kimani & Kibera, 2023). Factors such as dynamic operational, regulatory, and economic environments further complicate risk management (Chernobai et al., 2021). The sector is also impacted by external factors, including fluctuating interest rates, volatile exchange rates, and legislative changes, making cash flow management increasingly critical (Central Bank of Sri Lanka, 2020). The COVID-19 pandemic has exacerbated these challenges, exposing weaknesses in cash flow practices due to liquidity constraints and heightened credit risks (Shabir et al., 2023).

Moreover, the slow adoption of modern financial technologies, such as digital banking and automated systems, has hindered the efficient utilisation of resources. While these technologies can enhance cash flow management, their gradual uptake increases operational risks, including system breaches and internal fraud, ultimately affecting profitability (Madushika & Wijesinghe, 2022). Globally, studies indicate that effective cash flow management is inversely correlated with profitability risks and insolvency, as observed in advanced economies (Almeida, Campello, & Weisbach, 2004). However, limited research exists on the Sri Lankan banking sector, which operates within unique economic and political frameworks. This research gap underscores the need to examine the impact of cash flow risk management practices on the financial sustainability of Sri Lanka's listed domestic commercial banks.

1.2. Research Objectives

This study aims to analyse the influence of cash flow risk management practices (RMP) on the sustainable financial performance of listed commercial banks in Sri Lanka. Specifically, it aims to assess the impact of various risk management practices on financial sustainability. These include the influence of RMP on operating cash flow to total assets, liquidity coverage, cash flow from operations to net income, and loan-to-deposit ratios on the banks' sustainable financial performance. By addressing these aspects, the study provides a comprehensive understanding of the role that effective cash flow risk management plays in ensuring the financial resilience and long-term stability of Sri Lankan commercial banks.

1.3. Hypotheses Development

This study is guided by the following hypotheses to explore the relationship between cash flow risk management practices and the sustainable financial performance of listed commercial banks in Sri Lanka. The primary hypothesis (H_{1A}) posits a significant relationship between cash flow risk management practices and financial sustainability. Additionally, it examines specific dimensions of risk management practices, including the relationship

between operating cash flow to total assets (H_{1B}), liquidity coverage (H_{1C}), cash flow from operations to net income (H_{1D}), and loan-to-deposit ratios (H_{1E}) with sustainable financial performance. These hypotheses aim to provide a nuanced understanding of how distinct risk management strategies contribute to the resilience and long-term financial stability of the banking sector.

2. Literature Review

2.1. Theoretical Review

The study's theoretical framework incorporates Stakeholder Theory, Agency Cost Theory, Value at Risk (VaR), and Cash Flow at Risk (CFaR) to understand the impact of cash flow risk management on the financial sustainability of Sri Lankan listed commercial banks.

Freeman and McVeagh (2001) envisioned Stakeholder Theory, which suggests organising business management or ethics through the lens of morals and values. This theory posits that organisations consider all groups of stakeholders, not just the shareholders that the organisation instinctively serves, in order for the organisation to achieve and maintain decent performance and long-term survival. Within stakeholder theory and in relation to the management of cash flow risks, it is proposed that banks should develop and utilise practices that go beyond maximising shareholders' wealth alone, but also consider the interests of other stakeholders.

Agency Cost Theory highlights the importance of aligning managers' actions with shareholders' interests and mitigating risks associated with cash flow management (Jensen & Meckling, 1976; Wickramasinghe & Gunawardane, 2017). For commercial banks, this means implementing appropriate systems to control the flow of cash in and out of the organisation, ensuring the safety and security of funds for stakeholders. In Sri Lanka, given the economic uncertainties, achieving investor satisfaction and sustainable growth will depend on how agency costs associated with cash flows are managed.

VaR estimates potential losses due to market fluctuations, enabling banks to manage liquidity and mitigate risks in volatile economic environments (Astuti & Gunarsih, 2021; Central Bank of Sri Lanka, 2023). CFaR focuses specifically on predicting adverse cash flow changes, enabling banks to maintain liquidity amid challenges such as interest rate volatility and loan defaults (Oral & CenkAkkaya, 2015; Wickramasinghe & Gunawardane, 2017). Integrating these theories, the study seeks to evaluate effective cash flow risk management strategies to enhance financial stability and performance in the dynamic Sri Lankan banking sector.

2.2. Empirical Review

The empirical review examines existing research on cash flow risk management techniques and their influence on the sustainable performance of commercial banks, focusing on both local and global contexts. Cash flow risk management is crucial for maintaining financial stability, solvency, and profitability in the banking sector, as it addresses challenges such as economic volatility, regulatory changes, and operational risks (Kedarya et al., 2023; Nasimiyu, 2024). Practical strategies, including liquidity management, risk models like Value at Risk (VaR) and Cash Flow at Risk (CFaR), and scenario analysis, help banks mitigate risks and sustain operations during economic disruptions (Gemzik-Salwach, 2012; Astuti & Gunarsih, 2021).

Empirical studies highlight that effective cash flow management shields banks from financial shocks, ensuring stability and profitability. For example, Almeida et al. (2004) noted that organisations with better cash flow management are less sensitive to market swings. Similarly, Sri Lankan studies have shown that banks with robust cash flow systems performed better during challenges such as civil unrest and the COVID-19 pandemic, demonstrating the importance of adaptive strategies (Jayamaha, 2008; Central Bank of Sri Lanka, 2020).

Technological advancements and regulatory frameworks have a significant impact on cash flow risk management. Emerging technologies, such as artificial intelligence and machine learning, are reshaping forecasting and risk management processes, while ESG considerations are expected to further integrate sustainable strategies into cash flow management (Gunawardene, 2017; Vural, 2004). Despite these benefits, challenges such as economic instability, legal constraints, and the cost of technological implementation persist, underscoring the need for innovative and adaptive practices in managing cash flow risks.

Global Perspectives

Numerous studies emphasise the importance of managing cash flow risk in influencing a bank's performance. According to Almeida, Campello, and Weisbach (2004), effective cash flow management provides a buffer against financial downturns, as firms with access to external funds are less affected by cash flow fluctuations. This is particularly critical for banks operating in volatile financial environments and exposed to diverse economic shocks.

Research by Ho et al. (1999) demonstrated that banks utilising Value at Risk (VAR) models to estimate potential adverse changes in cash inflows performed better due to their ability to predict and manage risks effectively. Similarly, Aktaş et al. (2012) highlighted that adopting efficient cash flow risk management practices could help banks mitigate the risk of financial crises.

Vural (2004) further explored liquidity risk management through the Cash Flow at Risk (CFaR) model, concluding that banks using this model maintained stronger cash flow positions and managed risks more effectively. Collectively, these studies highlight the importance of advanced risk management techniques in safeguarding the banking sector against substantial financial losses.

Sri Lankan Context

Sri Lanka's banking sector faces distinct challenges influenced by its economic environment, regulatory structures, and competitive dynamics. Research has explored these challenges and the effectiveness of cash flow management practices, revealing varying degrees of success among banks. Gowthaman (2022) examined the impact of Sri Lanka's civil war on the banking sector, highlighting the importance of effective cash flow management during periods of instability. The study found that banks practising robust cash flow management demonstrated financial resilience, maintaining stability and performance despite the adverse effects of the war.

Wijesinghe et. al. (2018) investigated the use of digital banking technologies in Sri Lanka and their impact on cash flow management. The research indicated that technological advancements significantly enhanced cash flow management systems and contributed to improved bank performance, underscoring the transformative role of technology in modern banking operations. The Central Bank of Sri Lanka (2020) examined the impact of the COVID-19 pandemic on the banking industry, with a focus on the crucial role of adaptive cash flow strategies. Banks that swiftly adjusted their cash flow management practices to address the pandemic's economic challenges were able to sustain liquidity and provide better support to their customers. These findings underscore the importance of flexibility and responsiveness in cash flow management, enabling effective navigation of economic disruptions.

The existing literature on cash flow risk management in banking reveals several significant research gaps, particularly in the context of developing countries like Sri Lanka. The existing literature is incomplete in many aspects, particularly regarding the coupling of cash flow risk management techniques with sustainable financial performance. Whereas cash flow risk management and sustainable financial performance have attracted a large body of work separately, there are few, if any, attempts to study them in relation to each other. Most prior studies focus on traditional business financial performance indicators, with little regard for the cash flow management approach as a guarantee of long-term business sustainability, which also extends to environmental, social, and governance prospects. A majority of the empirical work regarding cash flow risk management is done in developed markets, with a few

exceptions in regions such as Sri Lanka. Technological innovations, particularly banking and financial technologies (FinTech), have prompted a paradigm shift in cash flow risk management practices (Wijesinghe, 2018). Nevertheless, this aspect of the literature has not addressed the impact of the technology used on cash flow risk management in commercial banks.

These gaps highlight areas that require further investigation to enhance understanding and practice in the field. While cash flow risk management and sustainable financial performance have been studied separately, their interplay remains underexplored. Most prior research focuses on traditional financial performance metrics, neglecting the role of effective cash flow management in supporting long-term sustainability, including Environmental, Social, and Governance (ESG) objectives. This omission is critical since stakeholders increasingly evaluate banks based on their ESG performance (Lins, Servaes, & Tamayo, 2017). Understanding the role of cash flow management in achieving broader sustainability goals is essential for developing holistic financial strategies.

Most empirical studies on cash flow risk management are concentrated in developed markets, with limited research addressing the unique economic and regulatory challenges of emerging markets, such as Sri Lanka. For instance, Gowthaman (2022) highlighted the importance of cash flow management during Sri Lanka's civil conflict, but emphasised the scarcity of studies examining how banks adapt their practices in response to evolving economic and regulatory environments. Further research is needed to understand the specific barriers and opportunities in emerging markets, which differ significantly from those in developed economies.

3. Methodology

This study employs a quantitative research approach, utilising secondary data to systematically analyse financial information from listed commercial banks in Sri Lanka. The goal is to uncover patterns and relationships that provide insights into financial performance and risk management practices.

3.1. Research Design

The study employs an explanatory research design, focusing on cause-and-effect relationships between variables. This approach involves hypothesis testing and the use of quantitative methods, such as regression analysis and panel data analysis, to establish causal links between independent and dependent variables. By analysing empirical data, the study aims to validate theoretical hypotheses and elucidate the mechanisms that influence cash flow risk management and financial performance.

3.2. Population and Sample

The study targets all listed commercial banks in Sri Lanka as its population, consisting of both domestic and foreign banks. However, the sample is limited to domestic private and public banks to ensure a homogeneous dataset. The exclusion of foreign banks is justified due to differences in regulatory frameworks, ownership structures, and risk management strategies, which are influenced by parent institutions abroad. Focusing on local banks ensures the findings are relevant to the Sri Lankan financial landscape and reflective of shared economic and market conditions.

The study examines data from 2014 to 2023, a period encompassing significant financial trends, regulatory changes, and the global economic impacts of the COVID-19 pandemic. This timeframe includes both pre- and post-pandemic dynamics, as well as macroeconomic turning points and one complete economic cycle, offering a comprehensive view of cash flow risk management practices and their impact on financial stability.

The study focuses on the following domestic banks: Amana Bank; Bank of Ceylon; Cargills Bank PLC; Commercial Bank of Ceylon PLC; DFCC Bank PLC; Hatton National Bank PLC; National Development Bank PLC; Nations Trust Bank PLC; Pan Asia Banking Corporation PLC; People's Bank; Sampath Bank PLC; Seylan Bank PLC; Union Bank of Colombo PLC. By concentrating on these banks, the study aims to provide findings that are valid, relevant, and applicable to Sri Lanka's domestic banking sector.

3.3. Conceptual Framework

The conceptual framework will illustrate how cash flow risk management practices influence sustainable financial performance.

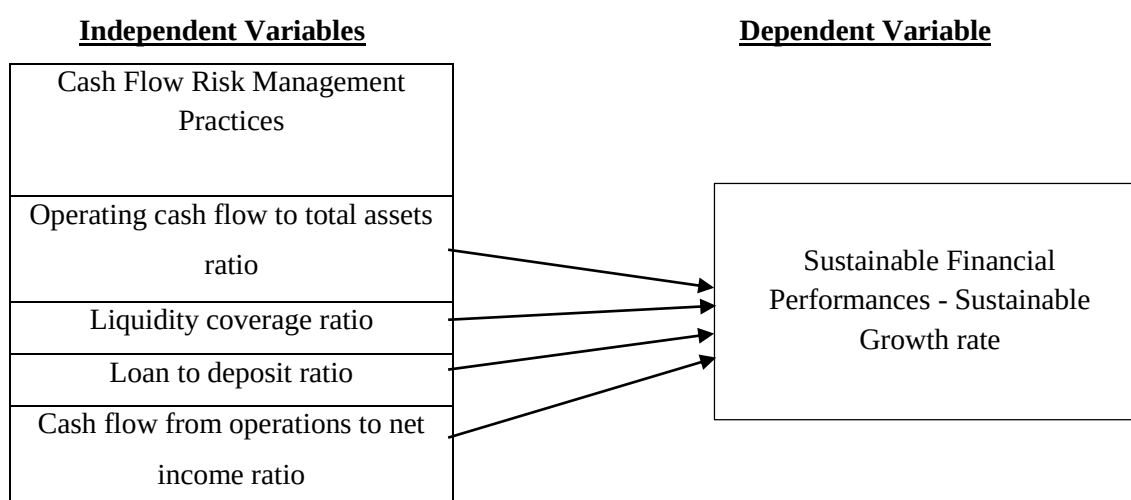


Figure 3.1: Conceptual Framework

Source: Developed by the Researcher Based on Previous Literature

Sustainable Growth Rate (SGR)

SGR represents the maximum growth a business can sustain without increasing its financial leverage or relying on external financing. It is calculated using the formula:

$$\text{SGR} = \text{ROE} \times (1 - \text{Dividend Payout Ratio})$$

This metric is essential for determining how far and how quickly a business can expand while maintaining internal financial stability. Once a company exceeds its SGR, it must resort to borrowing or external funds to facilitate additional growth (Guliyev & Muzaffarov, 2024)

Operating Cash Flow to Total Assets Ratio (TAR)

The operating cash flow to total assets ratio measures a bank's operational efficiency by comparing its operating cash flow to its total assets. A higher ratio indicates that the bank is effectively utilising its assets to generate cash flows, minimising the risk of liquidity issues. This ratio is crucial for evaluating how effectively a bank manages its cash flows to meet both current and future needs, thereby reducing the likelihood of financial distress. It provides insight into the bank's operational soundness and economic structure (Eyisi & Okpe, 2014).

Liquidity Coverage Ratio (LCR)

LCR, developed under the Basel III framework, ensures that banks maintain sufficient high-quality liquid assets to cover net cash outflows for at least 30 days. This metric is critical for managing short-term liquidity risks, enabling banks to withstand market shocks without resorting to unfavourable asset sales or emergency borrowing. The LCR reflects a bank's financial flexibility and its preparedness to handle liquidity demands during periods of market stress (Mashamba, 2021; Diamond & Rajan, 2001).

Loan to Deposit Ratio (LDR)

LDR assesses a bank's liquidity by comparing the total loans extended to the deposits held. A low LDR indicates excess liquidity but suggests underutilization of funds, while a high LDR signals potential liquidity risks, such as the inability to meet withdrawal demands or other callable liabilities. This metric is a critical tool for evaluating how effectively a bank manages its liquidity risks and ensures its capability to meet financial obligations without jeopardising stability (Bordeleau & Graham, 2010).

Cash Flow from Operations to Net Income Ratio (OIR)

The cash flow from operations to net income ratio compares actual cash generated from operations to the reported net income. This metric is crucial for assessing the quality and sustainability of earnings by verifying that actual cash flows support reported profits. It

highlights discrepancies between cash flows and earnings, which can act as a warning signal for potential financial risks. This ratio is particularly valuable in assessing a bank's liquidity and the reliability of its reported earnings (Dechow & Dichev, 2002).

Table 3.1: Summary of Cash Flow Ratios

Ratio	Measurement	Used in Prior Studies
Operating Cash Flow to Total Assets (TAR)	$\frac{\text{Operating cash flow}}{\text{Total assets}}$	Barth, Cram & Nelson (2001)
Liquidity Coverage Ratio (LCR)	$\frac{\text{High – quality liquid assets}}{\text{Net cash outflows over 30 days}}$	Basel Committee on Banking Supervision (2013); Diamond & Rajan (2001)
Loan to Deposit Ratio (LDR)	$\frac{\text{Total loans}}{\text{Total deposits}}$	Bordeleau & Graham (2010); Berger & Bouwman (2009)
Cash Flow from Operations to Net Income (OIR)	$\frac{\text{Operating cash flow}}{\text{Net income}}$	Dechow & Dichev (2002); Schipper & Vincent (2003)

Source: Compiled by the Author

3.4. Method of Data Collection

The study uses secondary data sourced from the financial statements and annual reports of listed commercial banks in Sri Lanka. These documents are accessed through the official websites of the banks, regulatory disclosures, or financial databases, such as the Colombo Stock Exchange.

3.5. Data Analysis using Panel Data Regression

The analysis employs panel data techniques to investigate the relationship between cash flow risk management practices and financial performance. By incorporating both cross-sectional and time-series data, panel regression models are utilised to identify patterns and effects. Statistical software, such as STATA, is used for data processing and regression analysis.

Panel data regression techniques are employed to examine the relationship between cash flow risk management practices and the sustainable financial performance of listed banks. The study first estimates an Ordinary Least Squares (OLS) model, which assumes no individual differences across banks. To address potential biases from unobserved heterogeneity, fixed effects (FE) and random effects (RE) models are employed.

Fixed Effects Model (FE): This model accounts for time-invariant, bank-specific characteristics by assigning each bank its own intercept. It controls for unobserved variables that remain constant over time. An F-test determines whether the FE model is a better fit than the OLS model.

Random Effects Model (RE): This model assumes that individual-specific effects are random and uncorrelated with the explanatory variables, thereby offering greater efficiency in generalising results. A Breusch-Pagan LM test compares the RE model against OLS to verify its suitability.

To choose between FE and RE models, the Hausman test is used. A significant result favours the FE model, while a non-significant result supports the RE model for efficiency (Sheytanova, 2015; Amini et al., 2012).

Model

$$SGR_{it} = \beta_0 + \beta_1 TAR_{it} + \beta_2 LCR_{it} + \beta_3 LDR_{it} + \beta_4 OIR_{it} + \varepsilon_{it} \quad (1)$$

Where,

SGR = Sustainable growth rate

TAR = Operating cash flow to total assets ratio

LCR = Liquidity coverage ratio

LDR = Loan to deposit ratio

OIR = Cash flow from operations to net income ratio

ε = Error term

4. Results and Discussion

4.1. Descriptive Statistics

Table 4.1: Descriptive Statistics

Variable	Mean	Std. dev.	Minimum	Maximum
SGR	0.378	0.202	0.003	1.030
TAR	0.045	0.638	0.000	0.607
LCR	2.238	1.995	0.539	13.144
LDR	0.928	0.199	0.074	1.862
OIR	1.235	1.614	0.005	13.067

Source: STATA output

Table 4.1 presents the descriptive statistics for several financial ratios, including the sustainable growth rate (SGR), operating cash flow to total assets ratio (TAR), liquidity coverage ratio (LCR), and loan-to-deposit ratio (LDR), Cash Flow from Operations to Net

Income Ratio (OIR), based on 130 observations from selected listed commercial banks in Sri Lanka between 2014 and 2023.

The Sustainable Growth Rate (SGR) has a low mean value (0.378) with a low standard deviation (0.2), indicating that most banks in the sample struggle with achieving sustainable growth, as they are unable to grow at a rate that can support their liabilities, which could lead to significant risks. The Operating Cash Flow to Total Assets Ratio (TAR) also has a low mean (0.045), suggesting that these banks are not efficiently utilising their assets to generate income, which may negatively impact their operations. The Liquidity Coverage Ratio (LCR) has a mean value of 2.238 with a standard deviation of 1.995, indicating that banks have sufficient liquidity to meet their short-term liabilities, which is essential for solvency, particularly during economic downturns. The Loan-to-Deposit Ratio (LDR) also has a mean of 0.928, implying that banks may not be effectively utilising deposits for lending, which suggests an imbalance with more deposits than loans. The Cash Flow from Operations to Net Income Ratio (1.235) has a positive value, indicating that the banks are generating income from operations that exceeds their overall operating income, which supports their solvency and future investments. The standard deviations for all these variables reveal considerable variability in financial performance across the banks. Positive scores across the ratios indicate significant fluctuations, while the minimum values highlight that some banks are facing challenges in growth and asset utilisation. Conversely, the maximum values show that some banks are performing exceptionally well, especially in terms of liquidity.

4.2. OLS Regression

The OLS regression (Table 4.2) provides a preliminary understanding of the data, which includes 130 observations and coefficients for variables such as LDR, OIR, LCR, and TAR. The R-squared in the OLS model (0.094) indicates a modest explanation of variability by the model. However, OLS regressions do not account for unobserved heterogeneity, which is often crucial in panel data, particularly financial data involving banks, where unobservable intrinsic characteristics significantly influence outcomes.

Table 4.2: Summary of OLS Regression results

R- Squared	Adj R- Squared	F-Statistics	Prob (F-Statistics)	
0.094	0.065	3.270	0.013	
Variable	Coefficient	Std. Err.	t-Statistic	Probability
TAR	1.199	0.802	1.49	0.138
LCR	0.011	0.009	1.21	0.227
OIR	-0.073	0.031	-2.33	0.021
LDR	-0.049	0.095	-0.52	0.604
_cons	0.434	0.097	4.45	0.000

Source: STATA output

4.3. Fixed Effects (FE) and Random Effects (RE) Models

The FE model controls for all time-invariant characteristics within each bank, allowing for the assessment of the effects of variables that vary over time. This model is preferred when significant individual differences that do not change over time could bias the estimators.

Table 4.3: Fixed Effect & Random Effect Regression Results

Fixed-effects Regression						
F (4,113) = 4.46						
Prob > F = 0.002						
Variable	Coef.	Std. Err.	t	P > (t)	(95% Conf. Interval)	
TAR	1.558	0.527	2.96	0.004	0.514	2.603
LCR	-0.002	0.007	-0.23	0.815	-0.016	0.013
OIR	-0.077	0.021	-3.69	0.000	-0.118	-0.036
LDR	0.073	0.066	1.11	0.268	-0.057	0.203
_cons	0.338	0.067	5.06	0.000	0.206	0.470
Random-effects Regression						
Wald chi2 (4) = 17.93						
Prob > chi2 = 0.001						
Variable	Coef.	Std. Err.	z	P > (z)	(95% Conf. Interval)	
TAR	1.546	0.522	2.96	0.003	0.521	2.571
LCR	-0.001	0.007	-0.07	0.924	-0.014	0.013
OIR	-0.077	0.020	-3.73	0.000	-0.117	-0.036
LDR	0.064	0.064	1.00	0.320	-0.062	0.191
_cons	0.344	0.081	4.21	0.000	0.183	0.504

Source: STATA output

F-Test for FE Model

The F-test result ($F(12, 113) = 19.33$ with $\text{Prob} > F = 0.0000$) strongly rejects the null hypothesis that all $u_i = 0$, indicating significant entity-specific effects. This test confirms the presence of substantial within-entity variations that justify the use of the FE model.

Random Effects (RE) Model

The RE model considers both within- and between-entity variations, assuming that the individual effects are random and uncorrelated with the regressors. This model is generally more efficient than the FE model if the random effects assumption holds, as it uses more of the data by considering the average effect across entities.

Breusch-Pagan LM Test for RE Model

The LM test, providing a chi-square statistic of 197.682 with a p-value of 0.0000, suggests that the variance attributed to the entities is significantly different from zero, indicating potential suitability of the RE model for the data.

Hausman Test: Deciding Between FE and RE

The Hausman test is a critical tool in panel data analysis used to determine the appropriateness of Fixed Effects (FE) versus Random Effects (RE) models. In this test,

Null Hypothesis – H_0 : Random effect model is consistent

Alternative Hypothesis – H_a : Fixed effect model is consistent

It tests the null hypothesis that the difference in coefficients between the FE and RE models is not systematic, which means the unique errors (individual-specific effects) are not correlated with the regressors. P-value of 0.7619: A p-value greater than 0.05 (typically the threshold for significance) indicates that there is no significant evidence against the null hypothesis. This suggests that the coefficients estimated by the RE model are consistent and not significantly different from those calculated by the FE model.

4.4. Interpretation and Implications of Model

The high p-value supports the conclusion that the Random Effects model is suitable for the analysis. This model assumes that the individual-specific effects are uncorrelated with the regressors across all banks. Given the p-value of 0.7619, this assumption is upheld, making the RE model more efficient for the study.

$$SGR_{it} = 0.3440 + 1.5462 TAR_{it} + 0.0005 LCR_{it} + 0.0770 OIR_{it} + 0.0646 LDR_{it} + \varepsilon_{it}$$

This study extends prior research on the relationship between cash flow risk management practices and sustainable financial performance (SFP) by analysing listed commercial banks. Using the Random Effects (RE) model, it identifies specific cash flow ratios as determinants of SFP, contributing to the literature on banking sector sustainability. The findings highlight both corroborations and deviations from earlier studies.

The study confirms a positive and significant impact of TAR on SFP. This finding aligns with Dechow's (1994) emphasis on the importance of generating sustainable operating cash flows to ensure long-term financial stability. TAR's high coefficient underscores its pivotal role in fostering sustainable operations and financial endurance for banks.

A negative relationship between OIR and SFP (-0.0770) suggests that the inefficient conversion of cash flows to net income has an adverse impact on financial sustainability. This

observation is consistent with earlier research by DeFond and Hung (2003) and Barth et al. (2001), which found that poor operational efficiency and excessive reinvestment reduce profitability and increase financial risks, ultimately harming long-term performance.

The study identifies a negative, albeit small, effect of LCR on SFP. This aligns with Diamond and Rajan (2001), who proposed that high liquidity levels constrain investment opportunities and profitability. However, the result contrasts with Berger and Bouwman (2009), who argued that liquidity enhances risk mitigation and sustainability. The findings suggest a tradeoff between maintaining liquidity and achieving profitability for commercial banks.

LDR demonstrates a positive relationship with SFP, indicating that increased lending relative to deposits boosts financial performance. This finding aligns with studies by Ahmad et al. (2019) and Trujillo-Ponce (2013), which observed that efficient capital utilisation through lending enhances revenue generation and long-term sustainability in banks.

These results highlight the complex dynamics of cash flow risk management and its implications for achieving sustainable financial performance in the banking sector. The findings reveal that the effectiveness of cash flow risk management practices on sustainable financial performance varies significantly depending on the banking environment. In developed economies, studies such as Pasiouras and Kosmidou (2007) demonstrate that regulatory impacts partially mediate the relationship between liquidity, capital coefficients, and financial performance. However, in low- and middle-income countries, including Sri Lanka, research such as Perera and Weerasinghe (2016) highlights the importance of risk management and operational efficiency as critical determinants of long-term sustainability.

This study contributes to the literature on the Asian context by demonstrating the pivotal role of cash flow risk management practices in determining the financial sustainability of banks, particularly in emerging markets. The empirical findings align with previous research, confirming that effective cash flow risk management has a significant impact on sustainable financial performance in the banking sector.

5. Conclusion

This study examined the impact of managing cash flow risk on the sustainable financial performance of listed commercial banks in Sri Lanka, focusing on four cash flow ratios: operating cash flow to total assets (TAR), cash flow from operations to net income (OIR), liquidity coverage ratio (LCR), and loan-to-deposit ratio (LDR).

The findings emphasise the critical role of effective cash flow risk management in achieving financial sustainability, particularly in Sri Lanka's volatile economic environment. As key agents of financial intermediation, credit granting, and economic growth, banks must

prioritise sustainable financial performance to ensure overall financial system stability. Through an extensive review of the literature and econometric analysis using OLS, FE, and RE models, the study revealed that cash management activities have a significant influence on bank performance, with TAR emerging as a major contributor to sustainability. The research emphasises the importance of balanced management of funds and credit in achieving sustainable financial outcomes within the banking sector.

This research provides valuable insights into the relationship between cash flow risk management practices and sustainable financial performance (SFP) among Sri Lankan banks. A strong positive correlation between the operating cash flow to total assets ratio (TAR) and SFP highlights that higher operating cash flows relative to total assets enhance financial sustainability, consistent with prior empirical studies. The inverse relationship between cash flow from operations to net income ratio (OIR) and SFP suggests operational inefficiencies negatively affect financial sustainability, aligning with earlier research on operational challenges in banks. While the liquidity coverage ratio (LCR) has a slight negative impact on SFP, the findings affirm that excessive liquidity can constrain profitability, reflecting the well-documented tradeoff between liquidity and profitability. The loan-to-deposit ratio (LDR) has a positive influence on SFP, indicating that efficient lending practices relative to deposits enhance financial performance, which supports existing studies on the profitability of effective capital allocation in banks. Overall, the study reinforces the importance of sustainable cash flow risk management practices in shaping the financial performance of banks, contributing to the growing body of literature on this topic.

Reference

- Ahmad, N., Naveed, A., Ahmad, S., & Butt, I. (2019). Banking sector performance, profitability, and efficiency: A citation-based systematic literature review. *Journal of Economic Surveys*, 34(1), 185–218. <https://doi.org/10.1111/joes.12346>
- Aktas, C., Cortuk, O., Teker, S., & Yildirim, B. D. (2012). Measurement of Liquidity-Adjusted Market Risk by VaR and Expected Shortfall: Evidence from Turkish Banks. *Journal of Applied Finance & Banking*, 2(5), 1–8.
- Almeida, H., Campello, M., & Weisbach, M. S. (2004). The Cash Flow Sensitivity of Cash. *The Journal of Finance*, 59(4), 1777–1804. <https://doi.org/10.1111/j.1540-6261.2004.00679.x>
- Amini, S., Delgado, M. S., Henderson, D. J., & Parmeter, C. F. (2012). Fixed vs random: The Hausman test four decades later in *Essays in honour of Jerry Hausman* (pp. 479–513). Emerald Group Publishing Limited.

- Arojo, A., Cabug-os, L., Cumba, R., Sumicad, E., & Naparan, G. (2024). A Correlational Study on the Cash Flow Management Utilization and Financial Performance of Specialty Beverage Businesses. *International Journal of Research Publication and Reviews*, 5, 2382–2390.
- Astuti, P., & Gunarsih, T. (2021). Value-at-Risk Analysis in Risk Measurement and Formation of Optimal Portfolio in Banking Shares. *JBTI : Jurnal Bisnis : Teori Dan Implementasi*, 12. <https://doi.org/10.18196/jbti.v12i2.12263>
- Barth, M. E., Cram, D. P., & Nelson, K. K. (2001). Accruals and the prediction of future cash flows. *The accounting review*, 76(1), 27–58. <https://doi.org/10.2308/accr.2001.76.1.27>
- Berger, A. N., & Bouwman, C. H. (2009). Bank liquidity creation. *The Review of Financial Studies*, 22(9), 3779-3837. <https://doi.org/10.14293/S2199-1006.1.SOR-PPYPW68.v1>
- Blancher, N. R., Appendino, M., Bibolov, A., Fouejieu, A., Li, J., Ndoeye, A., Panagiotakopoulou, A., Shi, W., & Sydorenko, T. (2019). Financial Inclusion of Small and Medium-Sized Enterprises in the Middle East and Central Asia. Retrieved from <https://www.elibrary.imf.org/view/journals/087/2019/002/article-A001-en.xml>
- Bordeleau, É., & Graham, C. (2010). *The impact of liquidity on bank profitability* (No. 2010-38). Bank of Canada.
- Central Bank of Sri Lanka. (2018). Banking Sector. Retrieved from <https://www.cbsl.gov.lk/en/financial-system/financial-system-stability/banking-sector>
- Central Bank of Sri Lanka. (2020). Central Bank of Sri Lanka [Annual Report].
- Chernobai, A., Ozdagli, A., & Wang, J. (2021). Business complexity and risk management: Evidence from operational risk events in U.S. bank holding companies. *Journal of Monetary Economics*, 117, 418–440. <https://doi.org/10.1016/j.jmoneco.2020.02.004>
- Diamond, D. W., & Rajan, R. G. (2001). Liquidity risk, liquidity creation, and financial fragility: A theory of banking. *Journal of Political Economy*, 109(2), 287-327. <http://www.nber.org/papers/w7430>
- Dechow, P. M. (1994). Accounting Earnings and Cash Flows as Measures of Firm Performance: The Role of Accounting Accruals. *The Accounting Review*. [https://doi.org/10.1016/0165-4101\(94\)90016-7](https://doi.org/10.1016/0165-4101(94)90016-7)
- Dechow, P. M., & Dichev, I. D. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The accounting review*, 77(s-1), 35–59.

- DeFond, M. & M. Hung. (2003). An Empirical Analysis of Analysts' Cash Flow Forecasts. *Journal of Accounting and Economics*, 35, 73–100.
- Eyisi, A. S., & Okpe, I. I. (2014). The Impact of Cash Flow Ratio on Corporate Performance. *Research Journal of Finance and Accounting*, 5(6).
- Fernando, J., & Basnayake, D. (2022). Banks' risk management: An analysis of risk management practices of the Sri Lankan banking sector. In the *International Conference on Business and Information*.
- Freeman, R., & McVeagh, J. (2001). A Stakeholder Approach to Strategic Management. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.263511>
- Gemzik-Salwach, A. (2012). The Use of a Value-at-Risk Measure for Analysing Bank Interest Margins. *E-Finanse*, 8. Retrieved from <https://bibliotekanauki.pl/articles/599468.pdf>
- Gowthaman, J. (2022). The Impact of Banking Sector Stability on Economic Growth: Evidence from Sri Lanka for the Post-War Period. 4, 945–950. <https://doi.org/10.56726/IRJMETs32275>
- Gunawardene, N. (2017). Digital Transformation in Sri Lanka: Opportunities and Challenges in Pursuit of Liberal Policies. Friedrich Naumann Foundation (FNF) Sri Lanka. Retrieved from <https://www.rticommission.lk/web/images/pdf/DigitalTransformationinSriLankareport-FINAL-30Nov2017.pdf>
- Guliyev, T., & Muzaffarov, M. (2024). Deciphering Sustainable Growth: The Influence of Corporate Financial Metrics on SGR and Stock Returns. *WSB Journal of Business and Finance*, 58(1), 114–121.
- Habeeb, F., & Wcikramasinghe, C. (2019). Innovation and Development of Digital Finance: A Review on Digital Transformation in Banking & Financial Sector of Sri Lanka. Retrieved from <https://www.empyrealpublishinghouse.com/pdf/edited-book-of-dr-vijay-prakash-gupta.pdf#page=140>
- Ho, T., Abbott, M., & Abrahamson, A. (1999). Value at risk of a bank's balance sheet. *International Journal of Theoretical and Applied Finance*, 1. <https://doi.org/10.1142/S0219024999000042>
- Jayamaha, R. (2008). The Impact of IT in the Banking Sector. Retrieved from <https://www.bis.org/review/r080201d.pdf>
- Jensen, M. C. & Meckling, W. H. (1976). Theory of the Firm: Managerial Behaviour, Agency Costs, and Ownership Structure. *Journal of Financial Economics* 3, 305–60.

- Kedarya, T., Elalouf, A., & Cohen, R. S. (2023). Calculating Strategic Risk in Financial Institutions. *Global Journal of Flexible Systems Management*, 1–12. <https://doi.org/10.1007/s40171-023-00342-3>
- Kimani, J., & Kibera, M. (2023). Evolution of Risks Facing Commercial Banks in Kenya and Associated Strategic Responses. *International Journal of Modern Risk Management*, 1, 56–65. <https://doi.org/10.47604/ijmrm.2245>
- KPMG Sri Lanka. (2021). KPMG Sri Lanka Issue 7 June 2021 Banking Report. Retrieved from <https://assets.kpmg.com/content/dam/kpmg/lk/pdf/kpmg-sri-lanka-banking-report-june-2021.pdf>
- Lins, K. V., Servaes, H., & Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *the Journal of Finance*, 72(4), 1785-1824.
- Madushika, W. A. D., & Wijesinghe, B. A. C. H. (2022, October). Cash flows and firm performance: Evidence from Colombo Stock Exchange. In the *5th Annual Research Symposium in Management* (p. 221).
- Mashamba, T. (2021). Liquidity regulations and bank behaviour: an emerging markets perspective. *Journal of Governance and Regulation*, 10(4).
- Nandalal, P. (2021). Sri Lanka's macro-financial. Central Bank of Sri Lanka. Retrieved from https://unctad.org/system/files/official-document/BRI-Project_RP13_en.pdf
- Nasimiyu, A. (2024). Cash-flow Management Practices and Financial Performance of Small and Medium Business Enterprises in Kenya. *African Journal of Commercial Studies*, 4, 252–263. <https://doi.org/10.59413/ajocs/v4.i3.7>
- Oral, C., & CenkAkkaya, G. (2015). Cash Flow at Risk: A Tool for Financial Planning. *Procedia Economics and Finance*, 23, 262–266. [https://doi.org/10.1016/S2212-5671\(15\)00358-5](https://doi.org/10.1016/S2212-5671(15)00358-5)
- Perera, E. A. Y. D., & Weerasinghe, T. D. (2016). Gender Imbalance in Sri Lankan Labour Markets and Concerns of Human Resource Management. *academia.edu*
- Pasiouras, F., & Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance*, 21(2), 222–237. <https://doi.org/10.1016/j.ribaf.2006.03.007>
- Sheytanova, T. (2015). The accuracy of the Hausman Test in panel data: A Monte Carlo study.

- Shabir, M., Jiang, P., Wang, W., & Işık, Ö. (2023). COVID-19 pandemic impact on banking sector: A cross-country analysis. *Journal of Multinational Financial Management*, 67, 100784. <https://doi.org/10.1016/j.mulfin.2023.100784>
- Schipper, K., & Vincent, L. (2003). Earnings quality. *Accounting Horizons*, 17.
- Tashakkori, A., & Teddlie, C. (2010). *SAGE Handbook of Mixed Methods in Social Behavioural Research*. SAGE Publications, Inc. <https://doi.org/10.4135/9781506335193>
- Trujillo-Ponce, A. (2013). What determines the profitability of banks? Evidence from Spain. *Accounting & Finance*, 53(2), 561–586. <https://doi.org/10.1111/j.1467-629X.2011.00466.x>
- Vural, O. (2004). Cash Flow-At-Risk in Publicly Traded Non-Financial Firms in Turkey: An Application in Defence Companies, The Institute of Economics and Social Sciences, Master of Business Administration, Bilkent University, Turkey.
- Wickramasinghe, M. B., & Gunawardane, K. (2017). Cash Flow Risk Management Practices on Sustainable Financial Performance in Sri Lanka. *dr.lib.sjp.ac.lk* 6(8).
- Wijesinghe, J., & Pallearachchi, D. (2022). Banking Sector Development and Economic Growth in Sri Lanka: An Econometric Analysis. *South Asian Journal of Finance*, 2 (1). <https://doi.org/10.4038/sajf.v2i1.42>
- Wijesinghe, C., Hansson, H., & Colomboge, R. (2018). University-Industry Collaboration for ICT Innovation in Sri Lanka. *Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2018*, 407–412. <https://www.learntechlib.org/p/185008>.