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The Predictive Power of Cash Flow Ratios in Assessing Organisational Risk

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Abstract
It is germane that risks are quickly identified within an organisation, and if necessary, actions are taken to prevent such risks from causing irreversible damage. Over the years, there has been a huge focus on the balance sheet and income statements for financial analysis and less emphasis on the use of cash flow ratios, even though cash flow ratios are good financial distress predictors that could help safeguard the future existence of an organisation. This study investigates the role of cash flow ratios in evaluating and predicting organisational risk, using AS Tallinna Vesi as a case study. A quantitative approach was employed, drawing on five years of financial data (2015–2019). Six key ratios were calculated and analysed to assess liquidity, credit, and operational risks. The results reveal persistent weaknesses in debt coverage and cash flow adequacy, alongside declining efficiency ratios in recent years. These findings highlight the predictive value of cash flow ratios and underscore their importance for risk evaluation, strategic planning, and financial sustainability. The study recommends that AS Tallinna Vesi closely monitor its cash flow to maintain adequate liquidity for interest payments and exercise caution when taking new loans to avoid excessive debt.
Keywords: Cash flow ratios; organisational risk; liquidity management; credit risk; financial performance; Estonia

1. Introduction

The vulnerability of organisations to financial distress has been dramatically highlighted in recent years by events such as the global economic crisis and the COVID-19 pandemic. These shocks have shown that even firms reporting profits may collapse when they lack adequate liquidity (Zhang, Hu, & Ji, 2020; McLaren, 2017). A company can present strong income statements and balance sheets while simultaneously facing insolvency because cash inflows do not match accounting profits. This paradox underscores the importance of analysing cash flows as a central dimension of financial risk assessment.

Traditional financial analysis has relied heavily on ratios derived from balance sheets and income statements. While useful, such accrual-based measures have significant limitations, particularly because they are shaped by accounting conventions and may not reflect the actual movement of cash. For example, revenues may be recorded without corresponding inflows, and expenses may be deferred, creating an overly optimistic picture of liquidity. This reliance on accruals rather than cash has contributed to corporate failures in both developed and emerging economies.

Cash flow ratios, by contrast, provide a more realistic and forward-looking assessment of organisational resilience. Bhandari and Iyer (2013) argue that cash flow measures are not only important for evaluating risk but also for forecasting organisational failure. These ratios capture the ability of firms to meet obligations through actual cash generation, thus offering early warning signals that may not be visible in profit-based indicators. Kirkham (2012) similarly stresses that cash flow ratios provide a holistic perspective on liquidity and solvency, enabling more informed decision-making by managers, creditors, and investors.

Despite their potential, cash flow ratios remain underutilised. Güleç and Bektaş (2019) observe that while ratio analysis of balance sheets and income statements is widespread, analysis of cash flow statements is less common. Epstein and Jermakowicz (2007) further note that auditors often prefer balance sheet cycles, and Bodie, Kane, and Marcus (2004) highlight the continued dominance of conventional ratios such as the current ratio in financial education. This neglect leaves organisations vulnerable to risks that could otherwise have been detected through cash-based measures.

This study employs cash flow ratio analysis to assess risk in AS Tallinna Vesi, Estonia's principal water utility provider. It asks two key research questions:

- How do cash flow ratios reveal potential risks in an organisation?
- To what extent can cash flow ratios predict the evolution of organisational performance?

Case Study Context: AS Tallinna Vesi

AS Tallinna Vesi supplies water and wastewater services to more than 460,000 residents in Tallinn and surrounding municipalities. Operating under exclusive rights until 2025, the company is subject to strict regulatory standards concerning quality, sustainability, and efficiency. Its financial stability is critical for the functioning of essential services and the fulfilment of environmental obligations. The sector itself is highly capital-intensive, requiring ongoing investment in infrastructure, treatment facilities, and regulatory compliance. These characteristics make AS Tallinna Vesi a compelling case for examining the predictive power of cash flow ratios.

Contribution of the Study

This study makes some contributions in various ways. First, it demonstrates the diagnostic and predictive value of cash flow ratios in identifying financial risks within the regulated utility sector, which has remained underexplored in the existing literature. Second, by analysing five years of audited financial statements (2015–2019), the study provides longitudinal insights into the evolution of organisational risk, highlighting both resilience and emerging vulnerabilities. Third, it bridges the gap between theory and practice by translating ratio findings into actionable implications for risk management, liquidity planning, and strategic decision-making.

Finally, the study has wider policy relevance. Across the European Union and other developed economies, regulators are increasingly attentive to the financial resilience of utilities because liquidity pressures can directly affect service continuity, environmental compliance, and consumer protection. By highlighting how cash flow ratios serve as both diagnostic and predictive tools, the paper contributes not only to academic debates but also to governance and public policy discussions on sustainable infrastructure financing.

2. Literature Review

2.1 Conceptualising Organisational Risk

The concept of risk has been defined in multiple ways, often shaped by the context of its application. Some scholars view risk narrowly, as a purely negative phenomenon associated with uncertainty and loss, while others regard it more broadly as both a threat and an opportunity, depending on outcomes (Geyser, 1999). In organisational contexts, risk is generally understood as the uncertainty that may prevent an enterprise from achieving its objectives due to the influence of external and internal factors. Zhao and Zhao (2020) emphasise that risk in organisations is not confined to financial dimensions but extends to operational, strategic, and reputational aspects.

Adabenege, Simpa, Mohammed, and Mohammed (2015) underscore that the way an organisation identifies, evaluates, and responds to risk determines its long-term survival. Firms that fail to understand or address risks adequately are likely to struggle with sustainability, regardless of their profitability in the short term. This is particularly relevant in sectors where operations are capital-intensive, and failure to mitigate financial or operational risks can lead to systemic crises.

2.2 Categories of Financial Risks

Although businesses encounter diverse types of risks, three categories of financial risk are particularly pertinent when evaluating cash flow ratios: credit risk, liquidity risk, and operational risk.

Credit Risk

Credit risk refers to the possibility that a debtor will fail to meet their obligations, resulting in financial losses for the creditor (Jílek, 2000). It is one of the most common sources of insolvency worldwide. Arif and Anees (2012), studying the banking system, found that credit risk has a significant negative effect on profitability. Similarly, Kargi (2014) and Ekinci and Poyraz (2019) provide evidence that higher credit risk reduces the financial performance of banks. Beyond banks, concentrated exposure to a small number of clients amplifies credit risk, potentially jeopardising an organisation's survival (Spuchľáková, Valašková, & Adamko, 2015). For utility providers like AS Tallinna Vesi, delays in customer payments or defaults can significantly constrain cash inflows, threatening liquidity and solvency.

Liquidity Risk

Liquidity risk arises when an organisation is unable to meet its short-term obligations due to insufficient cash or liquid assets. Effiong and Enya (2020) define it as the risk of failing to fulfil obligations when they fall due. Cook, Fu, and Tang (2014) highlight mismatches between long-term assets and short-term liabilities as common drivers of liquidity crises. The importance of liquidity is emphasised by CPA (2010), which identifies poor liquidity management as a leading cause of corporate failure. For highly regulated, capital-intensive sectors such as utilities, liquidity risk is particularly problematic since large-scale infrastructure investments demand consistent cash outflows before revenues are realised.

Operational Risk

Operational risk differs from financial risk in that it arises from failures in internal processes, systems, or human performance. Santomero (1995) identifies fraud, technological breakdowns, and non-compliance with regulations as major sources of operational risk. While often less visible, operational risks can have significant financial consequences, especially when combined with liquidity or credit challenges. For example, in the utilities sector, poor maintenance or technical failures can lead to service disruptions, regulatory fines, and customer dissatisfaction, which then translate into financial strain.

2.3 Cash Flow Ratios as a Tool for Risk Evaluation

Traditional financial analysis often emphasises ratios derived from income statements and balance sheets, such as profitability ratios, leverage ratios, and current ratios. However, several scholars have argued that these measures provide only a partial view of organisational performance and solvency (Epstein & Jermakowicz, 2007; Bodie, Kane, & Marcus, 2004). In contrast, cash flow ratios focus directly on an organisation's ability to generate liquidity, making them a more reliable tool for risk evaluation.

Mills and Yamamura (1998) highlight that cash flow ratios are inherently more robust than accrual-based measures, since they are not subject to the distortions of accounting adjustments. Kirkham (2012) adds that cash flow ratios provide a holistic picture of financial health by capturing the relationship between cash inflows and obligations. This makes them especially valuable in industries with volatile or seasonal revenues. Furthermore, cash flow ratios are less prone to manipulation, as they are based on actual cash movements rather than accounting estimates or accruals.

Despite their advantages, the use of cash flow ratios in practice remains limited. Epstein and Jermakowicz (2007) note that auditors often prefer balance sheet approaches, while Bodie et al. (2004) report that educators and managers continue to rely heavily on conventional accrual-based ratios. This underutilisation highlights the need for empirical studies that demonstrate the value of cash flow ratios in practical settings, particularly in sectors beyond banking and finance.

2.4 Empirical Evidence on Predictive Power

Empirical research supports the argument that cash flow ratios provide early warning signals of financial distress. Bhandari and Iyer (2013) found that cash flow measures outperformed accrual-based ratios in forecasting corporate failure, arguing that these ratios provide more realistic assessments of a firm's solvency. Rizzo, Valentinuz, Obratil, and Pediroda (2020) developed bankruptcy prediction models that incorporated cash flow ratios, demonstrating that they significantly improved accuracy across European companies.

In Turkey, Güleç and Bektaş (2019) applied cash flow ratios in evaluating corporate solvency, finding them valuable for assessing financial risks, though still less widely used compared to traditional ratios. Kirkham (2012) similarly demonstrated their relevance in the Australian telecommunications sector, showing that cash-based indicators reveal liquidity challenges not apparent in current ratios or profit margins. Collectively, these findings underscore the predictive power of cash flow ratios across different contexts.

Nevertheless, there is no consensus on whether cash flow ratios should replace or complement accrual-based measures. Ittner and Larcker (2000) argue that non-financial indicators also matter for predicting long-term performance, suggesting that cash flow ratios should be part of a broader toolkit rather than a standalone solution. This debate underscores the importance of continued empirical studies.

2.5 Research Gap

Despite growing recognition of their value, cash flow ratios remain less popular than income statement or balance sheet ratios in both academic research and managerial practice (Bodie et al., 2004). Many firms continue to rely on accrual-based indicators, which may fail to reflect liquidity realities. Moreover, most existing studies focus on banks, financial institutions, or large corporations, leaving relatively few applications in the utilities sector.

Since 2021, a growing body of research has reinforced the importance of cash flow ratios as early warning indicators of financial vulnerability in varied contexts. For example, Pervan & Kuvek (2023) conducted a systematic review highlighting that cash flow–based indicators significantly enhance bankruptcy prediction models across industries. Similarly, Almaqtari et al. (2022) demonstrated that incorporating cash flow ratios improves predictive accuracy compared to purely accrual-based models. In the context of firm resilience to macroeconomic shocks, Li & Wang (2023) highlighted that stable operating cash flows are closely aligned with post-crisis recovery trajectories. These findings underscore that cash flow ratio analysis remains highly pertinent and perhaps even more so in the current period of heightened uncertainty.

Furthermore, utilities present an especially relevant context for testing the predictive value of cash flow ratios due to their capital intensity, regulated pricing, and essential service obligations. Yet, limited research has been conducted in this area, particularly in emerging or transitional economies. This study seeks to fill that gap by applying cash flow ratio analysis to AS Tallinna Vesi, thereby extending empirical evidence to a new sector and geographical context.

3. Methodology

This study adopts a quantitative case study design to evaluate the predictive power of cash flow ratios in assessing organisational risk. A case study approach was selected because it allows for an in-depth examination of a single firm's financial dynamics, providing detailed insights into how cash flow ratios reveal risk exposures over time.

The analysis is based on secondary data drawn from the audited Consolidated Annual and Sustainability Reports of AS Tallinna Vesi covering the five-year period from 2015 to 2019. These reports include the income statement, balance sheet, and cash flow statement, which together provide the information necessary to calculate cash flow ratios. The use of audited financial reports ensures the reliability, comparability, and credibility of the data.

3.1 Rationale for Cash Flow Ratios

Traditional ratio analysis often relies on accrual-based measures such as current ratios, profitability margins, and debt-equity ratios. While these are informative, they can mask underlying liquidity problems because revenues may be recognised without corresponding cash inflows. For this reason, this study applies cash flow–based ratios, which are more directly

linked to liquidity and solvency. The focus is on six ratios that have been identified in prior literature as most relevant for evaluating risk (Giacomino & Mielke, 1993; Bragg, 2011).

3.2 Categories of Ratios Applied

The six ratios used in this study are grouped into two categories: cash sufficiency ratios and cash efficiency ratios.

- Cash Sufficiency Ratios

  - Long-term Debt Payment Ratio: This ratio evaluates whether a company's operating cash flows are adequate to meet its long-term debt obligations as they come due. Unlike earnings-based measures, it focuses on actual cash generation rather than accounting profits. A higher ratio suggests that the firm produces enough operational cash to comfortably cover principal repayments on long-term loans, reducing default risk. For example, a ratio greater than 1 typically indicates strong repayment capacity, while a ratio below 1 could raise concerns about refinancing risk or over-leverage. This ratio is particularly relevant for industries with significant borrowing needs, such as utilities or real estate.

  - Debt Coverage Ratio: The debt coverage ratio measures whether operating cash flows can cover both interest and scheduled principal payments. It provides a comprehensive picture of debt-servicing ability and is often used by lenders to assess financial health. A high ratio signals resilience, showing that cash inflows are sufficient to absorb debt costs even during revenue fluctuations. Conversely, a low ratio suggests vulnerability to liquidity shortages if revenues decline. Investors and creditors often compare this ratio across periods to evaluate whether debt servicing capacity is strengthening or weakening.

  - Cash Flow Adequacy Ratio: This ratio examines whether operating cash flows are sufficient not only for debt repayment but also for funding capital expenditures (CapEx) and dividend distributions. It reflects a firm's ability to sustain operations, reward shareholders, and invest in future growth without depending heavily on external financing. A ratio consistently above 1 indicates that the company can internally fund its growth and obligations, which signals financial independence. A ratio below 1, however, may suggest that the firm relies excessively on debt or equity financing to support its activities. Analysts often consider this ratio a long-term sustainability measure.

- Cash Efficiency Ratios

  - Cash Flow to Sales Ratio: This ratio measures how effectively revenues are being converted into operating cash flows. Unlike net profit margins, it cuts through accounting adjustments to show the actual liquidity generated from sales. A higher ratio suggests efficient operations, strong cost control, and effective working capital management. A declining ratio may indicate issues such as rising operating costs, slower receivables collection, or

inefficient inventory management. Firms in cash-intensive industries, like retail or hospitality, pay close attention to this ratio to ensure that sales are truly translating into usable cash.

- Cash Flow Return on Assets (CFROA): CFROA highlights how effectively a company's asset base generates operating cash flows. It improves upon the traditional Return on Assets (ROA) by focusing on cash rather than accrual earnings, making it less susceptible to accounting manipulation. A higher CFROA indicates that assets are being used efficiently to produce strong operating liquidity. For example, a manufacturing company with modern, well-utilized equipment would likely display a stronger CFROA compared to one with idle or outdated assets. Investors often view CFROA as a measure of operational efficiency and management effectiveness in maximizing asset productivity.

- Operations Index (Cash-to-Income Ratio): The Operations Index, also called the Cash-to-Income Ratio, compares operating cash flows with accounting income before tax. This ratio signals the extent to which reported earnings are supported by actual cash generation. A value close to or above 1 indicates that profits are strongly backed by operating cash flows, suggesting high-quality earnings. In contrast, a ratio significantly below 1 may raise concerns that accounting income is not translating into cash, possibly due to aggressive revenue recognition, slow collections from customers, or high levels of non-cash accruals.

3.3 Computation

Each ratio was computed using standard formulae established in prior research. Operating cash flow, drawn directly from the cash flow statement, was the central variable across all six ratios. Other required variables, such as sales revenue, total assets, net income, and debt repayments, were extracted from the income statement and balance sheet.

For example:

- Long-term Debt Payment Ratio = Operating Cash Flow ÷ Long-Term Debt Repayments.

- Cash Flow to Sales Ratio = Operating Cash Flow ÷ Net Sales.

- Operations Index = Operating Cash Flow ÷ Net Income (before tax).

Ratios were calculated for each year between 2015 and 2019, producing a five-year dataset that enabled trend analysis.

3.4 Analytical Approach

The study employs longitudinal analysis to examine changes in cash flow ratios across the five-year period. By tracking annual fluctuations, it becomes possible to identify whether financial

risks are improving, deteriorating, or remaining stable. This approach allows ratios to function as **e**arly warning indicators, highlighting vulnerabilities before they escalate into crises.

Benchmarks from accounting literature were used to interpret the results. For sufficiency ratios, values above 1 generally indicate adequate capacity to meet obligations, while values below 1 suggest vulnerability. Efficiency ratios were interpreted based on trends, with rising values seen as indicators of improving operational health, and declining values suggesting weakening efficiency.

3.5 Validity and Reliability

The study ensured validity and reliability through several measures:

- Reliance on audited financial statements, reducing risks of misreporting.
- Application of widely accepted ratio formulae from prior studies (Mills & Yamamura, 1998; Kirkham, 2012).
- Consistency of computations across years, ensuring comparability of results.

3.6 Limitations of Methodology

While ratio analysis is valuable, it is not without limitations. It is inherently historical, providing insights based on past performance rather than future projections. It also excludes qualitative factors such as regulatory changes, market conditions, or governance practices that may influence risk. Finally, the absence of widely accepted industry benchmarks for cash flow ratios limits cross-firm comparability.

Nevertheless, within these boundaries, cash flow ratio analysis remains a robust method for uncovering the trajectory of organisational financial health and exposing risks that may not be evident through accrual-based measures alone.

4. Data Analysis and Results

The financial performance of AS Tallinna Vesi was examined using six key cash flow ratios across the five-year period 2015–2019. The analysis is presented in two parts: cash sufficiency ratios, which focus on the adequacy of cash to meet financial obligations, and cash efficiency ratios, which highlight how effectively the firm converts resources into cash.

4.1 Cash Sufficiency Ratios

Long-Term Debt Payment Ratio

The long-term debt payment ratio began at 3.25 in 2015 and declined steadily to 2.78 in 2019. Ratios above 1 indicate that the firm had enough operating cash flow to cover its long-term debt obligations. However, the downward trajectory signals a gradual weakening in repayment capacity.

The fall in the ratio suggests that while the company remained solvent during the study period, its resilience to potential shocks was decreasing. Refinancing decisions in 2017 and 2019

lowered interest margins, providing temporary relief, yet the sustained decline in this ratio points to the need for careful monitoring. If the trend persists, the firm could face repayment difficulties in the longer term.

Debt Coverage Ratio

The debt coverage ratio exhibited significant volatility. It was 0.20 in 2015 and 0.18 in 2016, rose sharply to 0.73 in 2017, but then dropped again to 0.25 in 2018 and 0.29 in 2019.

Since all values remained below 1, this indicates that AS Tallinna Vesi consistently lacked sufficient operating income to cover debt service obligations. The temporary improvement in 2017 was linked to one-off effects, including provisions related to a third-party indemnity claim. However, the persistence of values below 1 underscores that debt servicing remained a structural weakness.

This ratio highlights ongoing liquidity pressure: unless corrected, the company may need to rely on external financing or refinancing to sustain operations, which could further increase long-term risk.

Cash Flow Adequacy Ratio

The cash flow adequacy ratio was persistently weak. It stood at 0.121 in 2015, dropped slightly to 0.110 in 2019, and only rose modestly in 2018 (0.180).

Values significantly below 1 indicate that operating cash flows were not sufficient to meet obligations such as dividend payments, capital expenditure, and debt repayments. This suggests that the company relied on external sources, such as debt financing or retained earnings, to cover these needs.

Heavy investments in fixed assets and rising costs of goods sold contributed to this weakness. For a capital-intensive utility such as AS Tallinna Vesi, the inability to generate adequate cash internally raises concerns about the long-term sustainability of its investment strategy.

4.2 Cash Efficiency Ratios

Cash Flow to Sales Ratio

The cash flow to sales ratio remained relatively stable but consistently below ideal levels. It was 0.556 in 2015, falling slightly to 0.536 in 2019, averaging just above 0.55 across the period.

This indicates that less than 60% of sales revenue was converted into operating cash flows. While revenues appeared steady, the efficiency of turning those revenues into cash was limited. The weak conversion efficiency points to potential issues in receivables management, customer payment cycles, or billing practices.

For utilities, where customer bases are large and billing processes complex, inefficiencies in collections can significantly constrain cash availability. This ratio highlights an important area requiring managerial attention.

Cash Flow Return on Assets (CFROA)

The CFROA ratio improved initially but declined sharply in later years. It rose from 0.10 in 2015 to a peak of 0.245 in 2017, before falling back to 0.089 in 2019.

This trend indicates that the company became less efficient at generating cash from its assets over time. While earlier years demonstrated reasonable utilisation of infrastructure and resources, the later years suggest underutilisation. Factors contributing to this decline may include ageing infrastructure, rising maintenance costs, and water leakage issues.

A declining CFROA is particularly worth paying attention to in capital-intensive sectors because it signals diminishing returns from heavy asset bases. Without corrective measures, this could impair both profitability and cash flow sustainability.

Operations Index (Cash-to-Income Ratio)

The operations index also fluctuated sharply. It began at 1.3 in 2015, peaked at 3.4 in 2017, but then dropped to 1.1 in 2019.

Values above 1 generally indicate healthy operations, where reported profits are supported by actual cash inflows. However, the sharp decline after 2017 reveals weakening efficiency in converting accounting profits into liquidity. This suggests that while the company may continue to report positive earnings, its cash position could lag, exposing it to liquidity risk.

4.3 Overall Interpretation of Results

The results present a mixed financial risk profile for AS Tallinna Vesi. On the positive side, the company maintained solvency in terms of long-term obligations, and operational indicators such as the operations index remained above 1 for most of the period. However, several red flags are evident:

- Persistent liquidity pressures, visible in the debt coverage and cash flow adequacy ratios.
- Weak credit control, indicated by the cash flow to sales ratio.
- Declining efficiency, reflected in the downward CFROA and operations index from 2018 to 2019.

Together, these findings suggest that while the company has historically been resilient, its financial health deteriorated in the later years of the study. Without intervention, these weaknesses could threaten its long-term sustainability.

5. Discussion

The findings of this study highlight the predictive value of cash flow ratios in assessing organisational risk and provide important insights into the financial health of AS Tallinna Vesi. By applying sufficiency and efficiency ratios to five years of audited financial statements, the analysis uncovered both strengths and vulnerabilities in the company's operations. This discussion situates those findings within the broader literature on financial risk, liquidity management, and the predictive role of cash flow analysis.

5.1 Liquidity Risk

One of the most prominent themes emerging from the findings is the persistence of liquidity risk. The debt coverage ratio was consistently below 1, meaning that the company's operating income was insufficient to cover debt obligations. Similarly, the cash flow adequacy ratio remained far below the threshold of 1 throughout the period, revealing that operating cash flows were not sufficient to meet the combined obligations of dividends, asset replacement, and debt servicing.

These weaknesses confirm the argument of Cook, Fu, and Tang (2014) that mismatches between liabilities and inflows are central triggers of financial crises. Despite stable revenues, the inability to convert sufficient inflows into usable cash highlights a structural liquidity challenge. The case of AS Tallinna Vesi shows that even regulated utilities, which operate in relatively predictable environments, can face severe liquidity risks if capital investments and obligations outpace operating cash generation.

Liquidity pressures also resonate with CPA (2010), which identifies insufficient liquidity as a major cause of corporate failure. For Tallinna Vesi, the combination of heavy infrastructure spending and stagnant cash inflows could create solvency concerns in the medium term if not addressed.

5.2 Credit Risk

The analysis also revealed significant credit risk, evidenced by the low cash flow to sales ratio. With less than 60% of revenue being converted into cash during the study period, the company faced delays and inefficiencies in receivables collection. This situation suggests weak credit management practices or systemic delays in customer payments.

The findings align with the studies of Kargi (2014) and Ekinci & Poyraz (2019), which show that poor credit control undermines financial performance by restricting cash availability and increasing reliance on external financing. For AS Tallinna Vesi, a utility with a wide customer base, improving collection processes and customer relationship management is crucial. Delayed collections not only limit liquidity but also amplify the effects of other risks, such as debt servicing pressure.

5.3 Operational Risk

The operational risk dimension is reflected in the efficiency ratios, particularly the declining CFROA and operations index after 2017. These trends suggest underutilisation of assets, ageing infrastructure, and growing maintenance costs. Declining operational efficiency can weaken resilience over time, as it erodes the capacity of the organisation to generate cash from its core activities.

Santomero (1995) highlights that operational inefficiencies, though often less visible than liquidity or credit issues, can undermine long-term sustainability. In Tallinna Vesi's case, operational inefficiencies are particularly concerning given the capital-intensive nature of the water utility sector. Underperforming assets not only reduce returns but also increase the financial burden of maintenance, replacement, and regulatory compliance.

5.4 Predictive Power of Cash Flow Ratios

Perhaps the most significant contribution of this study is the demonstration of the predictive power of cash flow ratios. The downward trends in key ratios, particularly the debt coverage ratio, adequacy ratio, CFROA, and operations index, provided early warning signals of deteriorating resilience as early as 2017–2018.

This supports Bhandari and Iyer's (2013) argument that cash flow ratios are more reliable predictors of financial failure than accrual-based measures. Similarly, Rizzo et al. (2020) show that cash flow ratios enhance bankruptcy prediction models across European firms. The Tallinna Vesi case provides further empirical support, showing how these ratios highlight risks before they escalate into crises.

Moreover, the findings illustrate that cash flow ratios complement, rather than replace, traditional measures. While income statements and balance sheets may present a picture of profitability and solvency, cash flow ratios uncover hidden vulnerabilities in liquidity and efficiency. This echoes Ittner and Larcker's (2000) conclusion that effective risk evaluation requires multiple perspectives, including non-financial and cash-based measures. These insights are particularly timely in light of the heightened volatility that firms have experienced in the aftermath of the COVID-19 pandemic and during recent energy and water sector disruptions across Europe. For regulators, investors, and managers alike, the results illustrate how cash flow analysis can strengthen resilience planning in industries where external shocks are increasingly frequent and potentially destabilising.

5.5 Sectoral Context and Implications

Another important dimension is the regulated utility context. Most prior studies of cash flow ratios have focused on banks, manufacturing firms, or large corporations. By contrast, AS Tallinna Vesi operates within a highly regulated environment, under exclusive rights until 2025. This context limits managerial flexibility in pricing and capital investment decisions, yet still demands financial sustainability.

The findings suggest that even in regulated environments, cash flow ratios are vital diagnostic tools. Utilities face unique challenges such as ageing infrastructure, large capital requirements, and regulated tariffs, all of which increase the importance of maintaining robust cash flow positions. The study underscores that ratio analysis must be interpreted in light of such industry-specific dynamics.

5.6 Synthesis of Key Insights

As a whole, the results and comparative insights suggest three key contributions:

Liquidity management is central to organisational survival, and cash flow ratios provide clear measures of liquidity strength or weakness.

Credit risk, as revealed by cash-to-sales inefficiencies, must be actively managed to avoid compounding liquidity challenges.

Operational efficiency, indicated by CFROA and operations index, is critical for sustaining cash generation, especially in capital-intensive industries.

Overall, the discussion demonstrates that cash flow ratios are not only diagnostic tools but also predictive indicators. Their longitudinal application allows managers, regulators, and investors to track the evolution of financial resilience, making them indispensable for risk evaluation and strategic decision-making.

6. Limitations

This study has certain limitations that should be acknowledged. First, the analysis is based exclusively on historical financial statements from 2015 to 2019, which predate the COVID-19 pandemic and subsequent global macroeconomic disruptions. Although this limits direct comparison with more recent developments, the discussion draws on contemporary pre-2023 research (e.g., Pervan & Kuvek, 2023; Li & Wang, 2023) to show that the patterns observed remain relevant within current financial risk debates.

Second, the study relies on cash flow ratios without widely accepted industry-specific benchmarks. Results were therefore interpreted against theoretical thresholds (for example, values above or below 1) rather than cross-industry comparisons. This limits the generalisability of findings across utilities in different countries or regulatory contexts.

Finally, the focus on a single case study restricts broader applicability. While the in-depth approach provides rich insights into the financial dynamics of AS Tallinna Vesi, extending this research to a larger set of utilities or other regulated industries would strengthen the robustness of conclusions.

Despite these limitations, the findings provide valuable insights into the predictive power of cash flow ratios, offering a strong basis for both academic debate and practical application.

7. Conclusion

This study was conducted to determine how cash flow ratios can expose the different risks that threaten an enterprise several years before the company ceases to operate. The second objective was to examine whether cash flow ratios are capable of signaling the evolution of an organisation’s financial health over time.

By analysing the financial statements of AS Tallinna Vesi, an Estonian water utility company, over the five-year period 2015–2019, the study applied six major cash flow ratios divided into sufficiency and efficiency categories. The results demonstrated that cash flow ratios can indeed serve as a powerful tool for identifying liquidity, credit, and operational risks, as well as for evaluating the overall trajectory of organisational resilience.

The findings revealed several persistent vulnerabilities. First, the company was at significant liquidity risk, as demonstrated by the sufficiency ratios: the long-term debt payment ratio, the debt coverage ratio, and the cash flow adequacy ratio. The long-term debt payment ratio showed a downward trend, suggesting that if the pattern continues, AS Tallinna Vesi may face challenges in meeting financial commitments, including interest and principal repayments. The persistently low debt coverage ratio indicated that the firm was not generating enough operating income to comfortably meet its debt obligations. Similarly, the cash flow adequacy ratio revealed that Tallinna Vesi lacked the operating cash needed to simultaneously pay dividends, acquire new assets, and service its debts.

Second, the company also exhibited signs of credit risk, highlighted by the efficiency ratio of cash flow to sales. This ratio indicated that AS Tallinna Vesi faced challenges in collecting payments from customers, with less than 60% of sales being converted into actual cash inflows. Delays in receivables weaken liquidity positions and increase reliance on external financing, making the organisation more vulnerable to shifts in the financial environment.

Third, the analysis uncovered operational risks, shown in the declining cash flow return on assets (CFROA) and operations index in the latter part of the study period. While the company achieved improvements in efficiency in earlier years, the last two years showed significant declines, suggesting underutilisation of assets, rising maintenance costs, and weakening ability to convert accounting profits into cash.Altogether, these findings confirm that cash flow ratios not only reflect the present financial situation of a company but also predict its trajectory into the future. They provide early warning signals that allow managers, stakeholders, and regulators to anticipate risks and take corrective measures.

From a theoretical perspective, the study contributes evidence supporting the view of Bhandari and Iyer (2013), Kirkham (2012), and Rizzo et al. (2020), who argue that cash flow ratios provide superior predictive insights compared to accrual-based measures. From a practical standpoint, the results show how managers in regulated, capital-intensive industries can use cash flow ratios to enhance governance, improve liquidity planning, and safeguard long-term financial stability.

In conclusion, this case study demonstrates that while traditional financial ratios remain useful, they are insufficient on their own. Cash flow ratios provide a more realistic and predictive measure of risk, particularly in industries where cash management is critical. By embedding cash flow ratio analysis into regular financial monitoring, organisations can shift from a reactive posture to a proactive, preventive approach to risk management.

8. Recommendations

Based on the findings of the study, the following recommendations are highlighted as measures to take for AS Tallinna Vesi and other regulated utilities to strengthen their financial resilience.

1. Strengthen liquidity management

The low and declining sufficiency ratios make clear that liquidity remains a central challenge. Rather than relying only on year-end or quarterly reporting, management should adopt rolling cash flow forecasts, updated weekly. This would allow potential mismatches between inflows and obligations to be detected early, giving the firm time to respond by rescheduling payments or adjusting expenditure priorities. Over time, such discipline embeds a proactive culture where cash flow is continuously monitored instead of being treated as a retrospective accounting figure.

2. Optimise debt structure

The persistently weak debt coverage ratio indicates that Tallinna Vesi struggles to comfortably service its debt. One response is to renegotiate existing loans, securing lower interest rates or longer repayment periods. Where refinancing is possible, management should consider replacing high-cost debt with instruments that provide more breathing room. Importantly, new borrowings should be approached cautiously: while loans can finance expansion, they should not be allowed to exacerbate existing vulnerabilities.

3. Improve receivables management

The cash-to-sales ratio showed that less than 60% of revenues were converted into cash. This points to inefficiencies in collections. Here, relatively simple measures can make a difference: streamlining invoicing systems, introducing digital reminders, offering small discounts for early payments, and enforcing penalties for chronic delays. Stronger credit checks before extending terms to customers can also help reduce bad debts. In an industry where services are essential and consumption is predictable, there is room for much tighter receivables control.

4. Enhance asset utilisation

The downward trend in CFROA revealed that assets were not being used effectively. Management should consider conducting a comprehensive asset audit to identify equipment or facilities that are underutilised. Some assets may be better sold, leased, or repurposed to release trapped value. At the same time, investing in preventive maintenance can extend the lifespan of critical infrastructure, reducing long-term replacement costs and sustaining efficiency.

5. Embed operational efficiency

The declining operations index suggests that cash flows are increasingly disconnected from reported profits. This calls for a renewed focus on process efficiency. For example, adopting new digital monitoring systems, building stronger supplier partnerships, or investing in automation could reduce operating costs and improve reliability. For a utility like Tallinna Vesi, operational efficiency not only improves financial performance but also strengthens public trust in service delivery.

6. Build a culture of proactive risk management

Cash flow ratio analysis should not be treated as a one-off academic exercise, but rather as part of the everyday language of financial management. Boards should expect regular ratio reports, managers should use them to inform strategy, and regulators should encourage their inclusion in performance reviews. This cultural shift will help firms move from reacting to crises after they emerge to preventing them before they materialise. At the same time, boards of directors should integrate cash flow ratio monitoring into broader governance frameworks, linking it with Environmental, Social, and Governance (ESG) and sustainability reporting requirements. By embedding these indicators into annual disclosures, firms can provide transparency for stakeholders while also institutionalising a forward-looking culture of financial resilience.

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Declarations

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