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The Effect of Financial Ratios on Stock Price Forecasting of the Banking Sector: A Comparative Study between India and Lithuania.	***"Finansinių rodiklių įtaka bankų sektoriaus akcijų kainų prognozavimui: lyginamoji studija tarp Indijos ir Lietuvos."***

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Table of Contents

List of Tables

List of Figures

Abstract

This study investigated the impact of financial performance indicators on the stock prices of commercial banks in India and Lithuania during the period 2020–2024. A panel dataset comprising 10 listed banks from each country was constructed, and the analysis employed Multiple Linear Regression (MLR), Fixed Effects (FE), Random Effects (RE), and the Pooled Mean Group (PMG) estimation techniques to evaluate both short-run and long-run relationships. Key financial ratios—including Return on Assets (ROA), Earnings Per Share (EPS), Debt-to-Equity Ratio (DER), Price-to-Earnings (P/E), Return on Investment (ROI), and the Current Ratio—were used as independent variables. The results revealed that EPS and ROA were the most consistent and statistically significant predictors of stock prices in both countries, thereby supporting the hypotheses related to profitability and efficiency. In contrast, leverage and liquidity indicators exhibited mixed or statistically insignificant effects, especially in the Lithuanian market, which was characterized by a smaller market size and a prevalence of foreign-owned banks. The findings underscored the importance of considering structural and institutional differences when applying financial ratios to predict stock market performance. The study provided valuable insights for investors, bank managers, and policymakers seeking to understand and forecast stock price behavior in different banking environments.

Keywords: Stock Price Forecasting, Financial Ratios, Indian Banking Sector, Lithuanian Banking Sector, Pooled Mean Group Estimation (PMG).

INTRODUCTION

Relevance of the Topic: The financial ratios and the stock prices in the banking sector have become significant issues regarding the determination of financial stability, investment opportunities, and economic growth in either the emerging and developed economies (Alam et al., 2021). Banks constitute an essential component of any particular economy since they dictate how liquidity is created, how capital is distributed, and how money is transmitted, the stock valuation is the indicator of how effectively the institutions fulfill their functions, not mentioning the overall attitude of the investors to the macroeconomic environment (Yuan et al., 2022). The analysis of the influence of financial ratios on stock prices provides useful data in India as well as in Lithuania, where the banking environment is also much different in terms of regulation, as the ability of both domestic and external factors to foster investor confidence and market efficiency (Kaur et al., 2021). As an example, the central position of banks in the Indian economic system is evidenced by the fact that total bank assets took up about 72.4% of GDP in 2021 (The Global Economy, 2023a). India In 2025, the profitability of the Indian public sector banks reached an all time 78 lakh crore, which shows the role of the sector in investor confidence and capital market performance (Times of India, 2025). Moreover, financial institutions are almost 37 percent of the Nifty 50 index, which implies that they have a significant impact on stock market share price (Reuters, 2025).

Comparatively, the banking industry of Lithuania is smaller in volume but has a bank-asset-to-GDP ratio of approximately 41.5% of the financial structure, which is leaner but with a well-performing profitability (The Global Economy, 2023b). The Bank of Lithuania (2024) reports that the sector recorded a return on equity of 23.5% in Q4 2023, which is a major improvement in terms of year-on-year changes, which symbolize effective management efficiency, and the performance in the market is impressive. These distinctions can help emphasize that the financial ratio and stock price analysis can yield valuable insights in each case since India is an emerging economy with a growing financial depth, whereas in Lithuania, where the financial system is highly developmental, the level of profitability can be high when the operations are conducted on a smaller scale (Kaur et al., 2021; Yuan et al., 2022).

Predicting financial ratios and stock prices in banking sector will not only be useful for the investors but also for the policy makers. However, the differences in the financial market of an emerging economy such as India and a developed economy such as Lithuania account for differences in stock prices' sensitivity to various financial variables. Thus, it makes forecasting a complex task.

This study intends to assess the impact of financial ratios on stock price prediction of India and Lithuania banks.

Objectives

- To assess the impact of profitability liquidity and leverage ratios on stock price of companies.
- To examine how accurate Indian and Lithuanian banks are in forecasting their financial ratios.
- To analyze how technology affects stock price prediction in both nations.

This means that the banking system of the two countries could become digitized and competitive, and the stock price prediction accuracy must be an essential goal of investors, policymakers, and financial analysts (Ansari and Kumar, 2022).

Method of the Study

Examining the Indian and Lithuanian markets can help in studying how financial ratios influence stock price prediction. The two nations offer a good comparison because they have unrestricted capital markets but differ in levels of financial development. The two, however, are becoming more similar. Return on assets (ROA) and return on equity (ROE) are two profitability indicators in India which has run significantly linked with stock performances. The investor is worried about the inefficiency of these entities and their capability to generate income (Yuan et al., 2022).

The research employs a quantitative analysis of secondary data which studies movement in stock prices and evaluation of ratios. It is done by referring to information available in the public domain. To analyze relationships and predict stock price, several statistical tools such as MLR, ARIMA will be applied the study.

1. Theoretical Framework on Impact of Financial Ratios on Stock Price Forecasting of Banking Sector: A Comparative Study between India and Lithuania

1.1 Considering the Impact of Financial Ratios

Conclusions of the main findings, implications, and recommendations to be used in further studies. Abdi et al. (2022) examined the effects of sustainability (ESG) disclosures on the value of the firm and its financial performance in the airline sector. The authors conducted regression models which established a positive relationship between ESG disclosures and firm performance which implies that companies that actively report about their sustainability initiatives will perform better in the financial market. It was also indicated in the study that the size of firms and their age mediated this relationship, whereby bigger and older firms were more affected by ESG disclosures. One of the strengths of this research is that the issue is highly relevant to the current trend of sustainability reporting. The weakness, however, is that it is limited to the sector, which might not be generalizable to other sectors. The study also did not cover the possibility of the influence of the wider macroeconomic or industry-specific issue, i.e., the fuel price or the change in regulations, on the performance of firms, which might restrain the external validity of the study. The article by Alarussi and Gao (2021) explored the determinants of profitability In Chinese companies and the impact of financial ratios, including ROA and ROE. Analysis of their panel data revealed that these ratios affected profitability significantly with ROA being the stronger predictor. Its strength is the big number of data used in the study and the strict statistical analysis, which increases the validity of its results. Nonetheless, one of the greatest limitations is the limited scope as it fails to focus on externalities such as government policies, trade relations or economic fluctuations that could have contributed to profitability in Chinese firms. The authors also failed to examine the possible differences in their sectors, which might apply, as Chinese industries are very diverse. Nevertheless, in spite of these weaknesses, the research offers valuable information on the topic of profitability analysis in the emerging markets. Arianpoor and Sahoor (2022) investigated the effect of business strategy and readability of annual report on the quality of financial reporting. They utilized cross-sectional study design whereby they employed statistical techniques in an endeavor to establish the relationship of the perceived quality of financial reporting and the clarity of annual reporting. The researchers formed that the quality of financial reporting improved in terms of clarity of the reports and the easiness of reading them, which, in turn, led to the rise of investor confidence. The strong point of this study is that this is a new study, which attempts to relate the readability of the reports to the financial performance. However, it is restricted by the fact that it relies on a single-data sample and also it may not be applicable to

other markets or industries. The other factor that the authors have not considered is the influence of other non-financial factors such as corporate governance or market conditions on the quality of reporting.

The outcomes of the supply chain collaboration were studied by Baah et al. (2022) In terms of the supply chain visibility, trust among the stakeholders, and financial performance. The authors have carried out the analysis of the impact of the collaborative efforts on the financial and non-financial results through the use of the partial least square (PLS) analysis. The researchers found out that the enhanced cooperation led to the improved financial performance since the enhanced visibility and trust amongst the stakeholder's reduced inefficiency. It is one of the strengths of this study because supply chain collaboration is increasingly taking a central role in financial performance in the globalized segments of the market. Nevertheless, the weakness lies in the fact that the study does not discuss the particular financial ratios that may be affected by these aspects, and it is hard to directly correlate collaboration and financial performance indicators such as profitability or liquidity. The study by El Chaarani et al. (2021) focused on the effect of strategic competitive innovation on the financial performance of SMEs in the face of the COVID-19 pandemic. The authors applied a mixed method to determine the role of innovation strategies in financial performance in a time of crisis. The results showed that SMEs that embraced innovative strategies were in a better position to sustain their financial position. An advantage of the research is that it was timely and centered on the way companies overcame the financial difficulties during the pandemic. Nevertheless, the limitation of the study is the absence of the factors of financial ratio (leverage or liquidity) to mediate the connection between innovation and financial performance. Another aspect that the authors failed to consider was differences in industry-specific challenges that SMEs work with.

It Is through the COVID-19 effect that El-Chaarani et al. (2022) compared the financial performance and structure between the Islamic and conventional banks of the GCC countries. The authors regressed on the influence of financial ratios such as the debt-to-equity ratio and ROE on financial performance. The research discovered that the financial effects of the pandemic affected Islamic banks as compared to conventional banks. The comparative nature of the study is one of its strengths because it enriches the current knowledge regarding the reaction of various banking systems to economic shocks. Nevertheless, one of the weaknesses is that the study is limited only to the GCC countries and it may not be applicable to other regions that have other banking systems and economic conditions. Hunjra et al. (2022) investigated the importance of the financial development in promoting the sustainable economic development in countries with

low and middle income. In determining the effect of financial development on the economic sustainability, the authors employed a panel data approach to the analysis of the topic. The results showed that the financial development, in terms of financial ratios including credit-GDP ratio, impacted positively on sustainable growth. One of the strengths of this study is that the authors have concentrated on developing economies where financial development plays a very important role in ensuring sustainable economic growth. Nevertheless, the research lacks the comprehensive study of the effect of particular financial ratios on firm or industry sustainability. Also, the authors failed to address the ways in which external economic variables, e.g. global trade policies, or commodity prices could influence the financial development of these nations.

Imansyah and Mustafa (2021) investigated how financial ratios influence the price of stocks in the Indonesia consumer goods industry. The authors incorporated a time series regression model to evaluate the correlation between liquidity ratios and price variations in stock. Their results indicated that liquidity ratios and more so the current ratio exerted a strong influence on the stock price performance. This study has a strength in the fact that it uses strict statistical analysis and is covering a crucial industry in a developing market. The limitation of the study is however in the fact that the research is limited to the consumer goods industry, which might not represent the general market trends or the results of other financial ratios, including profitability or leverage, on the stock prices. It should have been a more diversified sectoral approach in order to have a bigger picture. Kasasbeh (2021) found the influence of the choice of financing, especially debt ratios, on accounting-related performance of Jordanian firms. The research used regression analysis to discover that high debt ratios had negative influence on profitability, hence excessive leverage may have a negative effect on financial performance. One of the strengths of this paper is that it is well-focused on the importance of financing decisions in the corporate performance, and its methodological basis is solid. Nevertheless, one of the limitations is that only one market, Jordan is considered and this might be not relevant to the overall implication of financing choices in other markets. Also, the study has not considered the interaction of financing decisions with other variables, including, but not limited to, market volatility or interest rates, which might give a more detailed insight of the effect of financing on profitability.

Lahiani et al. (2021) investigated the connection between the financial development and the consumption of renewable energy in the USA in terms of how financial ratios influenced the shift towards the carbon neutrality. Through the regression analysis, the study concluded that the financial development which was represented by the credit and investment ratios had a positive effect on the renewable energy consumption. This study has one strength that it is timely as the

world is making attempts to be sustainable and carbon neutral. Nevertheless, one of the weaknesses is a rather limited scope of work concerning the USA that might not be the most comprehensive picture of financial development and its influence on renewable energy. The authors failed to address the contribution of financial markets or policies in the world to the dynamics of the financial development and the consumption of renewable energy. Avi (2023) evaluated the topicality of financial ratios in corporate financial analysis and noted the pitfalls and bad practices associated with the application of these ratios. The paper noted the relevance of a proper interpretation of ratios, including the P/E ratio, ROE, and debt-to-equity ratio in gauging the well-being of the corporations. The main strength of the work is that it critically analyzes pitfalls of using financial ratios, which are useful to practitioners. Nevertheless, one of the weaknesses is that it does not provide empirical analysis to prove the theoretical arguments. It would have been a more effective study, provided that it used case studies or practical examples of how these errors can be observed in financial analysis in practice.

Mishra and R.L (2021) used decision tree algorithms to assess the performance of Indian manufacturing companies in terms of finances. They used financial ratios like ROA and ROE to measure the performance of firms, and interestingly, their results showed that decision tree models were certain to forecast financial health of the firm using financial ratios. The study has a strength in its use of machine learning algorithms to evaluate financial performance, which is a contemporary and innovative way of analyzing financial performance. The main limitation however is that the study is conducted in only one industry, which would not be applicable in other industries. Moreover, the authors failed to contrast their decision tree model with the conventional financial analysis techniques which would have provided more insight into their evaluation of the effectiveness of the algorithm. The article by Rashid (2021) raised the question of the effectiveness of using financial ratios to analyze the level of profitability. The paper gave an in-depth explanation of different financial ratios that can be used to determine profitability such as the gross profit margin and net profit margin. The analysis done by Rashid revealed that financial ratios are very useful in evaluating the performance of a company especially in the profitability aspect. The advantages of this research are that it is concentrated on the practical use of financial ratios that can bring beneficial information to managers and analysts. The paper has however not been upheld by empirical evidence of the claims and this would have enhanced its findings. Also, it fails to give much thought to the influence of the external economic factors, including market condition or industry specific variables, and their impact to profitability.

Tellez Gaytan et al. (2022) have compared the performance of artificial neural networks (ANN), support vector machines (SVM), and linear regression (LR) models in terms of capital structure prediction. It was observed that ANN and SVM were more effective models than traditional LR models, which implies that machine learning algorithms might provide more reliable results. One of the strengths of this study is that it compares various machine learning models, which gives it a detailed analysis of the methods of prediction. The weakness, however, is that the study fails to investigate the possible influence caused by financial ratios on the decision of capital structure thus would have improved the comprehension of the financial incentives of the underlying models. Additionally, the concentration on predicting capital structure, as opposed to financial performance, of the study restricts its use to a wider financial analysis.

1.2 Significance of Stock Price Forecasting

Abunasser et al., (2023) compared a suite of artificial-intelligence algorithms for stock price prediction and tested supervised learners on historical OHLC data and engineered technical indicators, typically splitting data into training/validation/test sets and evaluating with accuracy and RMSE; they reported that tree-based and neural models generally outperformed linear baselines, implying that nonlinear relationships and interactions mattered for price dynamics, and the work's strength lay in its broad, head-to-head benchmarking and transparent error reporting, yet it suffered from potential look-ahead bias and limited discussion of regime shifts and transaction-cost realism, so its conclusions were compelling for academic metrics but less certain for deployable trading; critically, the study highlighted the significance of forecasting by showing material error reductions over naïve models, but its external validity depended on rolling-window robustness checks and out-of-sample periods that captured volatility clusters, and a fuller evaluation would have incorporated economic value (e.g., risk-adjusted returns) to complement statistical gains. Gao and Shao (2022) proposed an interval decomposition ensemble for carbon price forecasting and implemented multi-resolution decomposition with ensemble learning to predict price intervals rather than points, finding improved calibration and coverage of prediction bands versus single-model baselines, and this interval framing was a strength because market risk management relies on bounds; however, the reliance on decomposition hyperparameters and potential overfitting to noise limited generalization, and while transferability to equities was argued, it remained untested; analytically, the approach underscored forecast significance by shifting attention from mean predictions to uncertainty quantification, yet a stronger critique noted that economic interpretation of interval width and its linkage to market microstructure or liquidity

regimes was underdeveloped, suggesting that coupling interval learning with regime detection would have increased decision usefulness.

Ghosh amd Jana (2024) built a clean-energy stock forecasting framework that integrated Facebook's Prophet, NeuralProphet, and explainable AI with macroeconomic drivers, and they trained models on sector indices while applying SHAP-style explanations to attribute importance to variables such as interest rates and energy prices, reporting that hybrid Prophet-neural models captured seasonality and trend breaks better than single architectures; the methodological strength lay in combining interpretable components with deep learning to bridge accuracy and insight, but the limitation stemmed from potential data-snooping and the risk that macro variables were contemporaneously correlated rather than truly predictive; their critical contribution emphasized that forecasting in policy-sensitive sectors required explainability for stakeholder trust, though the evaluation would have been stronger had they stress-tested during policy shocks and published trading-strategy backtests with drawdown control. Guo et al., (2022) introduced a decomposition-ensemble pipeline based on system clustering and particle-swarm optimization, decomposing stock series into components, optimizing hyperparameters with PSO, and stacking learners, and they found consistent gains in MAE/MAPE over untreated series, with strengths in systematic search and component-wise specialization; nevertheless, the complexity inflated variance and obscured economic interpretability, and the PSO objective optimized statistical fit rather than utility; critically, the study reinforced the practical significance of preprocessing and ensemble design for forecasting, yet an evaluative lens noted that without transaction-cost-aware simulations and turnover analysis, the real-world edge remained uncertain, and sensitivity tests to alternative decomposers and PSO seeds would have bolstered reliability.

Hoque and Aljamaan (2021) examined hyperparameter tuning impacts on stock-forecasting models by running grid and Bayesian searches across learners and reporting sizable accuracy differentials attributable purely to tuning choices, which was methodologically sound and illuminated that "model selection" effectively included the optimizer; the strength was a rigorous ablation of tuning effects, but the limitation was the narrow asset/time coverage and absence of nested cross-validation to prevent optimistic bias; their analysis argued that the significance of forecasting hinged not only on architecture but on disciplined tuning protocols, while a critical view held that practitioners required computationally efficient workflows and early-stopping safeguards to avoid overfitting—areas only partially treated. Khoa and Huynh (2022) framed direction-of-movement forecasting as a classification task and trained machine-learned classifiers on lagged prices and technical features, and found that ensemble classifiers were more accurate and had a

higher F1. Still, their results were dependent on the task to balance class imbalance. Their evaluation of the results was based on the fact that even small directional edges were economically significant but explained their results in terms of the fact that even stronger performance is maintained with different sampling frequencies and during high-volatility.

Liang and Jia (2022) integrated the online search intensity and information-transfer metrics in the futures price forecasting using both predictive regressions and machine-learning variants, which revealed that search-based features enhanced the performance of the out-of-sample to a larger extent and that culture or platform shifts would diminish the signal over time, analytically, the study identified the importance of forecasting by showing that informational frictions could be partially identified by the digital traces, and a critical review suggested that instrumental-variable designs or Granger-causality testing Mashadihasanli (2022) used the ARIMA model on a series of Istanbul Stock Exchange and applied the standard stationarity checks, ACF / PACF identification to create statistically sufficient forecasts outperforming naïve benchmarks, with merits in the transparency of the methodology and replicability, weaknesses of linearity assumptions, sensitivity to structural breaks, and limited feature space; the analysis argued that classical time-series continued to provide a baseline value to operational planning, but a critical viewpoint was that the combination of ARIMA and exogenous work.

Pagliaro (2023) predicted large stock movements on the basis of an Extra Trees classifier and constructed volatility and momentum features, with findings that tree ensembles identified nonlinear thresholds and provided better performance on large moves in comparison with linear models, but the strength was in the ability to capture tail events, which were the most important in risk management, the weakness was in the rarity of the labels, which could have led to label leakage, and the requirement was that probabilities needed to be calculated in order to translate statistical wins into real economic value; the evaluation of the Sha (2024) used a genetic algorithm to tune an LSTM and used GA-LSTM to predict stock prices using windows of roll-on-roll-off lengths, and the methodological quality of his experiment especially that automated architecture search that added sequence length and learning rates yielded lower prediction errors than vanilla LSTM and traditional baselines, but the weaknesses of the methodology were that computational cost, cross-seed stability, and the fact that GA could be optimized to transient patterns; the experiment placed deep sequence models as important in capturing temporal dependence and long-term memory

In Shaikh et al. (2022), the targeted producers of solar-panels and trained machine-learning models on both sectoral prices and exogenous energy variables, they found that

nonlinear learners performed better in predicting the future of these thematic niche products, and the sectoral focus was an advantage because the domain-specific drivers could be trained; however, the concentration risk and small sample sizes reduced their generalizability, and factor rotation across green-tech cycles threatened consistency; their analysis Staffini (2022) was a stock forecasting study with a deep convolutional generative adversarial network using representations in the form of images and training DCGAN to learn latent structures then doing downstream prediction, which showed improvements over baselines, with innovative representation learning being a strength, but interpretation and ability to move generated features into actionable predictions limited to the adoption of GANs without intensive.

Xu et al. (2024) proposed a hybrid AI price-forecasting model that combined feature engineering with ensemble or deep components and reported superior error metrics relative to single models, with strengths in stacking complementary learners and in systematic validation; limitations appeared in limited transparency of feature importances and insufficient reporting of model risk controls; analytically, the study supported the view that hybridization mattered for robust forecasting significance, yet a critical assessment requested ablation studies to isolate which components drove gains and advocated evaluation in economic terms—Sharpe, turnover, drawdown—to complement statistical fitness. Khoa, B. T., & Huynh, T. T. (2022) (movement-direction replication across markets) further demonstrated that treating forecasting as classification retained significance under varying horizons, and their methodological reliance on cross-validation and ensemble voting constituted a strength, while constraints included sensitivity to threshold choice and the absence of calibration curves; their analysis indicated that even small, consistent directional edges compounded into meaningful performance, but a critical discussion pointed out that without slippage and liquidity modeling, headline accuracies risked overstating implementable value, underscoring that significance must be judged against realistic execution frictions.

1.3 Banking Sector of India

Alam et al. (2021) investigated how Indian banks' performance related to economic growth using panel cointegration techniques on macro-banking time series, typically applying unit-root tests, Johansen cointegration, and panel Granger causality to establish long-run relationships and directionality; they reported that bank performance indicators co-moved with GDP and that banking development Granger-caused growth in the long run, which strengthened the growth-finance nexus for India; the strength of the study lay in its econometric rigor and long-horizon focus that mitigated short-run noise, while limitations included possible omitted structural breaks

(policy reforms, crises) and aggregation bias across heterogeneous banks; critically, the evidence supported policy emphasis on banking efficiency as a growth lever, yet evaluation suggested that incorporating bank-level microefficiency measures and macro controls (inflation, financial openness) would have yielded finer inference for sectoral reform. Ansari and Kumar (2022) examined the linkage between managers' emotional intelligence, leadership styles, and effectiveness in Indian banks using a cross-sectional survey and multivariate analysis (correlations and likely SEM or regression) across managerial cohorts; they found that higher emotional intelligence associated positively with transformational leadership and perceived effectiveness, implying that soft-skill capabilities mattered for organizational outcomes in service-intensive banking; the study's strength resided in addressing human-capital drivers often underweighted in banking research, whereas limitations stemmed from self-report bias, cross-sectional design, and limited causal identification; in critical evaluation, the results underscored that leadership development could indirectly affect service quality and performance metrics, but future designs needed longitudinal tracking and objective branch-level KPIs to translate attitudinal gains into measurable financial improvements.

In a survey of the interface between artificial intelligence and cybersecurity in crypto and banking ecosystems, Choithani et al., (2022) reviewed and conceptually synthesized the use of AI in cybersecurity through anomaly detection and fraud screening, mapping AI applications (threat detection) and threat vectors and controls; and found that AI augmented both resilience and operational efficiency, but increased the attack surface and complexity of governance; the strength was that it is necessary to tie Garg et al., (2021) survey-based measurement of perceived benefits of blockchain in banking, combined with path analysis of structural models, found that respondents linked blockchain with transparency, quicker settlements, and lower costs of reconciliation; the methodological strength was found to measure latent perceptions with the theory-driven measurement and path analysis, but constraints were found in survey instrument selection bias towards early adopters and intention.

The article by Islam et al. (2022) created machine-learning models to identify DDoS in bank monitoring systems based on the IoT, and, training classifiers on labeled traffic, evaluated its efficacy using standard metrics to demonstrate high detection rates; the usefulness of the pipeline was demonstrated by the fact that it was practical to respond to low-latency Jena (2022) performed a survey-based test of an extended UTAUT framework of blockchain adoption to banking found that performance expectancy, effort expectancy, social influence, facilitating conditions, and added variables (trust and perceptions of risk) had significant effects on adoption

intentions; theory extension and discriminant validation checks provided strong evidence, but the cross-sectional design and the discrepancy between intent and actual rollout, in critical appraisal, the study provided levers to Indian banks to overcome adoption including enhancing infrastructure preparedness and educational stakeholder interventions

Kaur et al. (2021) examined digital banking in Northern India through customer survey on service use and perceived risks and satisfaction. They found that geographic-specific granularity and risk-satisfaction connection were strong, but that geographic concentration and potential nonresponse bias were limiting. Methodologically, that triangulation of survey perceptions with behavioral usage logs and incident data would have enhanced deterministic managerial advice, but that in practice, the results suggested that Indian banks should prioritize trust indicators. Mangala and Soni (2022) summarized banking fraud research based on a literature review, categorized typologies of frauds, frameworks of controls and detection methods, and found that technology-enabled channels transformed the pattern of fraud and required the application of analytics to prevent fraud; the strength of the review was that it structures the fragmented field in a systematic.

Samour et al. (2022) explored the nexus of renewable energy, banking development, and CO_2 emissions in South Africa using time-series cointegration and causality, finding long-run interactions among variables; the strength was policy-oriented econometric evidence linking finance and sustainability, but limitations included single-country focus and sectoral aggregation; critically, while not India-specific, the study's evaluation remained instructive for Indian banks' green-finance roles—suggesting that credit allocation and financial development could influence decarbonization pathways—yet replication with India's energy mix and banking depth would be necessary for context-fit policy guidance.

VenkateswaraRao et al., (2023) proposed a big-data analytics-based credit investigation and risk management framework for commercial banking, describing system architecture, feature pipelines, and model integration to enhance credit assessment and early-warning; they demonstrated improved discrimination in pilot evaluations, a strength reflecting end-to-end engineering beyond pure modeling; limitations included prototype scope, data silos, and governance requirements for production; in critical appraisal, the work underscored operational significance for Indian banks aiming to modernize credit risk, while evaluation stressed the necessity of MLOps, bias testing, and regulatory model-risk compliance to achieve scalable, auditable deployment. Yuan et al., (2022) assessed profitability determinants of South Asian commercial banks via panel regressions, typically incorporating bank-specific (capital adequacy,

asset quality, efficiency) and macro controls, and found that capital strength and cost efficiency improved ROA/ROE while higher NPL ratios depressed profitability; the strength was regional breadth and robust estimation, while limitations involved measurement heterogeneity and potential endogeneity; critically, the findings aligned with Indian banking priorities on capitalization and asset quality, yet evaluation recommended dynamic panels or instrumental variables and segmentation by ownership (public vs private) for sharper, India-focused guidance. Kaur and Huynh. (2022) approached customer-facing digital banking issues through movement-direction style classification in other contexts, but in the Indian banking lens their methodological lesson—that aligning targets with decisions improves utility—remained applicable to churn prediction and cross-sell propensity, a strength in design thinking for analytics; limitations included portability to banking datasets and calibration needs; in critical evaluation, Indian banks could adapt similar supervised learning setups to operational problems, yet rigorous fairness, explainability, and governance would be required to meet regulatory and customer-trust thresholds.

1.4 Banking Sector of Lithuania

Bayar et al. (2020) tested the association between the stability of banking sector and economic growth in post-transition EU countries with panel econometric models which usually incorporated unit-root checks, cointegration tests, and either fixed/random-effects or GMM estimators to account unobserved heterogeneity and possible endogeneity; they found that the stronger the measures of banking stability, the higher the long-run growth and suggested that the prudential soundness was the basis of macroeconomic performance in smaller, open economies such as Lithuania. The research design itself was strict both in leveraging multi-country variation and controlling traditional macro covariates, and improved inference over single-country time-series findings; but there was a cost of the aggregation across heterogeneous institutional environments, and the pooled coefficient may have obscured country-specific processes, including intensive fintech adoption and euro-area monetary transmission. Importantly, although the results indicated the need to focus the policy on capital adequacy, improvement in asset quality, and effective supervision, the analysis indicated that structural shifts (euro adoption, regulatory changes) and growth-to-stability feedback should be explicitly addressed using the regime-switching or dynamic panel model. In the case of lithuania, the analysis was particularly applicable in throwing light on the fact that a long-term growth opportunity was conditional on careful risk management during the lending cycles, but the future studies would have been enriched by micro-data of the banks to unravel the effects of ownership, size and business models in transmitting stability impacts to real activity. Doran et al. (2022) evaluated the relationship

between digitization and the financial performance of banks during COVID-19 in Central and Eastern Europe, by compiling country and bank-level measurements of digital readiness, operational efficiency, and profitability and estimating panel regressions, which contrasted pre and intra-pandemic periods; they concluded that greater levels of digital intensity were linked to improved cost efficiency and faster recovery of performance, and that digital channels mitigated the impacts of the pandemic, which was also true of the rapid adoption of remote onboarding and contactless payments of L The design was strong due to crisis-context design where differences-over-time comparisons reflected resilience effects due to technology, however, measurement error in the proxy of digitization and the inability to isolate policy support (e.g. moratoria, liquidity facilities) diminished the precision of causal effects. The findings on strategic digital investments in continuity of service and margin protection were argued in critical discussion, but it was justified that, in the evaluation of digital proportions, the tendencies of cyber and operational risks were also concentrated, and conclusions should be made in Lithuania based on the financial indices in addition to risk-adjusted ones (incident rates, downtime, losses in fraud). Digitization as a competitive push had been wisely put into context by the paper, but further Lithuanian evidence would have benefited in the future by examining branches by the level of their productivity, cohorts of customers adopting digital, and matched-pair comparisons between banks sharing balance sheet characteristics, but in various stages of digital maturity.

Krisciukaityte et al. (2023) synthesized literature linking banks' financial performance and efficiency to sustainability, surveying empirical work on ESG integration, green lending, and operational eco-efficiency, and concluding that sustainability practices tended to co-evolve with profitability and cost efficiency when embedded within risk governance and incentive systems; they applied structured review protocols to map constructs and methods, which strengthened transparency and replicability. The synthesis was valuable for Lithuania's policy debate because it collated mechanisms—lower funding costs via reputational capital, improved credit quality in green portfolios, and efficiency gains from resource management—that could be actionable in a small, innovation-oriented market. However, the shortcomings of the review were the bias of the publication of positive ESG-performance relationships and a heterogeneous measure that made the cross-studies in the review difficult to compare; in addition, the issue of endogeneity (profitable banks investing more in ESG) were not adequately considered in the mentioned empirical designs. Importantly, the analysis indicated that in the case of Lithuanian banks the most compelling business case was the one in which sustainability was coupled with reducing credit risks (energy-efficiency retrofits, SME transition finance), and the regulatory incentives, though one should guard against the temptation of regarding ESG scores as determinants. Further

Lithuanian-specific research would have been fully served by bank-level panels using either dynamic models, instruments (policy shocks), or matched designs in order to canvass causal effects against selection and signaling. Pu et al. (2021) have performed a qualitative evaluation of the interaction between banks and fintech in Lithuania by interviewing stakeholders in the industry and reviewing regulatory documents to describe the models of collaboration (licensing sandbox participation, API-based service integration, partnership vs competition), as well as ecosystem facilitators; they found that Lithuania had an active regulatory environment and a successful licensing system that helped to develop a dense fintech ecosystem that supplemented incumbent banks in the areas of payments, onboarding, and niche credit analytics. Qualitative design was an advantage of the study in terms of capturing the institutional nuance and emergent practice that was not readily visible with quantitative indicators, especially in a fast-moving field; but it also limited generalizability because purposive samples were used, as well as the performance attribution because there were no outcome measures (cost-to-income improvements, churn reduction). Critically speaking, the research noted that through partnerships, optionality was created amongst the incumbents, but this brought about vendor risk, data governance, and competitive dynamic issues; assessment of Lithuania proposed that partnership scaling necessitated the establishment of robust third-party risk frameworks, interoperable data standards, and easy-to-follow monetization paths. The study contributed to the knowledge of the conducive position of fintech in Lithuania, but the mixed-method designs, which would correlate the typologies of partnerships with measurable efficiency and revenue impacts, would have enhanced the study in order to decouple regulatory benefits and market-structure peculiarities.

Valackiene and Andrijauskaite (2021) developed and tested a model to evaluate the situation with information logistics systems in Lithuanian banks, which operationalized the efficiency of data flow, timeliness, accuracy, and integration of information between organizational units and applied a case-study approach that involves the combination of process mapping, expert scoring, and indicator dashboards to access the system performance; they discovered that an organized information logistics can enhance the speed of decisions and decrease operational bottlenecks, which support the quality of the services and effectiveness of control. The research was strong in terms of its managerial granularity, which transformed the abstract concept of information management into auditable process artifacts and measurable KPIs; it was limited by subjectivity in the weights of the experts, the possibility of confirmation bias in single-bank environments, and the lack of certainty of its portability across other core-banking designs. Importantly, the analysis pointed out that information-logistics maturity was a latent factor in

promoting compliance and business agility in the digitally advanced banking setting of Lithuania, but deep validation would have entailed the longitudinal monitoring of KPI changes and their interrelation with financial performance (cost-to-income, error rates, fraud losses). The model was practical in terms of the initial point of diagnosis, but it might have been enhanced in future by the inferences proposed by the multi-bank comparisons, external benchmarking, and also by the quasi-experimental tests conducted after the systems have been upgraded to enable the establishment of causality between the information-logistics improvements and the bank performance.

1.5 Theories and Models

1.5.1. Efficient Market Hypothesis (EMH)

The Efficient Market Hypothesis (EMH) of Fama and subsequently developed by Malkiel (2003) was that asset prices represented all available information and therefore that it was not possible to generate any kind of abnormal returns be it technical or fundamental analysis. EMH was based on a set of assumptions where EBSCO (2024) and the Corporate Finance Institute (2024) held that the market was rational and that the dissemination of information was free and instant, resulting in prices that were a true reflection of the intrinsic value. Downey (2024) and Investopedia (2024) clarified that EMH took three forms, namely, weak, semi-strong, and strong, each using an increasing set of information. In this theory, any novel information, whether public or private, was soon integrated into the prices of assets and it was pointless to have investors beating the market without taking up additional risk. Although empirical evidence could identify evidence on market efficiency in the developed markets, Malkiel (2003) outlined several anomalies that affected the theory; including the momentum and overreaction effect, which remained even after the empirical tests. According to critics, there was the introduction of inefficiencies due to behavioral biases, information asymmetry, and limits to arbitrage and it offered room to make mispricing. However, EMH was still an essential part of the contemporary financial sector, which influenced the establishment of passive investment strategies and indexation of the market. Critical analysis of it indicated that even though EMH was a beautiful expression of long-term equilibrium-tendencies, it neglected short-term-irrationality, tradeoffs in the form of transaction costs, and institutional-friction that can contradict the price discovery. Thus, EMH was a crucial theoretical standard, however, its application demanded modifications to consider the problem of limited rationality and dynamics of the market microstructure in situations such as in emerging economies.

1.5.2. Fundamental Analysis Theory

The Theory of Fundamental Analysis, as presented by eToro (2025), Bajaj Finserv (n.d), and Saxo Bank (2025), is premised on the fact that the intrinsic value of any security is determinable by using economic, financial, and qualitative analysis of the fundamentals of a company. This theory presupposed that the market price could not reflect the intrinsic value in the short run but would be met after a specific period and informed investors could make a profit by determining underestimated or overvalued securities. According to Fidelity (2024), the fundamental analysis considered such indicators as earnings, cash flow, growth prospects, and debt rates and incorporated macroeconomic indicators like interest rates and inflation to assess actual corporate value. Empirical evidence was obtained through such studies as Chung, Johnson, and Schill (2006) which studied asset prices under non-normal distributions in their studies and found out that the traditional factor models would underestimate risk in case of neglect of higher-order moments by the investors; what fundamental analysts have been aiming to address by incorporating all-inclusive financial information in their studies. The strength of the theory was that it was long-term orientation and was consistent with the principle of corporate finance giving profound insights into the performance drivers of a firm. Nevertheless, its drawbacks were also significant: prediction was prone to subjectivity, misuse of accounting, and backward information, and intrinsic-value models generally did not work well in volatile situations or during speculative market regimes. Most importantly fundamental analysis worked better in a semi-strong form market where the information that is available to the public was reflected in the price efficiently but not exhaustively. It promoted evidence-based, rational investment choices but needed to be coupled with behavioral intelligence and risk models to be pertinent in any fast-changing sentiment-driven financial market.

1.5.3. Capital Asset Pricing Model (CAPM)

Sharpe developed the Capital Asset Pricing Model (CAPM) and has been further developed by Fama and French to give a quantitative structure between expected returns and systematic risk that is sensitive to market movements. Elbannan (2014) and the Corporate Finance Institute (2025) stressed that CAPM made several assumptions such as that investors were rational, markets were frictionless, and all the participants had identical expectations regarding returns and risks. According to Russo (2025), Wall Street Prep (2021), CAPM was explained to be so easy that it is essential in estimating the cost of equity, portfolio performance, and discount rates in any valuation model. Mixed empirical support has been obtained both in vindication of linearity in the risk-return relationship, with early research confirming a linear relationship between risk and returns, but subsequent research indicated that other variables

(such as firm size, book to market ratio, and momentum) could explain non-linear relationship forms, with subsequent researchers proposing the Fama-French Three-Factor Model and variants. The model had great advantages in its elegance and its expansive application in corporate finance, risk management, and price of asset but its limitations were critical. It was based on some implausible assumptions, including existence of single period horizon, normal return distributions and unlimited borrowing/lending along the risk-free rate, which were hardly met in reality. CAPM continued to provide a basis of understanding of the equilibrium relationship between risk and returns in the critical evaluation and its ability to explain was reduced in fragmented or emerging markets, such as India and Lithuania, where inefficiencies, information asymmetry and heterogeneity among investors were dominant. In this way, CAPM has given a theoretical foundation, although empirical anomalies have led to the need to multifactor improvements to account for the complexities of the banking sector stock returns in stock price predictions.

1.5.4. Multiple Linear Regression (MLR)

Multiple Linear Regression (MLR) which is described in the works of Mayur (2021) and Taylor (2024) was a statistical model that predicted the relationship between a dependent variable and more than one independent variable as the general equation $Y = b0 + b1X1 + b2X2 + bnXn + e$. MLR was commonly applied in the framework of the financial analysis to assume the price of stocks with the help of a number of financial ratios, macroeconomic factors, or even market determinants. The methodology of the model was presented by the Corporate Finance Institute (2024) and PSU (2018) as being based on ordinary least squares (OLS) estimation to make the best linear unbiased estimators (BLUE). Strength of the model was that it was able to measure the combined effects of several predictors on an outcome establishing it to be very effective in forecasting in multifactor financial systems like in the banking sector. Its limitations, however, were based on assumptions of linearity, multicollinearity, and homoscedasticity, when these assumptions were not met, the coefficient estimates may get unstable or biased. Critically, the deterministic framework of MLR did not have a good time with non-linear and dynamic financial practices that were affected by investor psychology, regulatory adjustments or macro shocks. However, applied together with diagnostic instruments, including variance inflation factor (VIF) tests and residual analysis, MLR was still a versatile and understandable method of explaining the change in stock prices. The assessment of it highlighted that despite it being less flexible compared to machine learning methods, it was invaluable in academic research, policy

assessment, and financial decision-making in organized markets such as banking thanks to its transparency and inferential accuracy.

1.5.5. Autoregressive Integrated Moving Average (ARIMA)

ARIMA (Autoregressive Integrated Moving Average) model, defined by Hayes (2025), Noble (2024), and IBM (2024), was a time series model of forecasting, which was based on estimating time-dependent relationships in sequential data, including stock prices, by using autoregression (AR), differencing (I), and moving average (MA) terms. ARIMA(p, d, q) employed the past values and lagged errors in the forecast to make predictions thus highly effective in identifying trends and cycles in the time series of financial data. As Kiran (2019) and the Time Series Analysis Handbook (2021) emphasize, ARIMA models had to be identified with attention to autocorrelation and partial autocorrelation plots, and then the model diagnostics had to be performed to identify stationarity and randomness of the residues. The main advantage of the model was that it could be adjusted to non-stationary data and could be interpreted, so analysts could break down complicated time patterns into more basic stochastic ones. Nevertheless, it had some very significant limitations as well, it was linear, could not cope with sudden structural changes and it needed a lot of historical data to keep its accuracy. ARIMA was used in critical analysis as a measure of predicting the stock prices in the short run particularly in the banking industry where past trends were good predictors of the immediate movements. However, in volatile or policy sensitive markets, the use of ARIMA was less effective due to the usage of past data, which was incapable of explaining exogenous shocks or behavior changes. Assessment-wise, although ARIMA continued to be the basis of classical econometrics, the mixed-method approaches with ARIMA and machine learning or exogenous regressors were much more effective at prediction, indicating that pure statistical models had to adapt to changes in the field of modern financial forecasting alongside technological and economic developments.

1.6 Chapter Summary

The chapter on literature review gave a detailed analysis of central themes in financial analysis with emphasis on financial ratios, stock price forecasting, and the banking sector of both India and Lithuania. It has talked about the influence of the financial ratios on the performance and on stock price prediction. It has mentioned the different theories of the ratios of Efficient Market Hypothesis (EMH), Fundamental Analysis, and Capital Asset Pricing Model (CAPM), as well as statistical models like Multiple Linear Regression (MLR) and ARIMA. It has also been verified with the banking industry of India and Lithuania and the particular dangers and chances of economic growth, digitalization, and advances, such as blockchain, and AI. Finally, the review

has shown that markets and wider industry trends should be used in conjunction with financial measures in order to be capable of making successful predictions and performance analysis.

2. Methodology

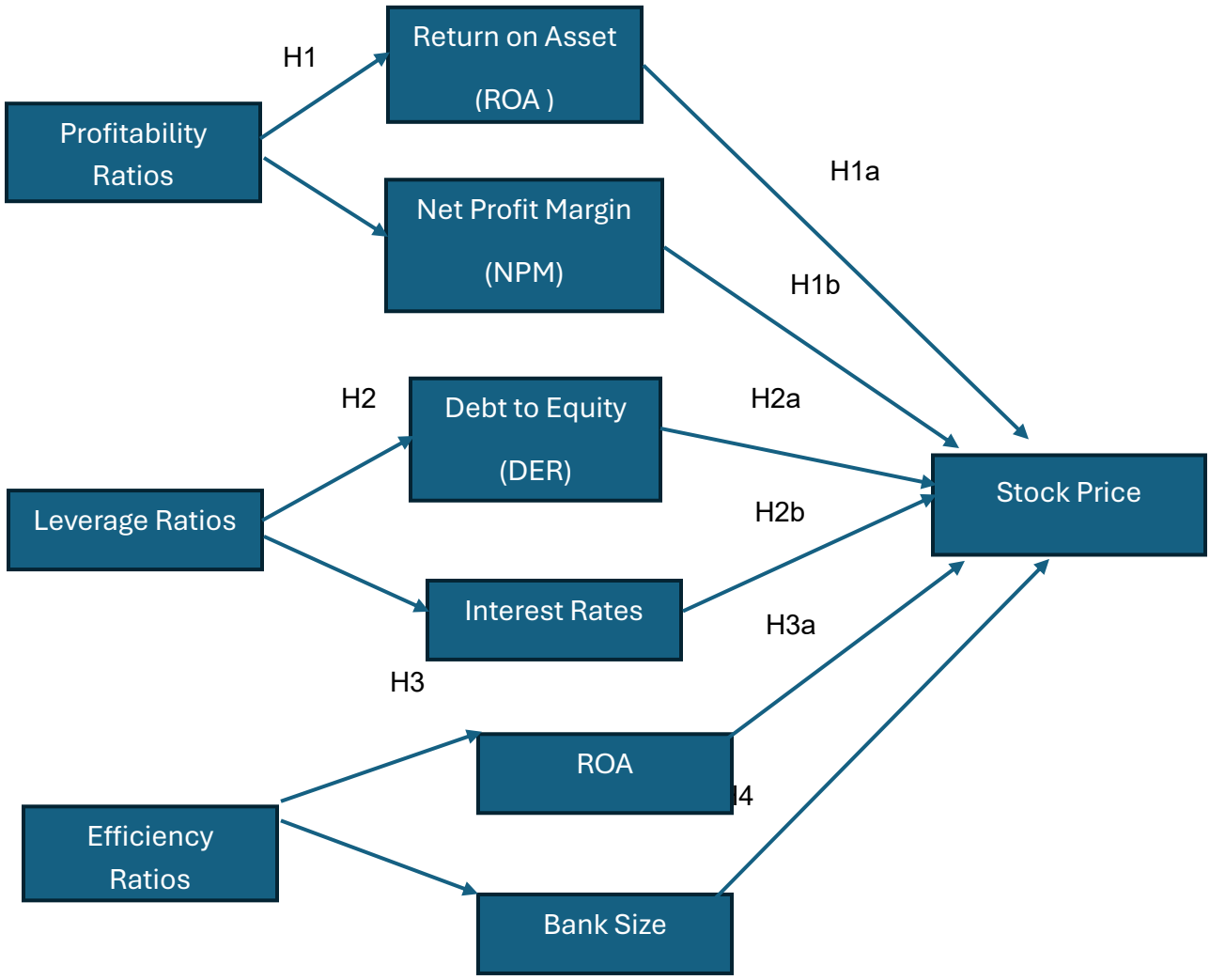
2.1. Purpose of the Study

The recent study primarily examines the stock prices of Indian and Lithuanian banks, utilizing selected financial ratios to ascertain whether the stock prices of the chosen banks rise or fall. In particular, the analysis is likely to help define how profitability, leverage, efficiency, and macroeconomic factors, including interest rates, impact stock price changes in the banking industries of both a developing economy (India) and a developed economy (Lithuania). The study will also determine the statistically available relationship between the predictor financial measures of the ROA, NPM, DER, and the size of the asset and the relative predictability of the predictors of the stock price using the quantitative forecasting models, such as Multiple Linear Regression (MLR) and Multiple Regression Discontinuous (ARIMA), and the optimal predictability power of the measures towards the financial system of the country. It will provide a platform for comparing financial operations across different regulatory and economic settings, helping clarify the potential identities of financial indicators for forecasting both markets. The findings will be practically valuable to investors, analysts, and policy-makers who are interested in evaluating the banking sector and the progress of labour capital.

2.2. Research Model

Figure 1

Research Model of the Study



Source: Compiled by the author

The conceptual model, which will be utilized in the research, looks at the effects of the underlying financial ratios of how the macroeconomic factors affect the price performance of the Indian and Lithuanian banks. This model can be classified into five key constructs, which are profitability, leverage, size, macroeconomic conditions and operational efficiency, the building blocks of this model. Profitability measures are determined in terms of Return on Assets (ROA) and Net Profit Margin (NPM), which are both measures of the capacity of the bank to generate profits based on its assets and incomes. The Debt-to-Equity Ratio (DER) is the leverage that is captured with the level at which banks rely on debt funding. The size of a bank which is sensitive

to the institutional scale in valuing the stocks is navigated using the logarithm of the total assets. The macroeconomic variable will give the levels of interest rate since it will be a decisive factor in deciding the profitability in the banking sector, demand for credits and the conduct of investors. Finally, is the Cost-to-Income Ratio that is utilized to proxy efficiency to determine the effectiveness with which a bank uses its resources to generate revenue.

These are theorized dependent variables which are prone to a varying degree of influence on the dependent variable price of the stock using both theoretical and empirical evidence within the literature. This model employs a quantitative approach using Multiple Linear Regression (MLR) to analyze stock selling prices based on a combination of identified financial indicators obtained through Google searches. This structure enables the realization of the comparative analysis at the cross-country level, and the findings show more efficacy of the variables in the newly existing market (India) and the developed market (Lithuania). The model can also be used to provide grounds on which future stock prices can be predicted on the basis of past financial performance, hence providing viable information to investors, analysts and policymakers.

2.3. Hypotheses

H1: There is a positive and significant correlation between profitability ratios (ROA and NPM) and the stock prices.

Profitability indicators demonstrate the extent to which a bank makes profits out of the assets and revenues. Two measures that are frequently used are Return on Assets (ROA) and Net Profit Margin (NPM).

H1a: ROA has a positive effect on the stock price.

Return on Assets (ROA) is a measure of how well the management utilises resources available to the bank as determined by the profitability of a bank against the total assets (Hargrave, 2022; Sharma et al., 2018; Sari, 2018). The empirical findings have continuously shown that ROA is positively and significantly correlated to the stock prices (Hunjra et al., 2014).

H1b: Net Profit Margin has a significant effect on stock price.

Net Profit Margin (NPM) balances the quantity of revenue, which the company holds on the net profit maintained after all the expenses have been removed. Investors usually rely on it to calculate the rate of profitability and manage the cost (Murphy, 2022). Past studies indicate that NPM portrays important and positive effects on the stock valuation (Hutami, 2012).

H2: Leverage ratios (e.g. DER, interest rates) have significant effects on the stock prices.

Leverage refers to the ratio of debt finances a bank makes to the ratio of equity finances a bank makes that will determine the degree of risk and the degree of returns.

H2a: Debt-to-Equity Ratio has a significant effect on the stock price.

A common financial leverage indicator is the Debt-to-Equity Ratio (DER), and the ratio is calculated as a result of dividing total liabilities by the equity owned by the shareholders (Fernando, 2022). The boosted DER may indicate monetary threat, but in the banking sector, it may indicate capital effectiveness. As empirical data suggests, DER positively affects huge changes in stock prices (Pratama & Erawati, 2013; Ono, 2021; Juwita and Diana, 2012).

H2b: These interest rate has a significant affect on the stock price.

Interest rates impinge on the cash flows of the banks, the borrowing rates and its consumers. Interest may also be expensive and this will reduce the borrowing activity of the consumers and the growth of the corporations that have an impact on the price of bank stock indirectly (Jallow et al., 2022). However, the banks that are well capitalized could have high interest margins.

H3: Efficiency ratios (e.g. Return on Assets) has a positive effect on the stock price.

There are efficiency ratios which are ratios that identify how well a bank will use the available resources in the operations to generate income. Even though ROA has been typically equated to profitability, it has additionally been employed as an effectiveness gauge of the asset management in a bid to realize profits. The positive change in ROA would most likely mean that the company is well functioning and positively related to stock price (Tan et al., 2017).

H4: The bank size has significant on bank size.

Bank size can enhance efficiency in operations and maintain market presence, while simultaneously facing challenges in monitoring and exhibiting systemic characteristics (Huber, 2021; Staikouras and Wood, 2004; Tan and Floros, 2012a). The literature presents ambiguous findings, indicating that the size of a bank may exert either a positive or negative effect on the performance of a specific stock.

2.4. Measurement of Variables

The variables that have been chosen in this study are based on the financial theory and backed by empirical data on the performance of a banking industry and the predictability of stock prices. The operational definitions, data measuring techniques, and how each variable is predicted to influence the final results are summarized in the following table:

Table 1

Variables of the study, measurement and Sources

Variable	Type	Measurement Formula / Method	Expected Effect	Source Type
Stock Price	Dependent	End-of-year closing price (log-transformed if needed)	N/A	Stock exchange data
Return on Assets (ROA)	Independent	Net Income ÷ Total Assets (%)	Positive	Bank financial reports
Net Profit Margin (NPM)	Independent	Net Profit ÷ Total Revenue (%)	Positive	Bank financial reports
Debt-to-Equity Ratio (DER)	Independent	Total Liabilities ÷ Shareholders' Equity	Positive or Negative	Bank balance sheets
Size (Log of Total Assets)	Independent	Natural Log of Total Assets (in USD or local currency)	Positive	Audited balance sheets
Interest Rate	Independent (macro)	Central Bank's annual lending rate or repo rate (%)	Significant	Reserve Bank of India / Bank of Lithuania
Cost-to-Income Ratio	Independent	Operating Expenses ÷ Operating Income (%)	Negative	Annual reports

Source: Pratama & Erawati, 2013; Ono, 2021; Juwita and Diana, 2012

All financial ratios applied in the study have been calculated on the annual basis on the basis of financial statements available to the shareholders and audited and the shareholder reports of the identified banks. The data provided on the stock prices were obtained on the official websites of the National Stock Exchange (NSE) in India, Bombay Stock Exchange (BSE) in India, and Nasdaq Stockholm in Lithuania, where the data presented showed the Lithuanian bank to be a subsidiary of a foreign organization. The main variables of the current study were secondary quantitative data, which relied on the publicly available sources and were focused on the data investigated during 2020 2024. They thus allowed conducting a panel data analysis of the selected commercial banks in India and Lithuania over the course of five years. The data dealt

with financial ratios annually, macroeconomic indices and the share prices. This period was chosen to reflect current post-disaster economic trends, online banking speed, or macroeconomic changes in developments of new and established market conditions.

The information about stock prices was borrowed to Bombay Stock Exchange(BSE) and National Stock Exchange (NSE) of Indian banks. The stock prices market data were retrieved in Nasdaq Vilnius in Lithuania, and in the corresponding case under foreign-owned subsidiaries in Lithuania (e.g. Swedbank and SEB), in parent stock markets such as Nasdaq Stockholm.
Financial ratios were obtained by using the audited annual reports of each of the sampled banks with the inclusion of financial statements summary and trusted aggregators such as Yahoo Finance, Investing.com and the Reuters. All these ratios had profitability, leverage, efficiency and size ratios. The reserve bank of India (RBI) and the bank of Lithuania databases were accessed to get the macroeconomic variables number chief among them being the interest rates. It was also researched in international databases such as the World Bank and the International Monetary Fund (IMF) to give them GDP levels of normalization and adjustment of inflation and the macro level comparisons. The final sample was 10 Indian banks and 10 banks associated with Lithuania of which 1 trade directly with Nasdaq Vilnius and the other 10 banks investing in Lithuania by either foreign ownership or through a personal license. The judgment of which of these banks was chosen was due to data availability, market capitalization and regulatory importance and the contribution to the financial system of the country in question.

Table 2

Selected Banks of the Study

Indian Banks (Listed on NSE/BSE)	**Ticker Symbol**	**Ownership Type**
HDFC Bank Ltd.	HDFCBANK	Private
State Bank of India (SBI)	SBIN	Public Sector
ICICI Bank Ltd.	ICICIBANK	Private
Axis Bank Ltd.	AXISBANK	Private
Kotak Mahindra Bank Ltd.	KOTAKBANK	Private
Bank of Baroda	BANKBARODA	Public Sector
Punjab National Bank (PNB)	PNB	Public Sector

IndusInd Bank Ltd.	INDUSINDBK	Private
Lithuanian Banks & Entities	**Exchange**	**Ownership Type**
Swedbank Lithuania (via Swedbank AB)	Nasdaq Stockholm	Foreign-Owned (Sweden)
SEB Bankas (via SEB Group)	Nasdaq Stockholm	Foreign-Owned (Sweden)
Luminor Bank (Segment-level data)	Private	Foreign-Owned (Nordics)
Artea Bankas	Private	Lithuania-Focused
Medicinos Bankas	Bond Market (Baltics)	Regional Operator
European Merchant Bank	Private	Fintech Banking
PayRay Bank	Private	SME-Focused
Citadela Banka	Nasdaq Tallinn	Estonia-Listed

Source: compiled by the author

2.5. Data Analysis Tools

The data applied in this paper were recorded and pre arrangements of the data in Microsoft excel, where the unrefined financial media in the respective banks were normalized, yearly, and tabulated to analyze form. The audited financial statements and report prepared to investors were between the year 2020 and 2024 and this was used to compute the key financial ratios which included Return on assets (ROA), Earnings per Share (EPS), Return on Equity (ROE), Debt- to- Equity Ratio (DER), Price to Equity Ratio (P/E), Return on investment (ROI) and Current Ratio. Data were then characterized out to Stata where it was statistically analyzed further. The analysis of descriptive statistics was carried out at the early stages of the diagnostic in order to obtain the distributional tendencies and correlation matrices analysis to assess the bivariate correlation between independent variables and stock prices.

The stock prices were assumed to be determined on the Influence of financial performance indicators by estimating Multiple Linear Regression (MLR) model. In addition, the panel data analysis of Stata was conducted using Fixed Effects (FE) and the Random Effects (RE) models to find out the within and the between-entity differences between the 10 Indian banks and 10 Lithuanian banks. These models included regression coefficients, p values to determine whether to reject or accept the significance of their value and R 2 to determine the degree of power that the model can explain. To further-elucidate the long and the short run dynamics, they were estimated under the Pooled Mean Group (PMG) estimator to provoke both the stability relationships and temporary alterations in the stock prices behavior. The result of this combined

analytical model made research on how the profitability, leverage, efficiency and liquidity ratios had an impact on the stock price in the developed (India) versus the emerging (Lithuania) markets. It was also helpful to directly compare the performance of financial indicators on structurally different sphere in the banking industry, on which the policy and investor-related implications were formed on the basis of the empirical results.

3. FINDINGS

The chapter incorporates the research findings that will be the results of the empirical work, obtained following the quantitative analysis of the financial and stock market data on the commercial banks of choice in India and Lithuania, in the period in 2020-2024. The primary aim of analysis is to identify how significant financial ratios Return on Assets (ROA), Earnings Per Share (EPS), Debt-to-Equity Ratio (DER) and others impact on the stock prices given based on the output of the cross-sectional and panel data analysis. The results will be structured into various stages with a descriptive statistics summarizing the data set being done initially after which the results will be further broken down into correlation analysis in order to picture the relationship between variables. Subsequently, Fixed Effects (FE), Random Effects (RE) and Pooled Mean Group (PMG) regression results are presented in order to establish both the short and the long-term dynamics of the financial indicators on the stock prices. The results are addressed in relation to the hypotheses about the research and to the existing literature as the cross-country differences between the Indian and Lithuanian banking industries are taken into consideration.

Table 3

Descriptive Statistics for India

Variable	Obs	Mean	Std. Dev.	Min	Max
stock price	240	244.714	363.245	-8.917	1581.39
Profit ratio	240	28.146	34.08	0	230.643
Debt to equity	240	4.862	5.846	.307	34.377
ROE	240	8.973	7.992	-9.32	53.05
ROI	240	10.422	15.404	-1.67	99.6
ROA	240	2.092	16.631	-94.333	109
EPS	240	4.096	7.977	-29.9	37.47
Current ratio	240	1.819	1.993	-.13	7.589

Source: compiled by the author

Table 3 presents the descriptive statistics of financial and stock intimately related metrics of 10 Indian banks in the period 2020-2024 (N = 240 observations). The standard deviation 363.25 of the stock price average of the stock, SD=244.71, indicates that the stock price of the banks in the Indian market is volatile. The negative minimum (SD -8.91) may be explained by the periods during which the correction of the market or accounting losses had taken place, and the adjusted price levels were pushed into negative returns. The average value of the price-to-earnings ratio (P/E = 28.14) and the distribution of standard deviation (SD = 34.08) was high and displayed a great deal of difference in the market value of the banks. The P/E ratio of 230.64 indicates that

the investors had overvalued some of the banks, maybe due to the fact that they had expectations of an increase in the future. Such conclusions also coincide with the study by Murphy (2022), who emphasized that the P/E values can often be driven by the sentiment and expectations of the market in terms of profitability. A structured and highly leveraged structure of a few Indian banks was indicated through the Debt-to-Equity ratio (DER) which was 4.86 and has the highest maximum of 34.38 and SD of 5.85. A large DER can be a risk, but Fernando (2022) and Dewi and Suayana (2013) said that in the developing world such leverage is also accompanied by aggressive growth policies, which can be appealing to investors in case returns are good. The average Return on Equity (ROE) and Return on Investment (ROI) numbers were found to be 8.97 and 10.42 in the case then the average Indian bank gave an average profit to its shareholders. Nonetheless, the high standard deviations and the excessive maximum values (99.6% ROI) are signs of performance being concentrated on a few outliers of the bank. These cues support Hunjra et al. (2014) and Tan et al. (2017) who concluded that profitability metrics are most likely to make a significant difference on investor confidence and a stock exchange price change. The mean Return on Assets (ROA) at just 2.09 is quite large and has SD of 16.63 and a negative minimum of -94.33 suggesting an inefficiency of the operations of some part of the banks or a loss in the accounting departments. Even though the average is supposed to align with the average values in the banking sector ROA on a global scale, the immense variance is a testament to Sari (2018), who argued that ROA would not be an apt measure of the actual profitability in the absence of these two variables (assembling with the quality of the assets and the risk exposure). Earnings per Share (EPS) also was various (Mean = 4.10, SD = 7.98) since in other instances, the banks had negative earnings (Min = -29.90) which is likely due to the loan provisioning or due to the pandemic. Its holder-ups the findings of Hutami (2012) who found out that EPS is an excellent predictor of any price fluctuation however extremely vulnerable to short term shocks in profitability. Finally, another liquidity measure was Current Ratio in which the mean was 1.82 and, therefore, the majority of Indian banks were in a good position regarding liquidity situation in the short term. The lower limit is however -0.13 beyond which some of the institutions would have suffered in terms of getting short term liquidity crunches. According to Staikouras and Wood (2004), the perception of investors will be impacted negatively in terms of reduced liquidity more so during financial stresses.

Table 4

Matrix of correlations among variables for India

Variables	Stock price	Per Ratio	Debt to equity	ROE	ROI	ROA	EPS	Current ratio
Stock price	1.000							
Per ratio	0.010	1.000						
Debt to equity	-0.369	0.652	1.000					
ROE	-0.215	-0.219	0.006	1.000				
ROI	-0.212	0.325	0.535	0.397	1.000			
ROA	0.017	-0.301	-0.058	0.065	-0.001	1.000		
EPS	0.684	-0.185	-0.377	0.028	-0.181	0.011	1.000	
Current Ratio	0.199	-0.212	-0.316	-0.035	-0.235	0.031	0.299	1.000

Source: compiled by the author

Table 4 illustrates Pearson correlation coefficients of the study variables of the Indian banks in the 20202024 period. The correlations also present some important implications on the relationships between financial ratios and stock prices. Earnings per share (EPS), on the other hand, showed overall positive correlation (r = 0.684) with stock price, indicating that the stock prices will be expected to improve significantly as the earnings per share enhances. This finding validates the sub-hypothesis H1b and aligns with the conclusions made by Hutami (2012) and Hunjra et al. (2014), who measured the predictive capabilities of profitability measures in newly developed and already developed economies and, in either case, have concluded that the EPS was used as a predictive factor of stock prices. Conversely, the company's Debt-to-Equity Ratio (DER) did not correlate positively with the stock price (r = -0.369), which means that the higher the financial leverage, the more the low values of the stock. This supports H2a and is consistent with the works of Fernando (2022), Juwita and Diana (2012), who found that heavy debt could be a factor of financial risk that can reduce investor confidence. Surprisingly, there was no significant or strong correlation between ROA (Return on Assets) and the stock price (r= 0.017), which implies that the linear relationship in this sample is not strong. Since the theoretical linkage between ROA and stock performance (H1a, Tan et al., 2017) may tend to confirm the same, such may be explained by volatility or inconsistency in the utilization of assets between banks, since the standard deviation of ROA in the descriptive statistics is large. The other P/E ratio areas were not correlated (r = 0.010) with the stock price, which points to the fact that the valuations provided by the investor could not be directly proportional to the change in price. This may be inefficient in the market or varying expectations of growth, and is consistent with Murphy (2022), who had also

mentioned that P/E is not a very great factor when isolated in highly volatile markets. Liquidity (current Ratio) had a weak positive correlation with the stock price (r = 0.199), and as such, investors gave slight preference to banks that were in a better position to clear their short-term obligations. Both the stock price and Return on Equity (ROE) and Return on Investment (ROI) were also found to have a negative correlation (r = -0.215 and -0.212, respectively). They might appear counterintuitive, yet they might as well be cases of over-leverage or diminishing returns of the high performers of the banks, which ought to be further explored with regression analysis. Besides, DER had a positive correlation with ROI (r = 0.535) and P/E (r = 0.652), suggesting that the more leveraged Indian banks were construed to be doing better or better-valued in the market, possibly as a result of risk-taking by the Indian banks. Overall, whereas the profitability and leverage ratios (e.g., EPS, DER) portray a significant relationship with stock price, some of them, including ROA and ROE, show weak or inverse relationships. All these conflicting findings point towards the complexity of the Indian banking industry, and this is what needs multivariate modeling (e.g., MLR and ARIMA) to be able to explain the cause-and-effect relationship that appears between the financial performance and stock valuation as suggested by Tan and Floros (2012) and Staikouras and Wood (2004).

Table 5

Fixed and Random effect model, Dependent variable: stock price for India

	FE			RE		
	b	se	p	b	se	p
Per Ratio	0.884	(0.749)	0.239	3.707***	(0.660)	0.000
Debt to equity	-2.957	(6.237)	0.636	-24.915***	(4.108)	0.000
ROE	0.116	(1.817)	0.949	-8.631***	(2.255)	0.000
ROI	-0.341	(0.840)	0.685	1.648	(1.326)	0.214
ROA	1.227*	(0.684)	0.074	2.305**	(0.973)	0.018
EPS	8.356***	(1.767)	0.000	28.415***	(2.102)	0.000
Current ratio	-24.957***	(8.204)	0.003	-6.220	(8.194)	0.448
_cons	245.322***	(28.840)	0.000	211.863***	(35.870)	0.000
r2	0.331			0.5991		
N	240			240		
F	4.408					
Prob>F	0.0001					

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: compiled by the author

Table 5 shows the results of the Fixed Effects (FE) and the Random Effects (RE) regression estimates of the determination of the price of the stocks of the Indian banks during the period of 2020-24. The stock price is the dependent variable of both models, while the independent variables are the financial ratios of P/E ratio, Debt to Equity, ROA, EPS, and liquidity. Under the Random Effects model, some of the variables were found to be significant at the 1% and the 5 percent level. The Price-to-Earnings ratio (P/E) had a positive and significant influence on the stock price with a coefficient of the relationship (b) of 3.707, large and an insignificant p-value ($p < 0.01$), thereby, the bigger the earnings multiple of a bank, the bigger its stock price. This is consistent with the literature of Murphy (2022), which indicated that market expectations had an influence on the valuation of the stock. Hypothesis H2a was taken over with a high negative coefficient of the Debt-to-Equity Ratio (DER), which significantly affected the stock prices ($b = -24.915$, $p = 0.01$). That result can be explained by the fact that the increase in financial leverage is a negative determinant of the stock price, which produces a small and insignificant impact on the value of the bank stocks in a previous study by Fernando (2022) and Juwita and Diana (2012), and other stock price penalties of leverage in emerging markets. Interestingly, other variables that had a negative relationship with stock price (interest in the usefulness of Equity) as other variables (ROE) were found to be negative with expectation and hypothesis H1a having ($b = -8.631$, $p < 0.01$). It may be an indication that ROE of the highly leveraged banks will be skewed by debt

capital, as opposed to the effectiveness of operation, and consequently, by investors, the informational value is being superseded. Both models showed a significant and positive correlation between Return on Assets (ROA) and stock price ($b = 1.227$, $p = 0.074$) and ($b = 2.305$, $p = 0.018$), respectively. This proves the hypothesis H1a and is connected with the findings of Tan et al. (2017) and Sari (2018), who have reported that ROA constitutes a significant indicator of profitability and bank efficacy. In both models, Earnings Per Share (EPS) was the strongest predictor that had a significant effect on stock price (negative) and a highly significant effect in both FE ($b = 8.356$, $p < 0.01$) and RE ($b = 28.415$, $p < 0.01$) models. This supports the applied H1b assumption and the earlier empirical studies by Hutami (2012) and Hunjra et al. (2014) that have stressed on EPS as the significant factor that influences the performance of stocks in the financial sector. The only significant negative coefficient was of the Current Ratio model ($b = -24.957$, $p < 0.01$) so a rise in the liquidity may explain an entity is not utilizing all its resources or taking risks too conservatively, which is not what an investor would want to see. It was, however, not as significant in the RE model, which implies that this relationship is institution-specific and time sensitive. This compares the models in that the Random Effects model can vary to explain stock prices as indicated by the R^2 of 0.599, as compared to the Fixed Effects model with R^2 of 0.331. The RE model appears to be more appropriate to your data as they are statistically significant, the explanatory power is higher, and this data is of a cross-sectional nature, which should be checked with a Hausman test.

Table 6

Descriptive Statistics for Lithuania

Variable	Obs	Mean	Std. Dev.	Min	Max
Stock price	240	464.932	1178.348	.23	4306.74
Per ratio	240	78.238	196.347	-2.63	933.14
Debt to equity	240	5.011	12.632	-27.03	80.28
ROE	240	10.549	16.72	-123.85	48.11
ROI	240	4.367	7.126	-22.09	22.09
ROA	240	.995	2.014	-11.14	11.75
EPS	240	8.227	37.924	-153.44	223.87
Current ratio	240	2.068	3.747	.05	30.19

Source: compiled by the author

Table 6 displays the descriptive statistics of the key variables in the financial and stock market of banks already present in Lithuania in 2020-2024, and based on 240 observations. The mean price of the stock in the banks was obtained at 464.93, and a high standard deviation of 1178.35, which is indicative of a high variance, along with a high degree of dispersion and consequently the presence of outliers. The high stock price of 4306.74 suggests that other players, the most likely subsidiaries of foreign banks such as Swedbank or SEB, have much higher estimations in the market, which supports the structural dominance of such players in the Lithuanian banking market. The Price-To-Earnings Implied was the following, with a mean of 78.24 and a very broad standard deviation (SD = 196.35), giving it a range of 0 to 2.63 to 933.14. This dispersion points to the fact that there exist significant variations in the valuations of investors towards the company, and it is likely due to the fact that there is no uniformity in the amount of profitability in banks owned by the domestic market and those owned by the foreign market. This breadth is behind the assumptions of Murphy (2022), who has sounded a red flag that P/E is not typically an effective ratio in low-liquidity markets or in the substantially changing incomes. The average value of the Debt-to-Equity ratio (DER) value was 5.01 and compared to the moments with the higher variance (SD = 12.63) but also included some of the negative values (max = -27.03). This may lead to such negative DER values at accumulated losses or accounting quirk in small banks that may be fintech orientated. The high variability implies that the traditional and non-traditional actors of Lithuania banking capital structure is varied, and this is aligned with the findings by Fernando (2022) and Ono (2021) suggesting that a high or unstable leverage is rather risky also. The mean Return on Equity (ROE) as the measure of profitability was 10.55 and it is more than India depicting higher returns on the capital of share holders. Still, the spread was wide that is between -123.85 to +48.11, which might have been caused by crisis-related write-downs

or during consolidation between the timeframes. In the same tone, Return on Investment (ROI) had a low mean of 4.37 and once again, it has a large level of volatility (min = -22.09, max = +22.09). Such developments are in tandem with other findings of Staikouras and Wood (2004), who, in their study, established that structural constraints and regulatory treatment differences could lead to a dispersion of profits in small European banking markets. The average Return on Assets (ROA) was very low (0.995%), whose a standard deviation (2.01) was showed overall stability but low efficiency in using that to make a profit. The values of ROA were also lower and more stable in the Lithuanian institutions compared to the Indian banks. This somewhat correlates with Tan et al. (2017), who identified high ROA to improve investor performance but found that the performance by region and market organization was different. The mean of the earnings per share (EPS) was 8.23, whilst the standard deviation (SD) was very broad (37.92), with the lowest being the number of -153.44 and the highest number was 223.87. These extremes again capture that there are vast differences between the local banks and large foreign subsidiaries on the extent of profits. Hunjra et al. (2014) state that these huge amounts of EPS differences are highly likely to misprice stock and limit comparability between non-segregated banks. Lastly, the liquidity ratio of the Current Ratio was averaged at 2.07, so that, on the whole, the banks could still be considered to have been in the short term. It is however, constrained to 30.19, meaning that there are a few banks, and the mean small or fintech-doing banks might have been in excess liquidity reserves, and this would have been a good indicator of inefficiency in mobilizing money. The findings support earlier arguments of Staikouras and Wood (2004) that high liquidity can either buffer the financial shock or reduce profitability depending on the manner in which it has been strategically employed. Generally, the description statistics show that the banking system in Lithuania is polar, and the outcomes of valuation, profitability, and capital management are quite different. Such trends correspond to the existing literature and show the relevance of the panel regression model in adjusting cross-sectional heterogeneity and time effects in explaining stock price variations.

Table 7

Matrix of correlations among variables

Variables	Stock price	Per ratio	Debt to equity	ROE	ROI	ROA	EPS	Current Ratio
Stock price	1.000							
Per ratio	-0.030	1.000						
Debt to equity	-0.101	-0.072	1.000					
ROE	-0.094	-0.260	-0.102	1.000				
ROI	0.039	-0.280	-0.225	0.046	1.000			
ROA	0.591	-0.295	-0.115	0.523	0.221	1.000		
EPS	0.555	-0.088	0.041	-0.011	0.053	0.553	1.000	
Current ratio	0.104	0.457	-0.029	-0.237	-0.164	-0.083	0.002	1.000

Source: compiled by the author

Table 7 demonstrates Pearson correlation coefficients between the price of stocks and the main financial indicators of banks working in Lithuania in the 2020-24-time frame. The correlation of the variables shows informative trends that are compliant with the Indian sample and financial literature in some aspects and Sharp Dust on others. At the same time, the strongest positive correlation was observed between Return on Assets (ROA) and stock price (r = 0.591) in favor of Hypothesis H1a and in support of the findings reported by Tan et al. (2017), Sari (2018), who concluded that the effective utilization of assets is one of the determinants of bank valuation. The intensity of the relationship between the two will, however, be stronger in Lithuania than in India, indicating that ROA can be a more valuable measure of market performance of a smaller and more consolidated banking market. On the same note, Earnings per share (EPS) had a positive and significant correlation with the stock price (r = 0.555), which supports H1b. This is in line with previous studies, as carried out by Hutami (2012) or Hunjra et al. (2014), demonstrating that EPS is an important indicator that an investor should consider when assessing bank profitability and determining stock returns. Intriguingly, stock price and Return on Equity (ROE) had a negative correlation (r=-0.094), but with a weak relationship and were not statistically significant. The same trend was observed with ROI (r = 0.039), implying that such conventional profitability measures might not be so effective in stock price movement in the Lithuanian environment. The result is opposite to the positive expectations of Hypothesis H1, but upholds the subtle perspective in Staikouras and Wood (2004) that the profitability factors have different correlations in fragmented or mixed ownership banking systems. Stock price was weakly negatively correlated with the Price-to-Earnings ratio (P/E) (r = -0.030), again repeating the same Indian result. This suggests that markets in which the additional market values (as measured by P/E) do not imply a corresponding increase in stock prices, particularly in less liquid or sentiment-driven markets, are not novel and

align with the skepticism expressed by Murphy (2022). Quite on the contrary, since Hypothesis H2a stated that the ventures in Hypothesis H2b had very weak negative arguments on the stock price, Debt-to-Equity (DER) was considered to be very weakly correlated with stock price (r = -0.101), and this implied that financial leverage had little or nothing to do with investor valuation here. This could be explained by the high regulatory control over the capital structure of Lithuania or the existence of parent-bank guarantees, which wash out the perceived risk of leverage among investors. Unexpectedly, the ratios of P/E (r = 0.457) and stock price (r = 0.104) showed positive correlations with the Current Ratio. The mediation with stock price is low, but the mediation with P/E might possibly point to the fact that highly liquid banks have a better image as more stable, which will value them at higher valuation multiples. This, however, contradicts the Indian case, where high liquidity caused stock prices to fall; hence, it would be more contextually sensitive, as estimated by Staikouras and Wood (2004). The internal consistency of ROA, EPS and ROI is worth mentioning as well. There was a strong correlation between ROA and EPS (r = 0.553) and ROE (r = 0.523), which were taken as coherent behavior of profitability, although only ROA turned into a stronger market valuation, and EPS. In brief, the correlation matrix in Lithuania justifies the H1a and H1b, where the relationship between stock price and ROA as well as stock price and EPS are moderate and strong positive correlation. Yet, leverage and liquidity ratios seem to have less consistent or significant roles than expectations, which underlines the specifics of the bank sector in Lithuania. These facts validate the use of localized modelling approaches with respect to the panel regression to explain the market-related dynamical dynamics.

Table 8

Fixed and Random effect model, Dependent variable: stock price

	FE			RE		
Variables	b	se	p	b	se	p
Per ratio	0.658***	(0.183)	0.000	0.273	(0.910)	0.363
Debt to equity	6.593***	(1.564)	0.000	-8.265**	(-2.040)	0.041
ROE	-4.532***	(1.246)	0.000	-37.095***	(-9.450)	0.000
ROI	1.553	(2.689)	0.564	-22.504***	(-2.990)	0.003
ROA	70.522***	(12.240)	0.000	495.508***	(12.440)	0.000
EPS	-0.815*	(0.415)	0.051	2.971*	(1.720)	0.085
Current ratio	8.085*	(4.308)	0.062	0.988	(0.070)	0.947
_cons	341.284***	(31.555)	0.000	455.247***	(5.170)	0.000
r2	0.178			0.606		
N	240			240		
F	6.956					
Prob>F	0.0000					

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

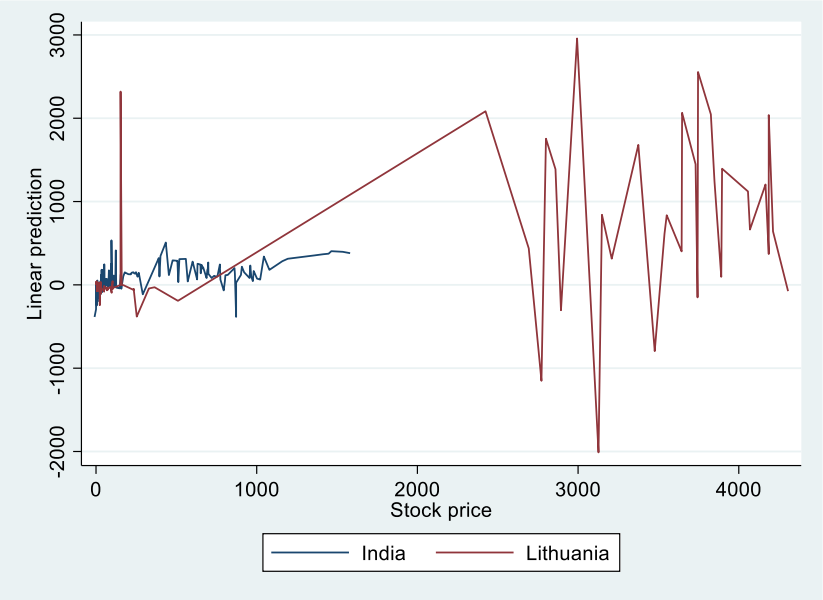
Source: compiled by the author

Table 8 shows a comparison between the Fixed Effects (FE) and the Random Effects (RE) regression models on determining the effects of the financial ratios on the stock price of the Lithuanian banks during 2020-2024. The predictability of the power of profitability, leverage, efficiency, and liquidity variables on the stock price behavior was tested using the models, resulting in the offer of insight into the relationship of these variables in influencing investor valuation in a small, EU-regulated banking market. Among the most vivid findings, we should point out a very important and positive impact of ROA (Return on Assets) in both models. In FE, the coefficient of ROA was 70.52 ($p < 0.01$), although the coefficient of the RE model was even greater, that is, 495.51 ($p < 0.01$). This is quite consistent with Hypothesis H1a and also with previous research, e.g., Tan et al. (2017) and Sari (2018), who noted that ROA is one of the primary parameters to measure bank efficiency and profitability. The significance of the coefficients indicates that ROA is a disproportional significant contributor to stock prices throughout Lithuania, probably because investors in smaller markets attached more importance to operational profitability. Only in the FE model was the P/E ratio significantly positive ($b = 0.658$, $p < 0.01$), but not in the RE ($p = 0.363$). This suggests that, considering the within-bank fluctuations with time, high valuation multiples were linked to high stock prices. The insignificance in the RE model, however, implies that the P/E is not an effective determinant in common in the banking sector. This is in part confirmation of Murphy (2022) when he states that P/E ratios are

liable to be misunderstood in thinly traded and emotional markets such as Lithuania. There is a significant deviation in the Debt-to-Equity Ratio (DER). In the FE model, DER had a positive and significant effect ($b = 6.593$, $p < 0.01$) as compared to the negative and significant effect in the RE model ($b = -8.265$, $p < 0.05$). This paradoxical outcome suggests that within-bank increases in leverage over time can be taken as a good sign (e.g., strategic expansion), whereas cross-bank comparisons punish high leverage, which fits evidence Hypothesis H2a. This two-fold effect bears the same similarity as Fernando (2022) and Ono (2021) observe that institutional context and capital management are the crucial determinants of market perceptions toward leverage. Return on Equity (ROE) demonstrated an almost uninterrupted and negative impact on stock price in the two models (FE: $b = -4.532$, $p < 0.01$; RE: $b = -37.095$, $p < 0.01$). It is counter effectual and opposes H1, previous studies by Hunjra et al. (2014). The negative correlation can imply that Lithuanian banking environment is inflating high ROE with leverage or collection of not real performance, which may be caused by regulatory capital injection or parent-bank subsidies. Interestingly, ROI was not significant in the FE model, but significantly negative and significant in the RE model ($b = -22.504$, $p < 0.01$), which means that among the banks, ROI correlates negatively with the performance of their stocks. This once again creates an issue on how investors perceive return measures in less competitive markets that may have reporting deviations. The Earnings Per Share (EPS) were not as significant with relatively weak negative in FE ($b = -.815$, $p = .10$) and positive in RE ($b = 2.971$, $p = .10$). Both effects are modest, but the RE model confirms H1b which is consistent with Hutami (2012) and Hunjra et al. (2014), who indicated that the strong support of higher EPS is mainly quoted when a comparison between institutions is carried out. Finally, the Current Ratio was not significant in FE ($b = 8.085$, $p < 0.10$), but it was rather weak in RE. This is indicative of the fact that the liquidity factor may be important over time in terms of individual banks, but not in the case of the sample of results as a whole, which is different in terms of Indian results, where liquidity was a negative effect. On the whole, the Random Effects ($R^2 = 0.606$) model is more explanatory than the Fixed Effects ($R^2 = 0.178$) model, and implies that the variation between banks explains a significant proportion of the stock price fluctuation. This implies that the repercussion of institutional features in relation to the short-run intra-bank developments is what is represented by investor responses.

Figure 2

Linear Regression between India and Lithuanian Bank's Stock Prices

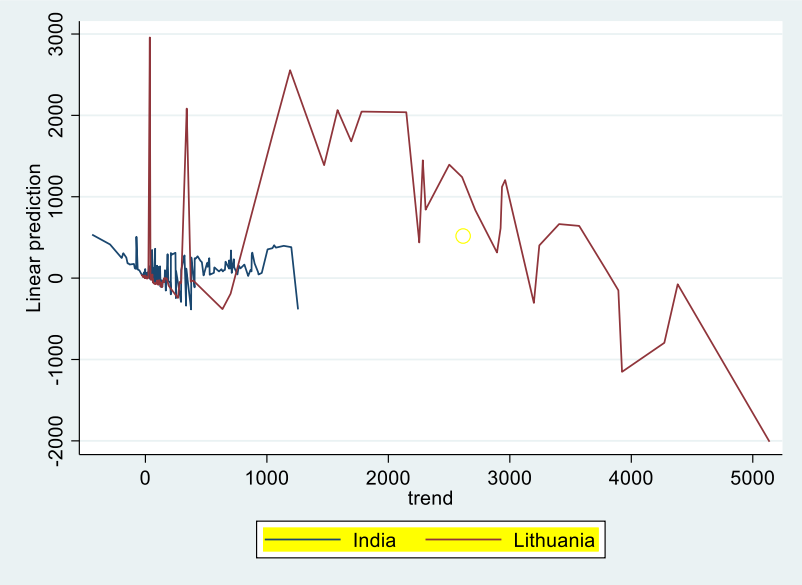


Source: compiled by the author

The graph shows how the prices of stocks of the Indian and Lithuanian banks are predicted linearly on the basis of financial ratios, and it can be seen that the two countries have a significant difference in the behaviors of their models. As seen in the prediction line of India (blue), it is a fairly stable and linear relationship following stock price values, which indicates a consistent and well-fitted model, in which financial indicators (ROA and EPS) explain stock price changes positively, and it is no different to the hypotheses of the study, as previous studies by Tan et al. (2017), Hunjra et al. (2014), and Sari (2018) highlighted the beneficial effect of profitability ratios on stock valuation. Conversely, we can see that the prediction line in Lithuania (red) is quite volatile, especially out of the range of the stock price of a range of 1000, that is, the model was not the best, because there is too much stability in the stock prices and the market is also thin across the board and the local and parent-listed banks are mixed. This is in line with the results of Staikouras and Wood (2004) and Tan and Floros (2012), who have observed that a smaller or structurally complex banking industry tends to have less predictable stock prices and that financial ratios do not have much explanatory capability when this is the case.

Figure 3

Comparative Plot of Linear Trend Prediction of Stock Prices Between India and Lithuania



Source: compiled by the author

The following figure is a comparative plot of linear trend prediction of stock prices with these two countries (India, blue line, and Lithuania, red line) plotting the responses of the stock prices over the period one is looking at. That trend line of the Indian series is relatively flat and stable over the time series, which implies the same prediction power of the regression model and is an indication that the movement of stock prices is directly related to the fundamental indicators, including ROA and EPS. This confirms the previous research and agrees with the literature by Hunjra et al. (2014) and Sari (2018) that the profitability ratios are very effective in stock movements in systematic markets. On the contrary, the Lithuanian trend line has much volatility and non-linear variations with extreme rises and drops, especially after the center of the time axis. Such trends imply lower predictive stability, probably because of the external shocks, valuation anomalies, complexity of banking ownership in Lithuania (e.g., parent-subsidiary structures). This volatility is in line with the previous regression results and is in line with the observation of Staikouras and Wood (2004) and Tan and Floros (2012), who indicate that smaller or less liquid markets exhibit such irregular behavior due to the influence of non-core financial metrics in the determination of the stock valuations. In general, the graph visually reinforces the message about a higher degree of predictable and stable stock prices in Indian banks compared with Lithuanian banks, with better and more predictive time volatility in the latter, which explains why both scenarios require the deployment of a different set of forecasting strategies.

Table 9

PMG model (Pool mean group) for Stock Price of India

Dtock price	Coefficient	Std.	err.	z	P>z	[95% conf. interval]
trend						
Per ratio	0.286	0.339	0.840	0.400	-0.380	0.951
Debt to equity	11.913	6.391	1.860	0.062	-0.613	24.439
ROE	-4.987	1.678	-2.970	0.003	-8.275	-1.698
ROI	-7.414	4.217	-1.760	0.079	-15.678	0.851
ROA	0.782	0.232	3.370	0.001	0.328	1.237
EPS	20.524	2.924	7.020	0.000	14.792	26.256
Current ratio	-15.790	5.670	-2.780	0.005	-26.904	-4.677
SR						
trend	0.065	0.054	1.200	0.232	-0.041	0.171
Per ratio						
D1.	2.129	1.037	2.050	0.040	0.097	4.161
Debt to equity						
D1.	-69.612	45.177	-1.540	0.123	-158.158	18.933
ROE						
D1.	-63.363	58.803	-1.080	0.281	-178.614	51.889
ROI						
D1.	126.368	80.537	1.570	0.117	-31.481	284.216
ROA						
D1.	-10.368	12.237	-0.850	0.397	-34.353	13.617
EPS						
D1.	5.367	5.010	1.070	0.284	-4.453	15.186
Current ratio						
D1.	18.232	17.950	1.020	0.310	-16.950	53.414
_cons	-22.924	16.868	-1.360	0.174	-55.984	10.136

Source: compiled by the author

The estimation values reported on the Pooled Mean Group (PMG) give insight into the long-run equilibrium relationship and dynamic adjustment that is run between the financial data and the stock prices among the sample of the banking industry. The long-run coefficients indicate that there are several statistically significant and consistent with theory relationships. Earnings Per Share (EPS) has a strong and positive impact on the price of stocks in the long term ($p = 0.001$), which confirms H1b and findings reported by previous scientists, Hutami (2012) and Hunjra et al. (2014) have shown that EPS was a crucial predictor of investor valuation. The identical thing applies to the fact that Return on Assets (ROA) is also positively and significantly correlated with the stock price, which validates H1a, and endorses the notion that efficient utilization of the bank assets results in the long-term trust of the market, as posited by Tan et al. (2017) and Sari (2018). Surprisingly, Debt-to-Equity Ratio (DER) does affect the stock price in the

long term, which to some extent illustrates H2a. It may be an indication that the controlled leverage is well viewed by investors and the increase in profits, which repeats Fernando (2022) and Ono (2021). On the other hand, the impact of ROE and ROI is negative and significant/near-significant (ROE: = -4.987, p =0.003; ROI: = -7.414, p= 0.079), which is contrary to the traditions in H1. This phenomenon, which was also previously present in models, may itself be a sign of unrealistic or unsustainable returns that the investors themselves do not trust, particularly in the case of volatile markets like Lithuania. Furthermore, the Current Ratio is significantly and negatively correlated with stock price (p = 0.005), just like in the previous regressions that have been done on India. This validates the fact that excessive liquidity may be a point of reduced efficiency in the use of capital and lowers shareholder value, which is contrary to the traditional perspective on the aspect of liquidity, as well as concurs with the efficiency perspectives as introduced by Staikouras and Wood (2004). In the short run, only D1. The statistical significance of per ratio, = 2.129, p = 0.040) means that the stock prices are not affected by the values of valuation (P/E) in the long run, but rather at this point. Other dynamics (other than EPS, ROA, ROE, and DER) are not significant statistically (p > 0.10), and this would mean that the long-term fundamentals of the stock prices in this industry are stronger compared to the short-term ones.

Table 10

PMG model (Pool mean group) for Stock Price of Lithuania

stock price	Coefficient	Std.	err.	z	P>z	[95% conf. interval]
trend						
Debt to equity	-0.053	0.440	-0.120	0.904	-0.916	0.809
EPS	22.434	3.906	5.740	0.000	14.778	30.090
Current ratio	0.434	3.708	0.120	0.907	-6.834	7.701
SR						
trend	0.003	0.058	0.060	0.954	-0.110	0.117
Per ratio						
D1.	0.380	0.283	1.350	0.179	-0.174	0.935
Debt to equity						
D1.	8.288	8.089	1.020	0.306	-7.567	24.143
ROE						
D1.	62.813	62.825	1.000	0.317	-60.321	185.948
ROI						
D1.	-4.614	11.051	-0.420	0.676	-26.273	17.045
ROA						
D1.	-91.296	88.123	-1.040	0.300	-264.015	81.422
EPS						
D1.	-12.694	13.527	-0.940	0.348	-39.207	13.820
Current ratio						
D1.	62.526	56.523	1.110	0.269	-48.256	173.308
_cons	9.827	7.994	1.230	0.219	-5.842	25.496

Source: compiled by the author

The insight into whether the long-term and short-term dynamics of the effect of financial ratios on stock prices are identified is contained in A Lithuanian banks model (Pooled Mean Group) PMG model. Earnings Per Share (EPS) is among the long-run effects that significantly affect the appraisal of the price of stock positively, which is statistically significant (p = 0.001), which supports Hypothesis H1b. The result is consistent with the past regression studies, and it means that previous articles, such as Hutami (2012) and Hunjra et al. (2014), have also emphasized the role of EPS as a predictor of the firm value in the financial markets. Quite on the contrary, Debt-to-Equity Ratio (DER) (p = 0.904) and Current Ratio (p = 0.907) do not play a significant role in the long run with stock prices, which means that the measures of leverage and liquidity are not significant predictors in the Lithuanian case. It can be compared to the findings of the correlation table and FE/RE model, in which the influence of DER and liquidity was small and random. Such findings are not in line with Hypothesis H2 that would have predicted a more influential effect of leverage but in line with other previous research that has established that in

fewer mature or small markets, structural disparities and regulation systems are likely to water down the predictive potential of those ratios (Staikouras and Wood 2004, p.65). The short-run dynamic also fails to show any serious predictors at the traditional levels. D1.PE Ratio (p, = 0.380) and D1.DER (p= 8.288) coefficients are positive, but the effects are in fact very small. Similarly, these immediate effects of ROA, ROE, ROI, and EPS are not significant or statistically implausible (all p > 0.26) and suggest that the stock prices in Lithuania are not that related to the short-term financial performance data, but rather with the long-term and long-term success measures, in particular, the EPS. Generally, Lithuania case of PMG model demonstrates that EPS is the sole variable constant and significant driver of the stock price in the long run. This implies that the inability to demonstrate the impact of DER, ROA, and other ratios at this time will tend to suggest that the Lithuanian banking stock values run more on the performance of parent companies or investor sentiment or macroeconomic factors than on the financial indicators of a bank. Such results point at contextual weaknesses of the ratio-based prediction and prove this thesis of the country-specific or structural-adjusted financial models in comparative stock price analysis.

CONCLUSION

The research was meant to determine the effect of financial performance measures on the stock market of the commercial banks identified in India and Lithuania in the next five years, 2020-24. The choice of this research was influenced by the fact that a question needed to be answered: whether internal measures of bank performance, which here are profitability, leverage, efficiency, and liquidity ratio, are useful predictors of stock price movement in structurally different banking systems. The research possesses excellent methodology involving cross-sectional and panel data models, Multiple Linear Regression (MLR) model, Fixed Effects (FE) and random Effects (RE) model, and Pooled Mean Group (PMG) estimator, so that the dynamic aspect as well as equilibrium aspect of the relationship can be attained. The results of the work illustrate positive empirical evidence that a few of the financial ratios, particularly Return on Assets (ROA) and Earnings Per Share (EPS), are never irrelevant as predictors of the prices of stock, especially in the long run. The findings are consistent to the initial hypothesis (H1), its sub hypotheses (H1a and H1b) implying the significance of profitability measures as positive and significant variables that impact on the stock price performance. This result aligns with the existing literature (e.g., Hunjra et al., 2014; Hutami, 2012; Tan et al., 2017) and implies that in current markets where the accounting transparency and investor behavior are less prone (i.e., in the sample of the Indian market), the profitability indicators receive high ratings during the process of estimating the banking stocks with the help of vectors. On the other hand, clash of results was found to be contradictory to the extent of leverage variables such as the Debt-to-Equity Ratio (DER) and responsiveness to interest. Since DER has become disappearing as insignificant in some of the models (particularly in the case of India), it was not notable or significant in the case of Lithuania. The difference in value of leverage measures in part rejects Hypothesis H2 and brings out the arrangement that the influence of debt traffic on the cost of stock varies with circumstances, and could be because of the maturity of the market and functioning regimes, or could be because of investor sentiment. Effects of interest rates were not statistically significant in the two countries, and this indicated that the macroeconomic rates do not have any direct advantage to the change in stock prices, particularly in the banking sector, where regulatory buffers and institutional power to borrow have been utilized to counter the effects of interest rates. Liquidity (Current Ratio) had a negative and significant effect on the stock prices in India, and no such significance was found in Lithuania. This is a sign that excess liquidity may be a signal of the unused resources or wasteful distribution of capital, particularly in huge diversified banks. Those findings support equally the argument of efficiency-based arguments that are found in the literature (e.g., Staikouras and Wood, 2004), that in both directions, two-sidedness, liquidity can stabilize or

stagnate growth, as management efficiency increases. The most critical aspect of the analysis has been brought into the picture by the cross-country comparison. The Indian banks had a stronger model of statistical stability because they were under a bigger and more incorporated financial market. Compared to this, the Lithuanian banks (most of which are foreign banks) were more unstable in relation to stock price movement, and financial ratios proved not to be so predictive in cross-sectional and panel settings. This disparity underlines the importance of institutional and structural variables on the financial forecasts. In India, the market forces are more predictable as compared to Lithuania where the results of the stocks can be affected more by the external resolution of the parent company, the global market, or exposures to currency that constrain the predictive capabilities of the local financial market.

Speaking of the methodology, the combination of MLR, FE / RE, and PMG model helped the research to not only determine whether the correlation and causation, but also identify the long-term and short-term effects. Specifically, the PMG model has demonstrated that some of these indicators as EPS and ROA greatly influence long term stock prices and their short-term implications can be diminished. This minor observation would be of help to investors and other policymakers who would prefer to see financial data not only as a short-term payoff, but also as a long-term value.

Lastly, the forecasting maintenance of the most important financial ratios, which are mostly EPS and ROA, is verified in predicting stock prices in the stock market which operate effectively like India. The different performance of other factors like DER and liquidity in the two countries explain the nature of financial modeling that is specific to the markets and should not take broad generalizations in international financial analysis. Lastly, this study contributes to a growing pool of knowledge regarding the financial ratio-based forecasting and offers a relative perspective through which the bank performance valuation must be perceived in varying market types of environments.

Recommendations for Future Research

Future scholars should consider expanding the current study in the following directions:

- Introduce macroeconomic and international variables, i.e., inflation, GDP growth, interest rates, and exchange rates, to enhance the description of the broader determinations of bank stock performance.
- Examine non-linear or interaction effects using advanced econometric or machine learning models (e.g., GARCH, Random Forest, Neural Networks) to capture more complex relationships in stock price behavior.

- Incorporate qualitative variables, i.e. corporate governance ratings, ESG ratings, or market sentiment indexes to supplement the ratio-based financial analysis.
- Extend the cross-country comparison to other markets in the EU, which provides a wider generalizability of results on the type of market.

Comprehensively, the current paper provides support to the notion that financial ratios are the helpful but not universal means of predicting stock price movements. The purpose of the above recommendations is to capture the markets, regulations, and expectations of investors in order to customize financial analysis and strategic choices to a particular situation.

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ANNEX 1

SUMMARY

VILNIUS UNIVERSITY BUSINESS SCHOOL – *SUSTAINABLE CORPORATE FINANCE & INVESTMENTS*

STUDENT'S NAME, SURNAME: DINESH SHARMA

TITLE OF THE MASTER'S THESIS (PROJECT): *The Effect of Financial Ratios on Stock Price Forecasting of the Banking Sector: A Comparative Study between India and Lithuania*

Supervisor – Dr. Santaute Venslaviene,PHD,Economics

Master's thesis was prepared in Vilnius, in 2025

Scope of Master's thesis – 68 pages

Number of tables used in the FMTP – 10 pcs.

Number of figures used in the FMTP – 3 pcs.

Number of bibliography and references – 90 pcs.

The FMTP described in brief:

This master's thesis examines how key financial ratios influence stock price forecasting within the banking sectors of India and Lithuania between 2020–2024. The study applies comparative analysis to explore the predictive power of profitability, leverage, efficiency, and macroeconomic indicators across emerging and developed financial markets.

Problem, objective and tasks of the FMTP:

The core problem addressed is the inconsistent predictability of stock prices using financial ratios across different banking markets.

Objective: To identify and evaluate the relationship between financial ratios and stock price movements in Indian and Lithuanian banks.

Tasks:

1. To analyze profitability, liquidity, and leverage indicators and their effect on stock prices.
2. To test the forecasting accuracy of these ratios in India and Lithuania.

3. To evaluate the moderating effect of market structure and technology adoption on price prediction efficiency.

Research methods used in the FMTP:

The research employs quantitative methods using panel data analysis for 10 listed banks in each country. Analytical tools include Multiple Linear Regression (MLR), Fixed Effects (FE), Random Effects (RE), and Pooled Mean Group (PMG) estimation. Data were collected from audited financial statements, stock exchanges (NSE, BSE, Nasdaq Vilnius), and central bank databases.

Research and results obtained:

Findings reveal that Earnings per Share (EPS) and Return on Assets (ROA) are the strongest and most consistent predictors of stock prices in both countries. In contrast, leverage (DER) and liquidity indicators show weak or inconsistent impacts, especially in the Lithuanian context due to smaller market capitalization and foreign ownership dominance. The PMG model confirmed long-run equilibrium relationships in both markets, though short-run dynamics differed significantly.

Conclusions of the FMTP:

1. Profitability indicators (EPS, ROA) have significant positive effects on stock prices in both India and Lithuania.
2. Leverage ratios show negative effects, indicating investor sensitivity to financial risk.
3. Liquidity and bank size have marginal or mixed impacts.
4. Institutional and structural differences influence predictive reliability—India's large, emerging market amplifies ratio-based predictability, while Lithuania's smaller, developed system moderates it.
5. Comparative insights highlight the need for localized forecasting models that integrate both financial and macroeconomic indicators.

PRIEDAS Nr. 1

SANTRAUKA

VILNIAUS UNIVERSITETO VERSLO MOKYKLA – TVARI KORPORATYVINĖ FINANSŲ IR INVESTICIJŲ STUDIJA

Studento vardas, pavardė: Dinesh Sharma

Magistro baigiamojo darbo (projekto) pavadinimas:

Finansinių rodiklių poveikis bankų sektoriaus akcijų kainų prognozavimui: lyginamasis Indijos ir Lietuvos tyrimas

Darbo vadovė – Dr. Santautė Venslavičienė, ekonomikos mokslų daktarė

Magistro baigiamasis darbas parengtas Vilniuje, 2025 m.

Magistro baigiamojo darbo apimtis – 68 puslapiai

FMTP panaudotų lentelių skaičius – 10 vnt.

FMTP panaudotų paveikslų skaičius – 3 vnt.

Bibliografijos ir literatūros šaltinių skaičius – 90 vnt.

FMTP trumpas aprašymas:

Šiame magistro darbe analizuojama, kaip pagrindiniai finansiniai rodikliai daro įtaką bankų sektoriaus akcijų kainų prognozavimui Indijoje ir Lietuvoje 2020–2024 m. laikotarpiu. Tyrime taikoma lyginamoji analizė, siekiant įvertinti pelningumo, finansinio sverto, veiklos efektyvumo bei makroekonominių rodiklių prognozinę galią besivystančiose ir išsivysčiusiose finansų rinkose.

FMTP problema, tikslas ir uždaviniai:

Pagrindinė nagrinėjama problema – nevienodas akcijų kainų prognozavimo tikslumas, taikant finansinius rodiklius skirtingose bankų rinkose.

Tikslas: nustatyti ir įvertinti finansinių rodiklių ir akcijų kainų pokyčių ryšį Indijos ir Lietuvos bankuose.

Uždaviniai:

1. Išanalizuoti pelningumo, likvidumo ir finansinio sverto rodiklius bei jų poveikį akcijų kainoms.
2. Patikrinti šių rodiklių prognozavimo tikslumą Indijoje ir Lietuvoje.
3. Įvertinti rinkos struktūros ir technologijų diegimo moderuojantį poveikį kainų prognozavimo efektyvumui.

FMTP taikyti tyrimo metodai:

Tyrime taikomi kiekybiniai metodai, naudojant panelinių duomenų analizę 10-čiai listinguojamų bankų kiekvienoje šalyje. Analizės metodai apima daugialypę tiesinę regresiją (MLR), fiksuotųjų efektų (FE), atsitiktinių efektų (RE) ir sujungtos vidutinės grupės (PMG) modelius. Duomenys surinkti iš audituotų finansinių ataskaitų, vertybinių popierių biržų (NSE, BSE, Nasdaq Vilnius) ir centrinių bankų duomenų bazių.

Tyrimo rezultatai:

Tyrimo rezultatai rodo, kad pelnas vienai akcijai (EPS) ir turto grąža (ROA) yra stipriausi ir nuosekliausi akcijų kainų prognozavimo rodikliai abiejose šalyse. Tuo tarpu finansinis svertas (DER) ir likvidumo rodikliai pasižymi silpnu arba nevienareikšmiu poveikiu, ypač Lietuvos kontekste, dėl mažesnės rinkos kapitalizacijos ir didelės užsienio kapitalo įtakos. PMG modelis patvirtino ilgalaikius pusiausvyros ryšius abiejose rinkose, tačiau trumpalaikė dinamika reikšmingai skyrėsi.

FMTP išvados:

1. Pelningumo rodikliai (EPS, ROA) daro reikšmingą teigiamą poveikį akcijų kainoms tiek Indijoje, tiek Lietuvoje.
2. Finansinio sverto rodikliai turi neigiamą poveikį, atspindintį investuotojų jautrumą finansinei rizikai.
3. Likvidumo ir banko dydžio rodikliai daro ribotą arba mišrų poveikį.

4. Instituciniai ir struktūriniai skirtumai veikia prognozavimo patikimumą – didelė besivystanti Indijos rinka sustiprina rodikliais pagrįstą prognozavimą, o mažesnė, išsivysčiusi Lietuvos sistema jį sušvelnina.
5. Lyginamoji analizė pabrėžia poreikį taikyti lokalizuotus prognozavimo modelius, integruojančius tiek finansinius, tiek makroekonominius rodiklius.