"ASSESSING PERFORMANCE OF A FIRM USING FINANCIAL ANALYSIS TECHNIQUES"

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Abstract

This thesis explores financial analysis techniques used to assess the performance of a firm. Special attention is given to banking sector in Azerbaijan to provide a deeper insight into financial performance. The focus of the research is to model the role of bank performance using key financial variables, including profit, revenue, risk-weighted assets, capital, and capital adequacy ratio as independent variables, with profit margin as the dependent variable.

The first chapter introduces the theoretical foundation of performance assessment, exploring how firms, particularly banks, measure performance through productivity, flexibility, and value creation. In this chapter, it also discusses the key stakeholders involved in performance assessment and the role of both internal and external factors.

The second chapter delves into financial analysis methods such as DuPont analysis, EVA, WACC, and CAPM highlighting how these techniques provide a more nuanced view of financial performance.

The third chapter presents an econometric analysis of Kapital Bank and Pasha Bank's financial performance (2016–2024) using multifactor regression models. Key findings highlight net profit and CAR ratio as contributors to profit margins for both banks, while inefficiencies in cost management and capital allocation were noted.

As a result of the study, the analysis confirms that financial indicators such as net profit, CAR ratio, revenue, total capital, and risk-weighted assets significantly influence profit margins. Also, the impact of financial indicators differs among banks.

Key words: Financial analysis, firm performance, profitability, bank, capital

Referat

Bu dissertasiya firmanın fəaliyyətini qiymətləndirmək üçün istifadə olunan maliyyə təhlili üsullarını araşdırır. Maliyyə nəticələrini daha dərindən öyrənmək üçün Azərbaycanda bank sektoruna xüsusi diqqət yetirilir. Tədqiqatın əsas məqsədi mənfəət, gəlir, risklə ölçülmüş aktivlər, kapital və kapitalın adekvatlıq əmsalını müstəqil dəyişənlər kimi, mənfəət marjası isə asılı dəyişən kimi əsas maliyyə dəyişənlərindən istifadə etməklə bank fəaliyyətinin rolunu modelləşdirməkdir.

Birinci fəsildə firmaların, xüsusən də bankların məhsuldarlıq, çeviklik və dəyər yaradılması yolu ilə performansı necə ölçdükləri araşdırılaraq, performansın qiymətləndirilməsinin nəzəri əsasları təqdim edilir. Bu fəsildə o, həmçinin fəaliyyətin qiymətləndirilməsində iştirak edən əsas maraqlı tərəfləri və həm daxili, həm də xarici amillərin rolunu müzakirə edir.

İkinci fəsildə DuPont təhlili, EVA, WACC və CAPM kimi maliyyə təhlili üsulları araşdırılır və bu üsullar maliyyə nəticələrinin daha incə bir görünüşünü necə təmin edir.

Üçüncü fəsildə multifaktorlu reqressiya modellərindən istifadə etməklə Kapital Bank və Paşa Bankın maliyyə fəaliyyətinin (2016-2024) ekonometrik təhlili təqdim olunur. Əsas tapıntılar xalis mənfəəti və CAR nisbətini hər iki bank üçün mənfəət marjasına müsbət töhfə verənlər kimi vurğulayır, eyni zamanda xərclərin idarə edilməsində və kapitalın bölüşdürülməsində səmərəsizlik qeyd olunur.

Tədqiqat nəticəsində, Təhlil təsdiq edir ki, xalis mənfəət, CAR nisbəti, gəlir, ümumi kapital və risklə ölçülmüş aktivlər kimi maliyyə göstəriciləri mənfəət marjasına əhəmiyyətli dərəcədə təsir göstərir. Həmçinin, maliyyə göstəricilərinin təsiri banklar arasında fərqlidir.

Açar sözlər: Maliyyə təhlili, firmanın performansı, gəlirlilik, bank, kapital

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Abbreviations

BS: Balance Sheet

CAPM: Capital Asset Pricing Model

CAR: Capital Adequacy Ratio

CCC: Cash Conversion Ratio

COE: Cost of Equity

DDM: Dividend Discount Model

DOH: Days of Inventory on Hand

DPS: Dividend per Share

DSO: Days Of Sales Outstanding

EBIT: Earning Before Interest and Tax

EBITDA: Earning Before Interest, Tax, Depreciation and Amortisation

EBT: Earning Before Tax

ECM: Earning Capitalization M

EVA: Economic Value Added

GDP: Gross Domestic Product

MRR: Market Rate of Return

NOPAT: Net Operating Profit after Tax

NPM: Net Profit Margin

NWC: Net Working Capital

P&L: Profit and Loss Statement

RFRR: Risk Free Rate of Return

ROA: Return on Asset

ROE: Return on Equity

ROIC: Return on Invested Capital

RWA: Risk Weighted Assets

WACC: Weighted Average Cost of Capital

YTM: Yield to Maturity

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Introduction

The actuality of the subject. The performance of banks is a crucial component of economic stability and growth. In the modern financial environment, banks face increased scrutiny from regulators and stakeholders to ensure they maintain profitability while managing risk. The ability to assess and improve bank performance is vital for maintaining the overall health of the financial system. This research seeks to address the growing need for comprehensive analysis techniques that accurately measure bank performance and inform strategic decision-making.

Purpose and objectives of the research. The primary objective of this thesis is to develop a model that assesses the performance of banks using various financial analysis techniques. The independent variables—profit, revenue, risk-weighted assets, capital, and capital adequacy ratio—are chosen to provide a holistic view of the bank's financial health, while the dependent variable, profit margin, reflects the profitability of the institution. The objectives include:

To explore how these financial indicators interact to influence bank profitability.

To analyze the effectiveness of financial analysis techniques such as DuPont, EVA, WACC, and CAPM in evaluating bank performance.

To provide insights that can help banks optimize their capital structure, risk management, and operational strategies.

Research methods. This thesis employs a quantitative research approach, focusing on financial modeling and ratio analysis. By using econometric techniques, the relationships between the independent variables and profit margin are examined. Key financial models like DuPont analysis, EVA, WACC, and CAPM are applied to assess their relevance and accuracy in measuring bank performance. The study also incorporates data from financial statements and reports to evaluate real-world bank performance.

Research question and hypothesis. What financial indicators most significantly affect bank profitability, and how do their impacts differ among different banks?

Based on this, the following null hypotheses are developed:

H_{01}: Financial indicators such as net profit, revenue, CAR ratio, total capital, and risk-weighted assets do not significantly influence bank profitability.

H_{02}: There is no difference in the impact of financial indicators on profitability between Kapital Bank and Pasha Bank.

This research contributes to the ongoing discussion on bank performance by providing a comprehensive model that assesses the financial health of institutions in today's complex economic landscape.

I CHAPTER. FUNDAMENTAL BASIS OF ASSESSING FINANCIAL PERFORMANCE OF A FIRM

1.1 Introduction to firm performance assessment.

The majority of businesses aim to increase their performance. But there is an unfinished of literature and ongoing debate on measuring performance.

To provide a more comprehensive understanding of the subject, one of the important studies on this subject, highlights that a company's performance is not solely measured by its ability to achieve its goals but also by how efficiently it can do so using limited resources. This efficiency is directly linked to the company's ability to maximize output while minimizing input, a concept known as productivity. Productivity measures how well a firm can convert resources, such as labor, capital, and raw materials, into products or services. Moreover, the study emphasizes the significance of flexibility within the firm. Flexibility refers to the company's capacity to adapt to changing market conditions, customer demands, and technological advancements. A firm with high flexibility can swiftly reallocate resources, adjust its operations, and innovate in response to external pressures, which is crucial for sustaining long-term success. Therefore, both productivity and flexibility are critical indicators of a firm's performance, as they collectively determine how well the company can navigate challenges and capitalize on opportunities in a dynamic business environment (Georgopoulos, 1957).

In their comprehensive definition, Warmington, Lupton, and Gribbin have specifically delineated performance evaluation as a critical tool for assessing employee productivity, gauging motivation levels within the organization, measuring customer satisfaction rates, analyzing turnover rates, and monitoring costs. By incorporating these key factors into their evaluation framework, they have provided a holistic approach that effectively captures the various dimensions of organizational performance. This multifaceted approach enables organizations to identify areas of strength and potential improvement, thereby fostering a more informed decision-making process. For instance, by assessing employee productivity, organizations can determine whether their workforce is operating at optimal levels or if there are inefficiencies that need to be addressed. Gauging motivation levels helps in understanding employee engagement and identifying any underlying issues that might be affecting morale. Measuring customer satisfaction rates provides insights into how well the organization is meeting customer expectations, which is crucial for maintaining a competitive edge in the market. Analyzing turnover rates allows organizations to understand the

stability of their workforce and the effectiveness of their retention strategies. Finally, monitoring costs ensures that the organization is operating within its financial means and that resources are being allocated efficiently. By integrating these elements, Warmington, Lupton, and Gribbin's performance evaluation framework offers a robust tool for driving continuous improvement and sustaining organizational success in a competitive business landscape (Gribbin, 1977).

According to Porter, how well a company performs is closely tied to how much value it creates for its customers. He believes that value creation is key to gaining a competitive edge because it helps a company stand out from its competitors and allows it to charge more for its products or services. This value isn't just about the product itself—it's about the whole experience, including the price, customer service, and the overall reputation of the brand. The more value a company can offer its customers, the stronger its position in the market and the better its chances for long-term success. Porter also points out that value creation should be in line with the company's broader strategy, making sure that every part of the business, from operations to marketing, works together to enhance the customer experience. By consistently delivering value, companies can build loyalty, keep customers coming back, and ultimately, perform better over time. In this sense, a company's success isn't just about its financial results—it's deeply connected to how well it meets and exceeds customer expectations (Porter, 1986).

On the other hand, Adam held the view that the overall performance of a company is intricately tied to the performance of its employees. He believed that when employees possess the latest, most relevant knowledge and skills, and actively apply them in their daily tasks, it significantly influences the company’s success. In his perspective, the continuous professional development of the workforce and their ability to effectively integrate new learning into their work are among the most critical determinants of the company's overall performance. Adam emphasized that a company's growth and competitiveness in the market are directly proportional to how well its employees are equipped with up-to-date expertise and how they leverage that expertise to drive innovation, efficiency, and productivity within the organization. The important factors there were determined to be the productivity and flexibility levels that the firm can achieve (Adams, 1994).

Bourguignon argued that performance should not be viewed as a fixed outcome or a single result but rather as an ongoing, dynamic process. He emphasized that understanding performance requires recognizing the continuous cycle of observation and action that shapes it. According to Bourguignon, performance is influenced by the constant adjustments and interactions that occur in

response to changing circumstances and evolving goals. He highlighted that to truly grasp the concept of performance, one must consider the fluid nature of these interactions and the adaptability required to navigate the ever-shifting environment in which organizations operate (Bourguignon, 1997).

Several studies have explored the extent to which a firm meets the expectations of its shareholders as a key indicator of overall performance. These studies suggest that aligning the company's results with shareholder expectations is not only crucial for assessing financial success but also for gauging long-term viability and strategic effectiveness. When a company consistently meets or exceeds these expectations, it often reflects strong management, effective resource allocation, and a clear understanding of market dynamics. Conversely, a failure to meet shareholder expectations can signal potential issues within the firm's operations, strategy, or market positioning. This approach highlights the importance of understanding and managing shareholder expectations as a critical aspect of evaluating a company's overall health and performance (Harrison, 1999).

A research study that builds on the work of Warmington, Lupton, and Gribbin, but delves deeper into various factors, is the model developed by Selvam and his team under the title of "Company Performance Determinants." This model takes a more comprehensive approach by identifying and analyzing a broader range of variables that influence a company's performance. While Warmington, Lupton, and Gribbin laid the groundwork for understanding key performance indicators, Selvam and his colleagues expanded on this foundation by incorporating additional elements such as market conditions, organizational structure, leadership effectiveness, and external economic factors. Their model offers a more detailed framework for evaluating how these diverse factors interact and contribute to a company's overall success, providing a more nuanced understanding of the determinants that drive performance. (Table 1).

Lebans and Euske tried to make firm performance measurable by providing their own definitions. According to their study, it is better to measure performance measured from both financial and nonfinancial perspectives to achieve a predetermined goal. The performance indicator can be seen as a causal model that explains how future results are affected by the current situation. Just as each performance evaluator may evaluate the same performance differently, the same evaluator does not make the same comparisons in businesses in different industries or areas. Even institutions in the same area but of any unequal factor (most size of firm) requires their own evaluation. However, as

a result, no matter how many different evaluation processes are carried out, it is necessary to be able to quantify the performance measure.

Firm performance	←Profitability Performance
	←Market Value Performance
	←Growth Performance
	←Employee Satisfaction
	←Customer Satisfaction
	←Environmental Performance
	←Social Performance

Table 1 Determinants of Firm Performance

(Selvam, 2016).

The company's performance analysis can be examined by many interested parties. The company's interested parties are not only internal but also external to the company. The parties that analyze the organization or use the analysis usually include:

Internal users such as

a. Shareholders - The number one party interested in the performance of the company is the company owners. Because once all liabilities have been paid off, shareholders retain a residual interest in the company and are entitled to its net assets.
b. Investors - Various factors must be considered when choosing which company to invest in. One of the biggest factors affecting investors' decision-making process is the company's performance.
c. Board of directors - They are responsible for protecting the interests of shareholders. Therefore, those are responsible for performance. Based on performance, board of directors set the compensation of the firm's senior managers, decide on the company's strategic direction, keeping an eye on the performance of the business.
d. Senior managers - Some privileges (such as expense accounts, company plane use, and special retirement benefits) can be added to a salary of senior managers. Also, their bonus is determined by some performance-related metric for the organization. It is reasonable to assume that they have the interests of maximizing their overall earnings and maintaining their position of employment. These facts shows that managers have a sufficiently high interest in the company's success because executive incentives are usually linked to some

indicator of the company's performance. So, they usually have the high possibility of a conflict of interest with the company owners.

e. Employees - Workers want to see a company succeed so they may grow in their careers, have more job security, adequate and timely paid salary, better working conditions, maximize their payments, spend more time and energy with their families and so on.

External users such as

f. Creditors/Lenders - Lenders that provide credit to a business are known as creditors, and they typically look through analyses to learn more about the creditworthiness and health of the enterprise. They can use this knowledge to make a rational decision about whether to raise capital in a specific business. In general, creditors have serious disagreements with company owners regarding the company's risk-taking level, which this level directly affects performance.
g. Suppliers - The supplier's interest is similar to the employee's interest, because the company wants to work with a solid company, receive regular orders, and receive payments on time.
h. Customers - They look more for non-financial performance than the direct financial results of the business. In other words, what customers want is quality products and/or services, customer satisfaction, positive experiences, and affordable prices.
i. Competitors - Competitors are closely interested in the performance of the business because they can set this performance as a benchmark for themselves. At the same time, their competitors' strategies and current situation, growth rates provide them with useful and comparable information in the same area.
j. Rating agencies - They conduct such analyses because they evaluate the performance of the company according to specific factors due to the nature of their work.
k. Government/tax authorities - The financial results of the business determine the tax liabilities, so the tax authorities are the interested party.
l. Analysts (potential investors) - Analysts compare current and future performance, potential investors attach great importance to predicting the future performance of companies and make decisions based on these predictions. They formalize stock values that they believe to be current based on future expectations and invest in assets that they think are undervalued.

m. General public - The performance of an institution may be a matter of interest to society because of its potential contributions to social welfare.

1.2 Financial analysis in performance assessment.

In quantification of enterprise performance, financial analysis has a broad role. With the assistance of financial analysis techniques, current financial position, potential growth of company can be evaluated. It can create a general description of financial health of a firm. Financial analysis can be done from several different perspectives. From a slightly narrower perspective, an examination can be done by processing the past and current data to deal with the current situation of the company. This is usually created to understand the current cash flow of the institution, its liquidity ratio, its ability to pay short-term liabilities. On the other hand, Only the past and present situation is not enough to make an investment, because the past or present good things do not always guarantee that they will go well in the future. Therefore, a broader analysis is required and both micro-level and macro-level factors should be taken into account for forecast about firm's future. Financial statements, ratios, operational efficiency, competitiveness, governance, and other internal indicators within a firm are key micro-level factors which directly influence its potential. Overall economic condition, GDP growth rate, industry trends, regulations, political situation, technology developments, and other global factors are external but impressive points. In general, micro factors have direct influence in short-term, macro factors have influence on economic environment which results in long term period.

The most commonly used terminologies at the time of financial review include "financial health", "financial performance" and "financial position". First, financial position reflects firms' or individuals' assets, liabilities and equity which exist in typically balance sheet at a specific point in time. Secondly, financial performance often illustrated as profit and loss statement (P&L) which is generated over a specific period (usually one year). Finally, financial health is comprehensive approach which shows strengths and weaknesses of financial situation.

Financial statements are used primarily to perform financial analysis of a company. Financial statements are used as the most basic for making financial analysis of a company. The categories and amounts in these statements are financial indicators and all analysis starts with them. Since businesses are generally sophisticated and therefore complex, analyzing them also becomes complicated and requires a lot of attention and care. Therefore, especially in recent years, it is preferred to use a single valid and standard system to analyze and evaluate all these complex

environments. Of course, if a more specific and special developed system is created for each situation, a sharper and more precise result can be obtained. However, this both demands a lot of cost and takes a lot of time and resources, so such definite results are not desired. That is why a versatile and specially developed system for each situation is not in great demand. Instead, standard and features that can handle some specific situations are sufficient for analysis at first. Definitely, special situations should be taken into account at the time of analysis and decision-making, but this can be done by the analysts who initiate and continue the research. Here, the analyst's approach and evaluation have a very big role in the decision-making process and in the formation of the analysis.

The above-mentioned single system or model should work equally well for large and small companies regardless of the size of the company. Otherwise, it may seem that large scope companies perform better than small ones. However, the comparison should be evaluated according to each one's own historical performance, according to the capital it has and the resources it uses, according to its net profit percentage compared to its sales, according to its completion of previously targeted destination, etc.

There are many different models and schemes for measuring performance. One of the most widely used scales is the balanced scorecard. Balanced scorecard is a performance measurement scheme that includes many financial and non-financial factors and aims to balance both sides according to the analyzed sector and business. Balanced scorecard brings the diversity to the same point, helps analyze customer relations and customer satisfaction level, business processes, how much efficiency the rapidly developing technology adds to the work done, etc. Balanced scorecard can also greatly support understanding the interrelationships and trade-offs between above-mentioned factors. With newly developed models targeting this objective, the interrelationship of different factors is observed. Nevertheless, these measurements witness great differences across industries and sectors.

According to (Kaplan, 1992), a more specific balanced scorecard is needed for each branch so that more accurate studies can be done. Kaplan and Norton argued that a balanced scorecard should be developed that is specific to the general market environment, marketing strategies, product services, and many other factors. The table below is a table taken from their study and summarizes the main financial indicators based on manufacturing, tourism, fashion design, and family businesses (Table 2).

Manufacturing (Fernandes et al., 2006)	Hotel sectors (Phipips, Louvieris, 2005)	Family firms (Craig, Moores, 2005)	Fashion Business (Cardinaels et al., 2010)
Revenue growth, Return on equity, Unit cost, Economic value added, EBIT.	Gross operating Profit, Net operating profit, Sales achieved, Adhering to budget Meeting financial Targets, Achieving predicted room and occupancy rates, Revenue per available room, Cash flow.	Revenue growth Productivity improvements	Sales margins (%), Sales growth per store (%), Inventory turnover, Percentage of sales from new stores (%).

Table 2 Financial performance indicators

Performance has different importance in the short and long term. For example, if the short term is considered, it is possible to sense the intention to lend to the company. Because during the loan period, the financial situation of the institution to which the loan is made and its ability to pay the debt with interest need to be investigated. On the other hand, if a long-term performance estimate is required, this is an indication that there is a longer-term plan with the company. The long-term plan includes larger and riskier decisions such as direct investment in the company, purchase of stock, partnership, share ownership, etc. In the first case, the person who does the research for the company becomes the debtholder, in the second case, the equity holder or shareholder if the investment decision is made. Debt Holders are less risky than equity holders, as previously mentioned. It is for a variety of reasons.

Firstly, the investee is obliged to make payments to the debtholder every month or, if agreed, at shorter or more frequent intervals, but the equity holder is not obliged to make any payments. But there is an exception, investee has a payment obligation to only preferred stock owner with

predetermined value. Because preferred stock has priority over other common shares when it comes to dividend payments.

Secondly, the company makes interest payments from the amount of EBIT it earns. This includes both the principal payment for the entire debt for that period and the interest payment. The dividend payment to shareholders is made from the remaining net profit share after the interest payment and tax payments. It is discussed how much of the net profit will remain with the common shareholders and the retention rate is decided. The retention rate can vary from 0% to 100% depending on the company's situation, future plans and efforts to please the shareholders. In other words, debt payments are made before taxes are even paid. Debt payments are prioritized, and then the decision of the board of directors is whether to make a payment to stockholders and the retention rate is discussed.

Although there are a lot of the differences between debt and equity instruments, the last important difference is the upside potential. In other words, the reason why the equity owner takes so much risk is that there is actually no upper limit to his gain. Namely, both the debtor and the equity owner may not get back the money they invested; they are at risk, it is maximum loss for both sides. However, in return for each level of risk, the highest profit of debt provider is the debt he gave, and the interest calculated on it.

However, things work differently in equity. As the value of the company and the price of the stock increases, the owner's wealth increases and there is no upper limit to this, so there is no limit to increase its his wealth. Still, there is always a risk that the value of the company can fall, and the price of the shares can decrease. This is why potential investors try to make long-term predictions by making comprehensive financial analyses and generating models.

All above explains why an equity investor is more concerned with a company's profitability and per share value, whereas a debt investor is more concerned with the ability of the business to pay interest and repay the principal invested. Financial analysis's main goals are to evaluate a firm's capacity to grow its operations profitably, generate enough cash flow to pay obligations, and seize opportunities. It also aims to determine if a company can generate a return on its capital that is at least equivalent to the cost of that capital.

The importance of different financial analysis techniques in performance evaluation was emphasized. However, the question of whether this is enough for us to make an investment is a

reasonable question. Because it will not always be right to invest although the performance is good. In general, good performance alone will not be enough to make investment decision for some reasons.

Because if the project will be implemented for the first time after the investment, the definition of "good performance" should be much more complete. It is more appropriate to measure good performance by whether the expected performance from the project is met. The expected gain from the project is a subject that will be discussed more comprehensively in the 2nd chapter and is a cost in return for the capital spent considering the risks of the project. If this minimum expectation is met or if it can earn more than this expectation, the project can be considered as suitable for investment.

Another reason is that if a decision is made to invest in a business that is already performing well, it may not be enough for it to meet expectations alone. Because when purchasing a stock to invest in such a business, the price of the stock plays a very important role. Investing requires the right timing. For example, it will not be enough to just find a business that is doing well and buy its stocks, because investors who probably agree with you are also buying, and the price may have increased. In fact, sometimes a good comment made by analysts or researchers may have caused an excessive price increase. The general expectation is that over time, the stocks will reach their real value, their price. In other words, if the investors invest capital in the right business at a high price at the wrong time, when the price drops to the level it should be over time, despite planning to make a profit, they may suffer a loss.

Therefore, finding an investment area with a bright future and a price that is lower than it deserves (often referred to as “undervalued”) would be the ideal path for investors. If there is an investment that is currently “undervalued”, it is worth keeping rather than selling. If a buy price that is higher than its expected value (often referred to as “overvalued”) would not be a suitable option for investment decision. If such an overvalued project is in the portfolio, it can be one of the best times for selling. In last, if project is “fairly valued” which means market price and forecasted value are close or even equal, it is not recommended to buy or sell. If there is such a “fairly valued” project in the portfolio, no transactions should be made yet.

1.3 Limitations of financial analysis

Financial analysis, like many other analytical techniques, has its own set of limitations that must be taken into consideration. One of these limitations is the challenge of encompassing all relevant factors due to the potential for generating unfavorable or chaotic outcomes when not all factors are weighed properly. It is crucial to bear in mind that these constraints are not solely related to the thoroughness of factor consideration. This complexity, which is likely to be encountered during each study, can unfortunately cause the work to continue in the wrong direction. Namely, it is more difficult to obtain a completely clean result from such complex data, because the margin of error of the human working on it increases.

As in every human-touched study, it is possible to encounter human errors in analysis. Therefore, it is necessary to use special care and attention when working in areas where such kind of errors can be made more often. In addition, audit committees should be mobilized to cope with this kind of mistakes. With years of experience, structuring strict control in places where there is a high probability of making a human error will help to prevent such human errors and obtaining incorrect results.

An impediment frequently encountered in the comparison stage of financial analysis arises from the varying estimates, standards, classifications, and tax implications found within financial statements. The presence of such discrepancies can hinder a straightforward comparison with industry competitors, yet, with careful adjustments, financial statements can indeed be aligned for more accurate assessments. Nonetheless, this realignment process may be painstaking and resource intensive.

Furthermore, the dynamic nature of variables such as inflation rates, fair values, and fluctuations in interest rates pose significant challenges due to their inherent unpredictability, which in turn makes the process of precise calculations and estimations a notably formidable task. This inherent unpredictability serves to add a layer of complexity to the analysis process, further complicating the attainment of definitive conclusions.

Moreover, a pertinent drawback commonly observed in financial analysis stems from its heavy reliance on historical data as the primary basis for drawing conclusions. While historical data provides valuable insights, it can potentially limit the ability to accurately project future outlooks and effectively respond to unforeseen changes in the financial landscape. This limitation is

exacerbated by the typically narrow focus intrinsic to financial analysis, where the emphasis is largely placed on financial and numerical aspects, potentially neglecting broader contextual factors.

Hence, many experienced analysts advocate for the incorporation of non-financial factors in financial analyses to address these limitations effectively. By integrating personal judgments and insights into the analytical process, analysts can create more comprehensive and well-rounded assessments that take into account a wider array of influences and potential future scenarios, thereby enhancing the overall robustness and relevance of their analyses. This strategic integration of non-financial factors serves as a strategic approach to complement the strictly numerical aspect of financial analysis and offers a more holistic perspective for making informed decisions and strategic recommendations in the volatile financial landscape.

It is possible to explain the increase in the value of the company with a simple equation. If the profit obtained from the investment is more than the cost of the investment, this increases the value of the company. However, this value, especially net profit, can be inflated or shown less than normal in financial statements. There may be many reasons for such distortions.

The most basic of these is to show the profits more and to make the performance seem more inflated to the people who will invest. When the profit seems high, the return-on-investment rate, profitability level, asset turnover amount will seem more attractive and more worth investing. It can be witnessed that artificial inflation is made by showing the expenses made less, by capitalizing the expenses, delaying the recognition and etc.

On the other hand, perhaps even in financial statements, the sales are recognized earlier or more than actual, and as a result, the general sales are increased artificially. In addition to these manipulation methods, some financial statements are prepared intentionally which consolidate the money earned from business primary business activities called operating revenue and from other secondary activities called non-operating sales. But in fact, operating sales is the main concern for investors and should be shown separately from other earnings. Because operating sales are continuous, other earnings do not constitute continuity, and even if they are continuous, they do not show the performance of the primary business. In many ways like this, profits are manipulated and multiplied, which puts great limits on seeing the real values.

On the contrary, values can be presented as if they were smaller than they are. In particular, the amount of earnings before tax (EBT) is tried to be minimized. The reason for this is to try to spread

out the tax. The lower the earnings before tax, the lower the amount of tax debt that must be paid. Therefore, expenses can be increased, payments that need to be capitalized are reflected as current expenses, payments can be made early, etc. The only purpose can be to reduce the amount to be applied for the effective tax rate which is percent of income that an individuals or corporations must pay for their profit, and it is also the one of the biggest weaknesses in this field.

Most of the above-mentioned methods are frequently used manipulation methods regardless of their illegality. However, it is known that some possibilities given in the accounting rules can be used as a manipulation tool.

Because each business has its own financial situation, each has its own characteristics. Therefore, in order to express corporation in the best way in financial statements, standards can offer flexibility in some parts. Accountants should use this to express the current financial description of the company. These flexibilities are mostly based on the ideas and opinions of those who create financial statements. However, this suppleness should not be used as any manipulation technique and should be within the framework of logic. Auditors check how much these untied areas reflect reality.

These flexibilities in accounting rules include decision of the useful life of the large amount of assets purchased and selection of the appropriate depreciation method. They directly constitute the non-cash part of the current period's expenses. This also affects important issues such as being able to manipulate net income, paying taxes early or late. It can be a trick to make cost savings by paying less tax with the help of making net income lower as a result of recognizing expenses earlier than it usually is.

Another flexibility is sales returns & allowances, another issue that requires estimation in accounting standards. Since sales returns & allowances part of financial statements is a situation that may occur after a period of time after the sale is made, they should be recorded by making an estimate in the reporting period. Normally, that kind of estimations should also be expressed at or near that rate as it was in previous periods or a decrease or increase to the rate can be made in the current period due to any radical reason. Again, this estimated value can be forecasted much less in order to show sales for manipulation purposes. It is also a method that is far from being true since it is likely to be an overly optimistic approach. In general, the accounting approach in which profits are recorded early and very optimistically in financial statements is called "aggressive

accounting", while the accounting approach in which profits are recognized late and expenses are recognized early is called "conservative accounting".

Finally, because managers are involved in running the business, they have more business knowledge than both internal users of financial analysis, such as boards of directors, and external users, such as outside research analysts. The inequality of information between the managers and especially the board of directors regarding the business processes and the execution of the operations is one of the main factors that cause conflict of interests between the parties. The essence of the problem called “principal-agent problem” is that each side prioritizes its own interests. To put it more clearly, managers generally focus on shorter-term goals because the commissions and bonuses they can receive are based on the financial performance of that period. Therefore, managers resort to methods such as investing in businesses that bring profit in the shorter term, recognizing profits earlier, etc. to increase their own earnings. But their primary duty is to increase the wealth of shareholders. This should be structured more fundamentally by doing longer-term projects. Therefore, the board of directors aims to increase not only the current performance of the company but also its future potential. They even know that they have to refuse to take a large part of the current profit for the sake of future performance and that it is more convenient to invest money in capital.

One of the effective ways to solve this mutual problem is to change the manager compensation procedure that causes the problem, in order to establish a reward system that focuses on operations and targets, not just material factors such as profit. In addition, this compensation should be measured with a target close to the shareholders' primary goals. The closer the interests of both parties are, the less conflict of interest there will arise.

II CHAPTER. DIFFERENT TECHNIQUES IN FINANCIAL ANALYSIS

Financial analysis can be more meaningful if it is conducted as per needs of the research and the unique characteristics of the firm. This has led to the development of many different methods in this field. Despite this specificity, the purpose of all methods is almost the same, evaluating an economic behavior of a business. The fundamental objective of financial analysis methods is to obtain the most crucial and relevant financial indicators providing the company management with an objective, reasonable and complex financial picture of a company. The procedure of financial analysis of an enterprise includes:

A. The representation of the preceding development of financial performance.
B. The identification of changes in the financial performance over time.
C. The specification of the reasons for the increase or decrease in fiscal performance.
D. The preparation of appropriate actions for enhancing processes in the company and improving its financial position and situation.
E. Being able to make predictions about the future by determining the main trends in the measured performance of the company.

When choosing analysis methodology, it is very important part what you are looking for. The keys to the different types of questions is hidden in different methodologies. When doing fiscal research, the most frequently asked questions are where to invest capital and when to invest. While the answer to the question of what to invest in can be found with **fundamental analysis,** the question of when to invest can be answered with **technical analysis**.

In addition to the questions asked, the choice of tools intended to be used is also a major factor in determining which methods will be chosen. Tools are generally either primary or advanced. Primary instruments are simpler and can be used by almost anyone interested in analysis, which is why they are preferred by wide range of users. Tools are usually either primary or advanced. Primary tools are simpler and are of a type that almost everyone interested in analysis can use, which is why they are preferred and useful by most people. **Absolute indicators, ratio analyses, and cumulative indicators** are examples of primary analysis.

Advanced analysis tools, on the other hand, can be used by a narrower range of people due to their difficulty and complexity. Large systems can stand behind such advanced analysis methods, which is costly because they require both more workers and more time and resources. For this reason,

such complex systems are preferred by very large companies or holdings when more detailed analysis is required. This type of detailed work is often requested by customers for a specific range of purposes.

2.1 Fundamental and Technical Analysis

Basically, financial analysis techniques are divided into two groups: fundamental and technical analysis techniques. A crucial difference is that while fundamental analysis often requires a more qualitative approach, incorporating a researcher's professional judgment on factors like management quality, competitive positioning, and economic conditions, technical analysis primarily relies on processing quantitative data, such as price and volume, to identify patterns and trends.

Fundamental analysis basically comprehends qualitative and comparative attributes. Analyzing an analyst's subjective viewpoint, theoretical knowledge, and impacts from the economy and industry are all part of fundamental analysis. By analyzing the firm's internal and external settings, the analysis seeks to assess the core worth of the company. While the in-house (internal) setting looks at the firm as a whole, its current life cycle, and the nature of corporate goals, the outside backdrop is typically represented by macroeconomic and microeconomic issues affecting the firm.

Technical analysis is an essential aspect of financial analysis that involves the utilization of computational, statistical, and mathematical techniques to process quantitative data. This can include various factors such as price trends, trading volumes, and market indicators. Through these methods, technical analysts are able to gain insights into a company's past performance and use this information to predict its potential success in the future. However, it is important to note that technical analysis should not be solely relied upon and must be complemented with qualitative analysis to consider broader economic factors. By combining these two forms of analysis, a more comprehensive understanding of an organization's financial health can be achieved.

2.2 Analysis of Absolute Indicators

A fundamental method that supports the more mathematical analysis of a company's financial performance is the analysis of absolute indicators. Because they are easy to apply and interpret, **horizontal and vertical analysis** are popular techniques for financial evaluation. The foundation of both methods is direct information gathered from financial documents, such as the cash flow

statement, profit and loss statement, and balance sheet, that show the health of the company's finances.

2.2.1 Horizontal Analysis

Both horizontal and vertical analysis belong to the fundamental analysis. They use numerical data, process it and results help to interpret financial situation. Because of their applicability, they are more widely used methods.

The main purpose of performing horizontal analysis is to observe the change in target elements over a certain period of time. Thus, the change of these target elements can be easily compared. This difference can be reflected in 2 types such as absolute and relative (Figure 1).

$$Absolute\ change = X_t - X_{t-1}$$

$$Relative\ change\ (\%) = \frac{X_t - X_{t-1}}{X_{t-1}} \times 100$$

$$t - time\ (year)$$

$$X_t - value\ of\ variable$$

Figure 1 Horizontal Analysis

When the changes in the values themselves are investigated over time, it is more appropriate to use the absolute difference, and when comparing them with each other, it is more appropriate to use the relative difference. Because the volumes of the different elements being compared may not be the same, in which case the absolute difference may remain meaningless. **Trend analysis** is a special case of horizontal analysis, if at least 3 periods are compared (Mrkvička, 2006).

2.2.2 Vertical Analysis

Vertical analysis, also called **structure analysis**, reflects how much value the items in the financial statement have relative to the total base. The two financial statements where structure analysis is most commonly used are the profit and loss statement (P/L) and balance sheet (BS) (Figure 2).

$$Vertical\ Analysis\ formula\ (IS) = \frac{Income\ Statement\ item}{Total\ Sales} \times 100$$

$$Vertical\ Analysis\ formula\ (BS) = \frac{Balance\ Sheet\ item}{Total\ Sales\ (Liabilities)} \times 100$$

Figure 2 Vertical Analysis

In the structure analysis, all balance sheet items are disclosed as a percentage of total assets and all income statement (profit and loss statement) are disclosed as a percentage of total sales. In the balance sheet, analyst can observe capital composition. On the other hand, in profit and loss statement, vertical analysis gives users an ability to read how much of the sales is net income and how much is cost of goods sold, other expenses etc. In this way, not only the sales but also the income rate is determined which is crucial to identify profitability.

When we compare vertical analysis with trend analysis, one of its biggest advantages is that it is not affected by inflation. Because in structure analysis, the ratios are determined according to a financial report to which it belongs. Therefore, this method is more useful in the long term, it does not require any inflation adjustment. Thus, it can be easily used in a wide variety of companies and comparisons can be made on a large scale.

2.2.3 Golden balance rule

Analyzing the company's capital structure is one of the most important financial analysis factors. Because it shows how much of the total company is based on equity and how much is based on liabilities, which is one of the most useful elements that measure the riskiness of the business. When making this risk assessment, the best result expected by the analysis is called the golden balance rule. This is a regime that can demonstrate the stability of the financial situation over a long period of time. This rule reflects the ability of current assets to be covered only by short-term liabilities.

$$Current\ Assets\ \leq\ Short\ term\ liabilities$$

On the other hand, if non-current assets are covered by both equity and long-term liabilities, the golden balance rules are met. There is also an order in financing. Namely, non-current assets will be financed by equity first.

$$Non\ current\ Assets \geq Equity$$

If the rules are combined, the following relation results:

$Equity + Long\ term\ Liabilities \geq Non\ current\ Assets \geq Equity$ (Vochozka)

2.2.4 Working capital

Working capital is among the absolute indicators used by a wide range of users to measure the ability to finance daily activities. It is generally calculated as the difference between current asset and current liability and helps to produce an idea of whether it has sufficient liquidity.

A company that generates positive net working capital is preferred. Due to insufficient liquidity, a company with adverse working capital is probably not going to be able to meet its short-term obligations on time. The type of business a company engages in determines the acceptable level of working capital. For example, capital-intensive businesses that manufacture large machinery and equipment take longer to turn a profit since manufacturing, production, and sales take time. Therefore, for these kinds of businesses, even a very little amount of NWC may be more than appropriate. Nonetheless, it is strongly advised to function with a sufficient amount of operating capital.

Sometimes not all current assets are selected, and some current assets are omitted from the equation when clearer elements are needed. For example, the most commonly used current assets in working capital are cash and cash-equivalents, marketable securities, and occasionally short-term receivables can be included optionally. The same applies to current liabilities, sometimes only payments and liabilities to be paid in the short term can be included. The short term here generally refers to cash expected to be earned within 1 year and debts to be paid within 1 year.

Paradoxically, while it is negative for a company to have little or negative working capital, it is also negative when it is too much. However, these negative aspects are not signs of the same problem. Because a negative working capital of a or negative indicates that its capacity to meet its short-term obligations is low or almost non-existent. On the other hand, having more than enough working capital means that the company only holds its own current cash and does not. This will definitely reduce future potential earnings.

2.3 Ratio analysis

Analysis using ratios is the most commonly used type of financial research because this method is easier to structure, less time-consuming, and less costly. However, if the variables are selected correctly, very important relationships can be captured and much needed information about the company can be obtained. These details are not visible when we look at the financial statement with the naked eye, but if a trend is detected, predictions concerning the future can be made in addition to those about the past and present. But more than one ratio is always considered, relative ideas are put forward, and a clearer picture is created by taking into account general economic environment, financial fluctuations and other important factors. So, for example, no matter how ratios give good and bright impression, if there is an economic recession, it is unrealistic for future expectations to be very positive.

In such cases, companies that operate in more than one sector may be more promising. In this case, it is not right to compare a business that belongs to a single industry with a business that operates in several sectors. **Cross-sectional analysis** is suitable for use to eliminate this inequality. The most mentioned analysis type with cross-sectional analysis is almost always time series analysis which is the evaluation of historical performance. In other words, it is not enough to examine the company's current performance, analysts should also criticize its past performance and they tend to learn whether this good performance is a coincidence or a particular trend.

2.3.1 Profitability ratio analyses

Profitability ratios (Figure 3) provide important financial information about how much profit a business generates from its sales/service/operations, what portion of its sales are net income, how much of its capital it has returned, and more.

Significant elements of sales such as gross profit, operating profit, EBITDA, EBIT, EBT, net income etc. are investigated. The ratio of any of them to the total sales reveals the margin of that element. Of course, it is profiting sign when the company has higher results. On the other hand, it is possible to ascertain rate of income return is obtained by using total asset/equity/capital with the help of the profitability ratio. Investors generally require a certain return on equity (ROE) or return on invested capital (ROIC) rate before strategic investment decision. If the project’s estimated rate is lower than required rate, generally the investment is rejected. The profit ratio of the investment is expected to be much lower in startups and higher in mature businesses. Because in startups, there is strong demand for high amount of investment and there is a situation where little income is

obtained or not yet obtained at all. As a result, it may be unreasonable to expect a high rate for startup projects. However, in mature businesses, large investments are not required, ordinarily income is more stable.

Return on asset (ROA) = Net profit / Total assets
Return on equity (ROE) = Net profit / Equity
Comprehensive-ROA = Comprehensive income / Total assets
Comprehensive-ROE = Comprehensive income / Shareholders' equity
Return on invested capital = Operating profit / (Total liabilities + Shareholders' equity)
Gross profit margin = Gross profit / Net sales
Operating profit margin = Operating profit / Net sales
EBITDA margin = EBITDA / Net sales
Net profit margin = Net profit / Net sales

Figure 3 Profitability ratios (Francois-Eric Racicot, 2011)

2.3.2 Activity ratio analyses

Activity ratios (Figure 4) show how effectively business can generate cash by utilizing their assets.

Inventory turnover = Cost of goods sold / Average inventory
Days of inventory on hands (DOH) = Number of days in the period / Inventory turnover
Receivables turnover = Revenue or Revenue from credit sales / Average receivables
Days of sales outstanding (DSO) = Number of days / Receivable turnover
Payable turnover = Purchases / Average payables
Number of days of payables = Number of days in a period / Payable turnover
Working capital turnover = Revenue / Average working capital
Fixed assets turnover = Revenue / Average fixed assets
Total assets turnover = Revenue / Average total assets

Figure 4 Activity ratios

One of the most used activity ratios is the inventory ratio. This ratio indicates how effectively the inventory is operated. Another activity ratio derived from inventory ratio is the days of inventory

on hands (DOH) ratio. The DOH ratio indicates how long (usually measured in days) it takes to convert inventory into sales. The same logic applies to receivables and payables turnover rates, and the number of days of payables and receivables are derived from these rates. The Working Capital Turnover Ratio is another efficiency metric that indicates how effectively a business is leveraging its working capital to support sales growth. If the same process is examined by assets, it is called total asset turnover ratio. A special case of this ratio is fixed asset turnover.

2.3.3 Liquidity ratio analyses

The ability of a business to settle its short-term debt is gauged by l**iquidity ratios** (Figure 5). The speed at which a business may convert its assets and use them to pay off outstanding debts is measured by its liquidity ratio. The easier it is to pay off debts and stay out of default, the greater the ratio. Before giving short-term loans to a business, creditors look at this crucial liquidity condition. The general liquidity measurement is made with the current ratio, which is the ratio of the current asset to the current liabilities. Cash ratio does not take into account current assets other than those that are most quickly converted into cash, such as cash and short-term marketable securities, while quick ratio takes into account receivables account in addition to the cash ratio.

There is another similarity to quick ratio, which is not all current liabilities, but using daily expenses. This is implemented with the help of the defensive interval ratio (DIR), the result obtained shows the time the company can meet daily expenses without needing to use capital resources.

Current = Current assets / Current liabilities
Quick = (Cash + Short-term marketable securities + Receivables) / Current liabilities
Cash = (Cash + Short-term marketable securities) / Current liabilities
Defensive interval = (Cash + Short-term marketable securities + Receivables) / Daily expenditures
Cash conversion cycle = DOH + DSO - Number of days of payables

Figure 5 Liquidity ratios

The cash conversion cycle (CCC) also called the net operating cycle or cash cycle, is a liquidity ratio derived from activity ratios. The goal is to understand how much time is needed to sell inventory, collect receivables, and then make payments.

2.3.4 Solvency ratio analyses

With solvency ratios, analysts can investigate the ability of businesses to meet their financial obligations, usually over a period longer than one year. Solvency ratio also called **leverage ratio** (Figure 6), measures the ability to pay long-term debts, just as the liquidity ratio measures the ability to pay short-term debts. This measurement can be done with a simple calculation such as the ratio of debts to assets, capital, or equity. Financial leverage is also often used to understand how much of the company's assets are covered by equity and how much by liability, this is the ratio of assets to equity. A high result indicates that a small portion of the assets are covered by equity, i.e., the debt is high.

Debt-to-assets = Total debt / total assets
Debt-to-capital = Total debt / (Total debt + Total shareholders' equity)
Debt-to-equity = Total debt / Total shareholders' equity
Financial leverage = Average total assets / Total shareholders' equity

Figure 6 Leverage ratios

2.3.5 Coverage ratio analyses

With **coverage formulas** (Figure 7), it is possible to measure the ability to cover specific payments such as interest, dividend, lease, and other payments. The higher the result, the more ability to service its financial obligations it indicates.

Interest coverage = EBIT / Interest payments
Fixed charge coverage = (EBIT + Lease payments) / (Interest payments + Lease payments)

Figure 7 Coverage ratios

Sometimes coverage and solvency ratios can be likened. Because both represent the scope of the business and the ability to pay debts. But there are important differences between them. Solvency measures the company's ability to run its operations in the long term, while coverage evaluates its ability to meet the more specific short-term payments mentioned above.

2.4 Analysis of Cumulative Indicators

Absolute indicators can sometimes misdirect researchers. Because not all absolute indicators come to the same conclusion. Therefore, looking at more than one absolute indicator can be misleading.

On the other hand, looking at just one type of absolute indicator will definitely not be enough. Because absolute indicators have a limited scope of explanation on their own.

For this reason, it would be more appropriate to collect the necessary indicators according to the purpose of the research and make a comprehensive cumulative analysis without making a mess. Thanks to this cumulative analysis, more than one factor is taken into account and it is possible to reach a single result that is not misdirected. In addition, since more than one situation is examined, if there are relationships between these situations, they also emerge, and these hanging relationships between variables can also be clarified.

The principal aims of a cumulative indicator analysis are to enable periodically the transparent tracking of business performance over time and to furnish a foundation for subsequent decision-making. There are many different examples of cumulative indicators, and these examples have emerged from some basic techniques. If desired, the researcher can also use a special technique by developing a cumulative indicator that suits his needs.

The pyramid decomposition technique is recognized as one of the most necessary tools used among different financial analysis techniques. In general, such pyramids help to understand how different factors are divided within performance, how they affect the overall business, and the connection among this type of factors. Credibility and bankruptcy models, on the other hand, can be classified as cumulative indicators, as they aim to measure the probability of a company going bankrupt or the risk of going bankrupt in the future by reflecting several perspectives on one single variable.

2.4.1 DuPont analysis

One of the best examples of pyramid decomposition for financial performance analysis is the DuPont analysis. DuPont is such a system that analyzes the indicator that shows how much profit has already been earned relative to equity. Namely, it divides the return on equity indicator into sub-layers, and by analyzing these components, it contributes greatly to seeing the origin of performance more transparently.

Dupont does not only study a single return on equity, it also examines the return on equity indicators that change over a specified period of time, allowing it to determine which component is more responsible for this positive or negative change. This helps understand the factors that are inhibiting performance, which is the most important factor for internal research, while it is a useful method for external researchers to see future risk or growth potential.

Initially, the Return on equity itself shows the ratio of net income to average total equity. In its simplest form, the Return on equity is expressed as the combination of two components: the ratio of Financial Leverage and net income to average total assets owned which is called as “Return on Asset”.

Financial leverage itself is the absolute ratio of the average total assets to the average total equity. In other words, if the assets are high but equity is low, these assets are financed by liabilities, not equity, and therefore the financial leverage ratio is higher. This also shows that the firm's debt level is high, and the default risk is higher than normal level. On the contrary, if the equity constitutes the majority of the average total assets, this indicates that assets are covered by equity. In other words, indebtedness is low, there is no risk of default due to debt. Thus, the initial breakdown of return on equity, which forms the top of the Dupont pyramid, is net profit margin and financial leverage.

If necessary, elements can be broken down to provide a more comprehensive analysis (Figure 8). As a rule, return on asset itself can be divided into the net profit margin and asset turnover. Return on asset (ROA) is an interest rate that shows how much profit is made in return for the assets owned. This is a very important rate because it shows the performance and effectiveness of the company. Because how much profit it has already produced by using resources such as assets is a feature that is paid as much attention as how much profit it makes. Net profit margin is also a widely researched ratio in DuPont model. Because seeing how much of the sales goes to expenses and how much of it remains as net income provides a more accurate understanding of the financial success rate. But of course, net profit margin becomes more meaningful when used together with total revenue.

Due to the importance of net profit margin itself, it is often seen that it is also broken down into elements. The first of these elements is tax burden. This shows the current tax liability that the firm, partnership, or individual to which the business belongs must pay.

It is true that tax burden and tax rate are related concepts. The false fact that the tax rate and tax burden are the same has been formed. Although sometimes confused, tax burden is a different indicator than the tax rate, but the tax rate is a rate that creates the tax burden. However, not every firm, partnership, or individual has the same tax liability, regardless of the tax rate being the same. This distinction is made for several reasons.

The tax rate directly shows the portion of income, property value, and other tax bases that are subject to tax. Tax burden, on the other hand, does not address the interest on the tax liability, but the it is directly related to absolute figure. The main reason why the tax burden result differs from the tax rate arises from this differentiation.

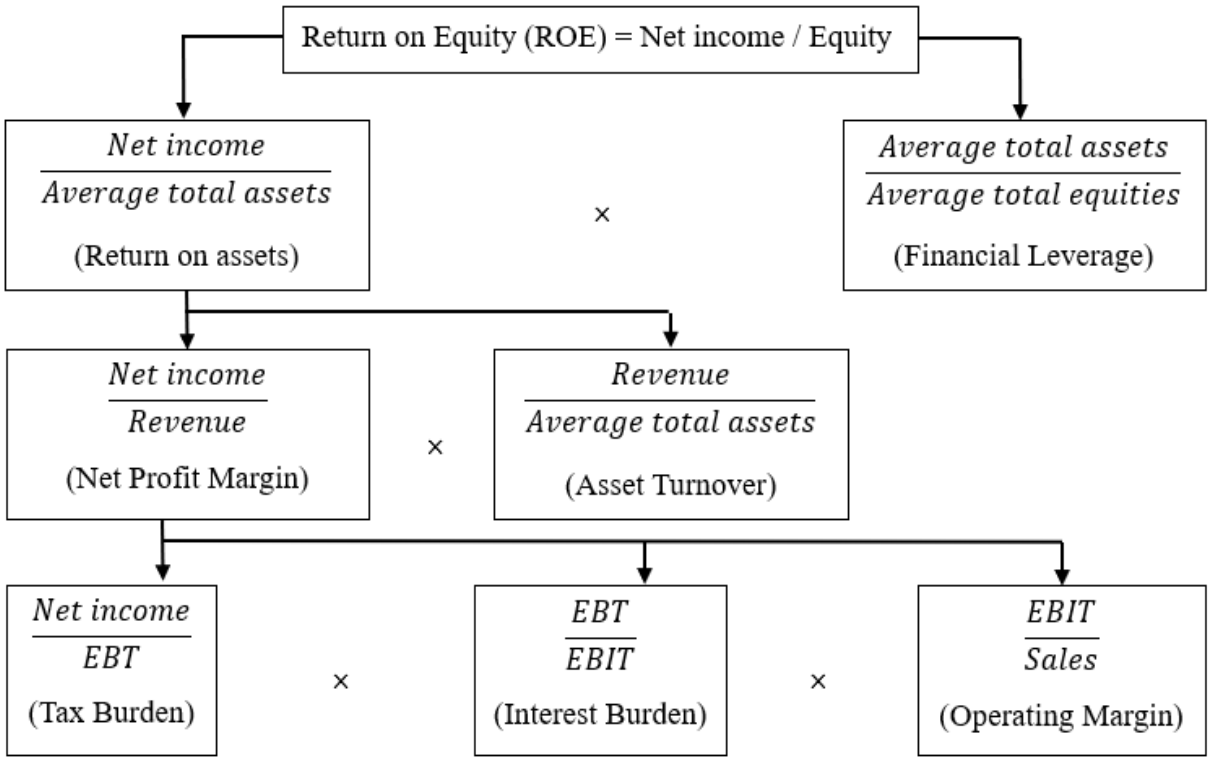

Figure 8 ROE DuPont Model

In summary, the tax rate refers to a specific percentage that is applied to an individual's or business's taxable income, assets, or transactions to determine the amount of tax owed to the government. This rate can vary based on various factors, including the type of tax being levied—whether it be income tax, sales tax, property tax, or corporate tax—as well as the specifics of tax law that may apply at the local, state, or federal level.

On the other hand, the tax burden encompasses the total amount of tax paid by individuals, businesses, or taxpayers as a whole. This burden is influenced not only by the applicable tax rate but also by the base amount that is being taxed—essentially, the amount of income, net worth, or value of goods and services on which the tax is calculated.

Additionally, it is important to recognize that the tax burden can vary greatly among different taxpayers based on their specific financial situations and obligations. Factors such as deductions,

credits, and exemptions can significantly impact the actual amount of tax owed, thus influencing an individual's or company's overall tax burden. Economic conditions and changes in tax legislation can further affect both the rates and the burdens, making the understanding of both concepts crucial for effective financial planning and strategic decision-making.

There is also a term similar to these two terminologies, which is effective tax rate. The main difference of effective tax rate from tax rate is that it does not only consist of tax interest, but also depends on how much tax the individual or company pays. However, tax burden is a broader, more comprehensive concept than effective tax rate. Because tax burden covers all kinds of taxes paid (such as income, property, sales, and excise taxes), effective tax rate only takes into account income tax. Another important reason why tax burden terminology is more comprehensive is its ability to express in numbers the general financial impact on the individual or company, not just for measuring income tax. At the same time, tax burden is not only suitable for business, but also for important calculations such as the percentage of Gross domestic product (GDP) economic output of countries.

The formulas that underline all these differences are as follows: Effective tax rate is the ratio of total tax expense during a specific period of time to earnings before tax (EBT). Tax burden is the ratio of earnings after tax to earnings before tax (EBT) (Figure 8).

Finally, the tax cost also differs according to business ownership. Namely, when there is a corporation type of business ownership, double taxation is applied. Because both the corporation has to pay tax on its profit and the individual has to pay income tax on the income received at the personnel level. That is why corporations pay more for their establishments compared to other types of ownership (Sole proprietorship, partnership, etc.). Double taxation applies not only to corporations, but also to any organization that shares its profits with the shareholder in the form of dividends.

The interest burden is similar to the tax burden in terms of calculation. Similarly, after the interest payment is made, it is taken from the ratio of the pre-tax earnings which is earnings before tax (EBT) to the earnings before the interest payment which is called Earnings before interest and taxes (EBIT). The interest burden methodology shows how much proportion of the financial performance is covered by the earnings part after interest expenses are paid. In other words, the higher the subject ratio, the lower the interest cost is compared to earnings. Incorporating the

interest burden into DuPont analysis offers valuable insights to analysts as they delve into the intricate relationship between a company's debt structure and its financial performance. Specifically, a higher interest burden, indicated by a ratio closer to 1, signifies that the company is managing its interest expenses effectively in comparison to its earnings before interest and taxes (EBIT). This efficient management could potentially enhance the return on equity (ROE) and contribute positively to the company's overall financial health.

With a detailed understanding of how debt obligations and interest costs factor into the company's profitability and operational efficiency, analysts can discern the level of financial leverage employed by the company. This deeper analysis aids in evaluating the potential risks associated with the amount of debt carried by the company and its potential influence on shareholder returns over time. By unravelling these financial intricacies through the lens of DuPont analysis, analysts gain a comprehensive view of the company's capital structure and how it impacts its ability to generate returns for its shareholders in the long run. By diving into the interest burden, analysts are better equipped to make informed assessments regarding the company's financial stability and its competitiveness within the market landscape, thus empowering strategic decision-making and insightful recommendations for investors.

Operating margin is an important factor to consider when evaluating a company's financial performance, especially when using the DuPont Analysis methodology. Operational income to net sales is a measure of how well a business controls its operational expenses in relation to its revenue. When it comes to DuPont Analysis, operating margin is crucial in figuring out the company's total profitability, which in turn affects Return on Equity (ROE). An organization's capacity to control expenses and maintain pricing power is demonstrated by a better operating margin, which shows how well the company converts sales into operating profit. In addition to being a measure of operational effectiveness, this statistic provides insightful comparisons with peers in the industry, enabling businesses to assess their own performance.

A strong operating margin is a key indicator of a company's operational and financial stability to investors, and it influences their choice to invest. Consequently, assessing a company's ability to produce sustainable profits and increase shareholder value requires a thorough grasp of and analysis of operating margin within the context of the DuPont model.

2.4.2 Economic Value Added

Economic Value Added (EVA) serves as a crucial financial metric that enables the evaluation of a company's genuine economic profit. This measurement diverges from traditional profit metrics, which typically focus on operational costs. Instead, EVA takes a comprehensive approach by incorporating the cost of all capital utilized by the company, which includes not only debt but also equity (Figure 9).

The essence of EVA lies in its ability to assess whether a company is able to generate value that surpasses the minimum return expected by its investors. This is achieved by analyzing residual wealth, which reflects the profits left after all capital costs have been deducted. Therefore, EVA serves as a valuable tool for understanding whether company management is effectively creating value for shareholders or simply managing to cover the costs associated with capital. In order to get the profit left after all capital costs, NOPAT must be deducted all costs of capital.

EVA = NOPAT – (WACC × capital invested)

Figure 9 Economic Value Added (EVA)

Net Operating Profit After Taxes **(NOPAT)** represents the profit generated from the company's operations after taxes but before any financing costs. Net Operating Profit After Taxes, serves as a critical indicator of a company's operational efficiency and effectiveness in generating profits from its core business activities. It is a pivotal metric employed for evaluating a company's performance without being influenced by its capital structure, which encompasses the mix of debt and equity financing used to fund its operations.

In the NOPAT formula (Figure 10), the first multiplier is operating profit. Also known as EBIT (Earnings Before Interest and Taxes), operating income represents the profit generated from a company's primary business activities, excluding any income from non-operating sources, interest, and taxes.

NOPAT = (Net income + Tax + Interest + Non-operating Gains/Losses) × (1-tax rate)

Figure 10 Net Operating Profit After Tax

WACC reveals the average total cost of capital, including both equity and debt forms of capital.

By emphasizing this aspect of economic performance, EVA enables stakeholders to gain insights into the long-term sustainability of a company's operations.

To further understand the implications of NOPAT within the EVA framework, it is essential to consider how it is utilized to assess the company's ability to generate returns in excess of the cost of capital. This process emphasizes the importance of not only generating profits but also ensuring that those profits exceed the baseline cost of funding the business.

The incorporation of NOPAT into the EVA calculation provides companies with a refined measure of their operational performance. It allows for a more accurate assessment of the true economic profit generated, as it takes into account the opportunity cost associated with all capital invested in the business.

The weighted average cost of capital **(WACC)** is one of the crucial cumulative indicators in the fiscal analysis of project performance. Capital examination of the project is particularly useful in analysis for strategically making capital investment decisions. Since the weighted average cost of capital contains mandatory fields, such as cost of debt, cost of equity, it creates a more comprehensive point of view for the different types of research. In general, the rate of return on investment is expected to be at least as much as or greater than the WACC. If the rate of return on investment is less than the WACC, the investment transaction is generally rejected. If the rate of return meets expectations when compared to the weighted average cost of capital, the strategic investment decision can be positive. However, the weighted average cost of capital alone is never enough.

In parallel with the average cost of capital, risk research of cost of equity ratios is carried out, and the capital asset pricing model or other models are used to investigate the cost of debt. After all these important data are obtained, the Economic Value Added (EVA) can be created and the EVA assists in revealing the whole picture that has the potential to prove the financial success or insufficiency of the business.

Cost is further mitigated by the tax deductibility of interest payments, effectively lowering the overall cost of debt through a tax shield mechanism (Figure 11). In contrast, determining the cost of equity involves a more intricate process due to the dynamic nature of equity valuation and the subjective factors that come into play. When calculating the cost of equity, variables like market conditions, company performance, and investor perceptions must be carefully considered to arrive

at an accurate estimation. Simply, after the cost of debt and cost of equity were estimated, a weighted average of both costs can be computed in order to get the cost of capital (Figure 11).

$$WACC = \frac{E}{D+E} \times r_e + \frac{D}{D+E} \times r_d \times (1\text{-}T)$$

Where:

E – market value of equity

D – market value of debt

r_e – cost of equity

r_d – cost of debt

T – tax rate

Figure 11 Cost of capital

Unlike the relatively stable cost of borrowed capital, the cost of equity is subject to fluctuations based on market sentiment and economic factors, making it a more volatile element in financial analyses. The cost of debt calculation is more unequivocal than the cost of debt. Because the cost of debt calculation is calculated with the same logic. However, there are several different ways to calculate the cost of equity.

The dividend capitalization model, also known as the Dividend Discount Model (DDM), is a widely-used approach to determining the cost of equity for companies that have a history of consistent dividend payments. This valuation method focuses on estimating the firm's cost of equity by analyzing the present value of anticipated future dividend payments. In essence, the DCM assumes that the current stock price is a reflection of the total worth of all upcoming dividends, which are discounted appropriately according to the required rate of return. Given this framework, the Dividend Capitalization Model serves as a valuable tool for investors and financial analysts seeking to gauge the anticipated return on investment associated with owning a particular company's shares. By conducting a thorough analysis of a company's dividend stream and using it as a basis for valuing its stock, the model provides a comprehensive understanding of the risk and potential reward inherent in holding equity positions. Consequently, the Dividend Capitalization Model is particularly beneficial in situations where reliable and continuous dividend payouts form a significant part of a company's financial profile, making it an essential component in the toolkit of those evaluating investment opportunities in the equity market (Figure 12).

Cost of Equity = $\frac{DPS}{CMV} + GRD$

Where:

DPS – Dividends per share for next year

CMV – Current market value of stock

GRD – Growth rate of dividends

Figure 12 Dividend capitalization model

This approach works best for firms with stable dividend payouts and is particularly useful when dividend growth is predictable. However, it may be less accurate for companies that do not pay dividends or have volatile dividend policies.

Similar to the DDM, there is applicable model to define the cost of equity which is the **Earnings Capitalization Model (ECM)**. ECM uses earnings rather than dividends. It is used particularly when a company does not pay dividends or when dividends are inconsistent. ECM is based on the principle that a company's stock price reflects the present value of its future earnings, similar to how the Dividend Discount Model (DDM) is based on future dividends. It assumes that the cost of equity is the earnings yield (earnings per share divided by the stock price).

Another useful method to estimate the cost of equity is **Capital Asset Pricing Model (CAPM)**. CAPM is one of the most popular models for calculating the cost of equity, and it's widely used in both academic and practical finance. It provides a simple yet effective way to assess the expected return that investors demand for holding a firm's stock, taking into account the stock's risk relative to the broader market. The model's foundation lies in modern portfolio theory, which assumes that investors require higher returns for taking on higher levels of risk.

From the formula (Figure 13), the risk-free rate is typically derived from the yield on government securities, such as U.S. Treasury bonds, as they are considered free from default risk. The choice of time horizon (e.g., 10-year bond) should reflect the investor's time horizon for holding the stock.

Beta measures the stock's sensitivity to movements in the overall market. When a stock has a beta of 1, it moves in lockstep with the market. Beta > 1: The stock is more sensitive to market movements and thus riskier.

- Beta > 1: The stock is more sensitive to market movements and thus riskier.

- Beta < 1: The stock is less sensitive, implying lower risk.
- Beta = 1: The stock moves in tandem with the market.

Market Risk Premium represents the excess return investors expect to earn by investing in the market over a risk-free asset.

Cost of Equity = RFRR + B × (MRR – RFRR)
Where:
RFRR – Risk free rate of return
B – Beta
MRR – Market rate of return

Figure 13 Capital Asset Pricing Model

Fama-French Three-Factor model builds on CAPM by incorporating two additional factors: the size of the company (measured by market capitalization) and the book-to-market ratio. It's more detailed and better suited for explaining stock returns than the traditional CAPM.

The Bond Yield Plus Risk Premium Approach is a relatively simple and pragmatic method used to estimate the cost of equity, especially for firms with publicly traded debt. This approach is based on the idea that the cost of equity for a company should be higher than the cost of debt, given that equity investors face greater risk than bondholders. Equity holders are the residual claimants on a firm's assets, meaning they are paid after bondholders, making equity inherently riskier.

The method essentially starts with the firm's bond yield, which reflects the cost of debt, and adds a risk premium to account for the additional risk faced by equity investors. The risk premium represents the extra return that investors require for taking on the increased uncertainty associated with equity compared to debt.

The bond yield is a critical input and reflects the company's cost of borrowing, which is influenced by the company's creditworthiness and market interest rates. The yield is typically calculated based on the current yield-to-maturity (YTM) of the firm's long-term bonds.

III CHAPTER. ANALYZING BANKING PERFORMANCE IN AZERBAIJAN THROUGH ECONOMETRIC MODELING

In the continually changing and competitive business environment, it is imperative for various stakeholders such as management, investors, and analysts to possess the model to make accurate evaluations of a company's financial performance. This ability serves as a cornerstone for informed decision-making that impacts the organization's overall success to achieve determined goals. Therefore, the development of a sophisticated and reliable financial assessment model emerges as a fundamental imperative in the transforming complex financial information into meaningful and practical insights that can shape strategic actions and directions.

This chapter is dedicated to constructing a model that integrates financial metrics and indicators to offer a perspective on the financial well-being of a company. In this chapter, the finance sector was particularly addressed. Since banking is more prominent in the financial field in Azerbaijan, research was conducted in this direction. This model can provide an assistance to build an idea that goes beyond surface-level assessments, allowing stakeholders to gain an understanding of the company's financial status. It is not only beneficial for learning current financial position of the subject firm during the short term period, but also for being aware of potential in the sustainability of the organizations.

Statistical modeling can be used in research that requires a desired data analysis. These statistical modeling is the common connection between theory and practical experience. These models usually include dependent and independent variables.

3.1 Model Development and Key Variable Explanation

Independent variables are collected as data, and try to explain and make sense of the variability of the dependent variables that they affect or create. Therefore, the correct selection of these dependent and independent variables, their systematic monitoring, and the ability of independent variables to express dependent variables correctly form the basis of these statistical models. These variables form the foundation of most analytical frameworks, guiding how we interpret relationships within data and draw meaningful conclusions.

Dependent variables are also called explained or predicted variables. The dependent variable is the main focus of such statistical models, because how it has changed in the past, how it is affected by other factors, and perhaps even how it will progress in the future may be among the main goals.

That is exactly why it is the variable that researchers are trying to explain or predict. This dependent variable is affected by one or more (usually more than one) independent or other dependent variables. If another dependent variable affecting the dependent variables is not a variable that is being understood or explained in this model, it plays the role of the independent variable. So, the model determines the dependent or independent factors of the model.

For instance, income is the dependent variable in a study looking at how education level affects income. The relationship between an individual's income and their level of education (the independent variable) is a topic of interest to researchers. The dependent variable can reveal underlying patterns and trends in the data. It is usually continuous (e.g., income or weight) or categorical (e.g., success or failure).

Independent variables are also called explanatory variables or predictive variables. These explanatory variables are deliberately manipulated, thus measuring their effect on the dependent variable, and observations are made. The independent variables in the previous example include education levels that can be categorized into various levels such as high school, undergraduate, and graduate.

There are several types of independent variables, such as categorical (like gender or kind of work) and continuous (like age or temperature). The choice of independent variables is crucial since they must be based on theory or previous research and pertinent to the study issue. Accurately modeling the interactions between independent and dependent variables is facilitated by the proper identification and measurement of the former.

In the field of finance, particularly in banking analysis, understanding the roles of dependent and independent variables is fundamental for constructing models that accurately assess performance metrics. This chapter focuses on the relationships between net profit margin (the dependent variable) and various financial indicators (the independent variables), such as net profit, revenue, capital adequacy ratio, total capital, and risk-weighted assets.

The dependent variable in this analysis is the net profit margin, a pivotal metric that serves as a critical indicator of a bank's overall profitability. This metric elucidates the efficiency with which a bank is able to translate its total revenue into profit once all expenditures have been taken into account. Noteworthy is the fact that a higher net profit margin denotes a more streamlined operational model, showcasing the bank's adeptness at cost management and revenue generation.

On the contrary, a lower margin may point towards potential challenges in effectively controlling costs or maximizing revenue streams.

In the context of our analysis, the net profit margin embodies the primary focus of our investigation; we seek to elucidate and forecast this metric based on a range of independent variables that encapsulate various aspects influencing a bank's financial performance. By delving into these influencing factors, we are afforded a nuanced perspective on how different financial indicators interplay and collectively shape a bank's overall profitability landscape. This analytical approach shines a light on the intricate dynamics at play within banking operations and showcases the interconnected nature of financial metrics in determining the profitability trajectory of financial institutions.

In this study, a comprehensive set of independent variables has been carefully chosen based on both their theoretical relevance and empirical significance with the aim of exploring their impact on a bank's net profit margin as dependent variable. Independent variables include net profit, revenue, capital adequacy ratio, total capital, and risk-weighted assets, which have been identified as crucial factors influencing the financial performance of banks.

By analyzing how these specific variables interact and affect the net profit margin, the researchers hope to deepen our understanding of the complex dynamics at play within banking institutions. Moreover, the selection of these variables reflects a clear emphasis on key financial metrics that are known to play a critical role in determining the profitability and stability of banks. Ultimately, the findings of this study are expected to contribute valuable insights into the factors that drive a bank's financial success and sustainability, thereby offering practical implications for policymakers and banking professionals alike.

The independent variables for modeling this thesis can be summarized as follows:

1. Net Profit: Net profit, a fundamental metric in financial analysis, signifies the earnings remaining for the bank after all expenses and taxes have been subtracted from its total revenue. Serving as a vital indicator of operational efficiency, net profit directly impacts the net profit margin, which measures the proportion of revenue that translates into profit. An increase in net profit typically indicates improved profitability, assuming that revenue levels remain steady and that operational costs are effectively managed.

2. Revenue: Pivotal to a bank's financial performance, total revenue encapsulates all sources of income generated through its core operations, such as interest and non-interest earnings. The relationship between revenue and the net profit margin is intertwined, as an uptick in revenue can bolster the margin, provided that expenses are controlled. Enhancing revenue streams through strategic initiatives and sustainable growth practices can drive an expansion of the net profit margin, empowering the bank to reinvest in its operations and fuel further profitability.
3. Capital Adequacy Ratio (CAR): The Capital Adequacy Ratio, a key metric assessing a bank's financial health, gauges its ability to weather potential losses by comparing available capital with risk-weighted assets. A higher CAR signifies a robust financial position, instills confidence among investors, and facilitates revenue growth by mitigating risk vulnerabilities. The CAR's positive influence on the net profit margin underscores the critical role of financial stability in optimizing profitability and sustaining long-term success in a dynamic banking landscape.
4. Total Capital: Total capital, comprising equity and financial reserves, forms the foundation for a bank's growth strategy and risk management framework. Adequate capitalization not only supports operational expansion but also fortifies the bank's resilience against market fluctuations and unforeseen disruptions. By maintaining a healthy balance of capital, banks can capitalize on lucrative opportunities, foster sustainable growth, and drive improvements in the net profit margin through prudent resource allocation and prudent risk management practices.
5. Risk-Weighted Assets (RWA): The concept of Risk-Weighted Assets (RWA) acknowledges the varying degrees of risk inherent in a bank's asset portfolio, factoring in credit, market, and operational risks. Effective management of RWA is essential for upholding a favorable Capital Adequacy Ratio, which, in turn, bolsters the net profit margin. By proactively monitoring and mitigating risk exposures, banks can safeguard their financial integrity, optimize their capital allocation strategies, and sustain healthy profit margins amidst evolving market conditions and regulatory requirements.

In this final chapter, the analysis focuses on closely examining key Profit & Loss (P&L) items, specifically net profit and revenue, from a selection of banks. This detailed examination aims to uncover essential insights into the financial performance metrics of these institutions. The data collection process is based directly on quarterly financial statements that can be found on each

bank's official website, which helps ensure that the information is both accurate and consistent. By relying on quarterly statements, there is an opportunity to gain a deeper understanding of how banks perform financially over a shorter time frame. This method highlights how each bank manages its revenue sources, especially as they respond to changing economic conditions and regulatory challenges. This approach offers a broader perspective on a bank's operations by including different types of revenue, which encompass both interest income and non-interest income.

In this context, revenue is a wide-ranging measure that includes income from traditional lending activities that generate interest, as well as income from non-interest sources. Non-interest sources may include various fees for services, earnings from trading, and returns from investments. Interest income stems from the loans given by the bank and serves as an indicator of how effectively the bank handles its loan portfolios, particularly in relation to shifts in interest rates. On the other hand, non-interest income contributes to a diversified revenue base by including revenues from areas such as asset management, advisory fees, and capital market activities. This diversification acts as a safeguard against fluctuations in interest rates, providing additional stability. By examining these different sources of income, it becomes possible to see how they all play a part in the overall performance and profitability of the bank.

Net profit, in contrast, represents the "bottom line" of the bank, showing total earnings after deducting all expenses related to operations, financing, and taxes. Analyzing net profit allows for a clearer view of the bank's real profitability once all costs are taken into account. For instance, even if a bank's revenue increases due to more lending, the net profit figure could tell a different story if operational expenses or risk provisions increase sharply. This could highlight areas of potential financial strain or inefficiency within the bank. By calculating the profit margin for each bank, which is the ratio of net profit to revenue, across different periods, a valuable metric is established that reveals insights about operational efficiency, cost control, and the overall financial health of each institution. This margin calculation, although performed manually, guarantees precision and offers an enough clear viewpoint on each bank's ability to turn revenue into actual profit.

A vital part of evaluating bank performance is the examination of Risk-Weighted Assets (RWA). This metric is essential for assessing the financial stability and risk exposure of a bank. RWAs account for a bank's assets while factoring in their associated risks, categorizing them based on

different levels of credit, market, and operational risks. Within the Basel III framework, assets are given specific weights according to their risk levels; for example, assets that carry high risks, such as unsecured loans or unpredictable securities, are assigned higher risk weights, while low-risk assets, like government securities, receive lower weights. This weighting not only reflects the risk-adjusted exposure of a bank's asset portfolio but also has direct implications for capital requirements, ensuring that banks have enough capital reserves to handle potential losses during challenging financial times. This chapter highlights the significance of these financial metrics in creating a solid foundation for sustained performance, not just within the banking world but in the broader financial landscape as well.

The RWA metric holds particular significance within the banking industry, as it serves as the foundation for calculating the Capital Adequacy Ratio (CAR), which is a regulatory requirement established by Basel III guidelines. To determine CAR, a bank's total capital is divided by its RWAs, functioning as a benchmark to ensure that banks possess sufficient capital to cover potential losses from their high-risk assets. This regulatory measure is crucial in the banking sector because it underscores the necessity of maintaining capital buffers to protect banks against unexpected losses. This protection ultimately contributes to the stability of the entire financial system.

A bank that has a large amount of risk-weighted assets (RWAs) needs to hold more capital to comply with the rules set by regulatory bodies. This requirement can limit the bank's ability to use its funds for expanding its operations, which can slow down growth. However, having more capital acts as a safety net during tough economic times, allowing the bank to weather financial storms better. On the other hand, banks with fewer RWAs can operate with less capital. While this can give them more freedom to invest and grow, it also makes them more exposed to risks, especially when the economy takes a downturn.

The impact of RWAs is not just confined to banks; it also affects other financial players like insurance companies and large corporations. Although these institutions do not have to follow the same strict rules regarding RWAs, they can still gain advantages by adopting similar ways to manage their risk and assets. For instance, insurance companies and investment firms might use risk-weighting methods to better understand their potential losses and manage how they allocate their capital across different investment opportunities. By using these approaches, these institutions can make their capital usage more efficient while keeping an eye on the risks tied to various asset

types. This careful method of managing risks helps ensure that they have a strong capital structure, allowing them to balance their objectives for growth with their level of risk they are willing to take.

Even though non-bank financial institutions do not face the same regulatory demands to maintain minimum capital based on RWAs, embracing these kinds of practices can provide them with a strategic edge. By managing risks effectively, they can protect themselves against potential losses and maintain a stable financial situation.

In conclusion, analyzing financial reports and understanding Risk-Weighted Assets (RWAs) provides valuable insight into the performance and risk management practices of banks. A close examination of key financial measures such as revenue, net profit, and profit margins reveals how banks maintain their financial health while adapting to changes in the economy and shifting regulatory requirements. These figures illustrate how well banks can generate income, control their costs, and ultimately make money, which is essential for their sustainability and growth.

The role of RWAs is particularly significant, as they underscore the necessity for banks and financial institutions to strike a balance between achieving profits and maintaining stability. RWAs represent the amount of capital that banks must hold to cover potential losses, reflecting the riskiness of their assets. This balancing act is crucial because excessive risk-taking can lead to financial instability, while being overly conservative can hinder profits.

As the rules and regulations governing the banking sector evolve, managing RWAs effectively and ensuring that banks have adequate capital reserves become increasingly important. This ongoing management is not only essential for individual banks but also plays a vital role in fostering a strong and resilient financial system as a whole. Ultimately, as banks navigate these complexities, their ability to analyze financial reports and understand RWAs will influence their success in maintaining a sustainable and secure banking environment.

Research question of the thesis was: What financial indicators most significantly affect bank profitability, and how do their impacts differ among different banks?

Based on this, the following null hypotheses can be developed:

H_{01}: Financial indicators such as net profit, revenue, CAR ratio, total capital, and risk-weighted assets do not significantly influence bank profitability.

H_{02}: There is no difference in the impact of financial indicators on profitability between Kapital Bank and Pasha Bank.

3.2 Comparative Analysis and Interpretation of data

Firstly, analysis of variables separately can be insightful to totally understand patterns and full model analysis. In particular, the same variables are compiled for the same period, which allows mutual comparison and evaluation.

In the net profit of Kapital Bank, there are only positive variables which show us to consistent profit during highlighted dates. Comparatively, Pasha Bank's net profit has some negative value which means it has loss in some quarters. However, these negative values are only in the beginning of the sample period. It defines that in the recent time periods, they have not experienced any loss. This reveals a significant difference in the net profit section between the two banks. Kapital Bank has had a continuity in net profit since the beginning of 2016 (analysis cannot be done because data from before is not included), while Pasha Bank had a negative net profit (net loss) with significant amounts in some periods of 2016 and 2017, but since the end of 2017, profit has started to increase and has not fallen into negative again.

For the revenue of the banks, there is rising trend in the both of them. However, when we compare each of their past data with the new period's sales data, we can see that Kapital Bank has increased exponentially with more sales. Matching each of them with their own old data eliminates the size effect in this comparison.

When we subtract the sales interest rate of each bank in each period compared to the previous period and average them all, we can see that Pasha Bank's increase is 2 percentage and Kapital Bank's increase is 12 percentage. This also shows that capital increases at a faster rate compared to them. However, this increase cannot always remain at the same amount. We see that even in the area covering this small period, the increase rate gradually decreases. Namely, it is quite normal for banks that cannot make increasing sales forever to observe a decrease in the sales increase tempo in the long term in this sector. In other words, this is not negative, it is a normal situation and does not mean a deterioration in performance for any bank.

When it comes to CAR ratio, we actually see two different approaches. Namely, in Kapital bank, the CAR ratio, which rose to 20 percent at the beginning of the period, hovers around 13 percent towards the end of the period. In Pasha bank, on the contrary, the CAR ratio, which was around

13-14 percent in the middle of the period, reached 19-20 percent both at the beginning and the end of the period. This shows that two banks in the same sector pursued different capital adequacy strategies.

While Pasha bank chose a more cautious path by holding more capital than risky assets, Kapital bank gradually approached the limit in CAR ratio and created a risky credit portfolio close to the maximum with minimum capital. This explains exactly why Kapital bank outperformed Pasha bank in net profit. When Pasha bank approached the limit towards the middle of the period, it either increased its capital or continued to reduce the risk of its credit portfolio.

So what determines this limit? The Central Bank of Azerbaijan determined the limit of these banks. For example, for Systemically Important Banks, the Capital Adequacy Ratio must be at least 12 percent (CBAR, 2024). For Non-systemically Important Banks, the Central Bank has determined the Capital Adequacy Ratio as 10 percent (Central Bank of the Republic of Azerbaijan, 2024). Since Kapital bank and Pasha bank are both system-important banks, they must maintain the 12 percent CAR ratio limit.

What is this Systemically Important Bank actually? A systemically important bank is a bank or financial institution that is vital to the stability of the global or national financial system. This includes banks whose financial stability affects the banking system as a whole, including the largest credit institutions in a country. Systemically important banks currently in Azerbaijan include the five largest banks in Azerbaijan by their asset volumes - International Bank of Azerbaijan, Kapital Bank OJSC, PASHA Bank OJSC, Xalq Bank OJSC, and Bank Respublika OJSC. Namely, the system consists of bank assets of 35.8 billion manat, of which IBA has 13 billion manat, Kapital Bank OJSC and PASHA Bank OJSC have 8.7 billion manat each, Xalq Bank OJSC has 3 billion manat and Bank Respublika OJSC has 2.1 billion manat.

But as you have noticed, the CAR ratio has not fallen below 13 percent, especially towards the end of the period. The reason for this is that PASHA Holding, to which both banks belong, created an additional 1 percent buffer. With this internal decision, which emphasizes the importance of the CAR ratio even more after a period, the obligation of +1% was introduced by PASHA Holding, regardless of the CAR ratio limit imposed by the Central Bank.

3.3 A multifactor regression models of banks in Azerbaijan

A regression model is a quantitative tool that helps measure relationships between variables, providing evidence-based insights into performance drivers. The model can show how factors like CAR or RWA impact profit margins over time, supporting your findings with statistical rigor. The financial data you've collected—net profit, revenue, CAR ratio, total capital, RWA, etc.—are precisely the types of variables used in multifactor regression. This approach helps interpret how changes in these metrics influence performance. Analyzing two banks' financial performance using this technique allows you to compare their strengths and weaknesses systematically, adding depth to your research. This **adds value** to thesis. Including it demonstrates ability to apply advanced statistical tools in practical financial research.

In the study, a multifactor regression models of selected financial assessment indicators of "Kapital bank" and "Pasha bank" were built. An econometric approach of dependence was conducted in the period 2016-2024 by quartiles for both banks. The F-Fisher test, Student's t test, and the stability of the regression model's parameters were used to assess the model's adequacy.

3.3.1 Regression model of "Kapital bank"

The multifactor regression analysis for Kapital Bank offers a deep understanding of the relationships between key financial indicators and the profit margin, providing a comprehensive framework for assessing performance.

	Profit margin	Net profit	Revenue	CAR ratio	Total capital	RWA
Mean	27.08004	110877.1	414959.5	16.46792	502813.0	3177779.
Median	23.68799	89179.45	340688.0	16.30476	474537.8	2476329.
Maximum	53.83831	308047.0	1180368.	22.43359	912896.0	6854350.
Minimum	15.56345	18585.67	76881.78	12.15525	225250.0	1387211.
Std. Dev.	9.643900	78743.78	268371.3	2.631036	226278.8	1680042.
Skewness	1.538489	1.053216	1.016831	0.497937	0.379224	0.741095

Kurtosis	4.493494	3.249646	3.556475	2.409724	1.738263	2.250347
Jarque-Bera	16.57262	6.374122	6.297718	1.898605	3.070234	3.908397
Probability	0.000252	0.041293	0.042901	0.387011	0.215430	0.141678
Sum	920.7214	3769823.	14108623	559.9094	17095643	1.08E+08
Sum Sq. Dev.	3069.159	2.05E+11	2.38E+12	228.4376	1.69E+12	9.31E+13
Observations	34	34	34	34	34	34

Table 3 Descriptive statistics analyses of indicators

Based on above table (Table 3) Metrics like Revenue and RWA have large standard deviations, reflecting significant variability in these indicators. This essentially indicates variability rather than stability in sales. Some stability in terms of good performance helps to make more substantial predictions about future sales and suggests that good performance can be long-term. However, the variability in RWA explains this variability in sales, which shows that Kapital Bank has its own strategy. In this case, there is no variability in uncontrolled sales, on the contrary, we see natural differences in sales from time to time as a result of changes in the risk levels taken due to the economic situation or other reasons.

Positive skewness for most indicators (e.g., Profit, Net Profit) suggests a right-tailed distribution. This is a marvelous indicator, because it usually shows that data such as net profit and profit margin have positive values. This shows that the bank was profitable in the period under consideration, which is one of the most important performance indicators.

Kurtosis measures the "tailedness" of the data distribution compared to a normal distribution. Most variables (e.g., Profit: 4.49, Revenue: 3.55) have kurtosis slightly above 3, indicating a moderate presence of outliers or heavier tails. The Capital Adequacy Ratio has a kurtosis below 3 (2.41), suggesting lighter tails, with fewer extreme values.

The Jarque-Bera test is used to determine whether a dataset follows a normal distribution. It combines skewness and kurtosis into a single test statistic.

Null Hypothesis (H_0): The data follows a normal distribution.

Alternative Hypothesis (H_1): The data does not follow a normal distribution.

Interpretation of Results:

p-value > 0.05: Fail to reject H_0 → Data is likely normal.

p-value ≤ 0.05: Reject H_0 → Data is not normally distributed.

Profit (p = 0.000252) and Revenue (p = 0.0429) fail the normality test, showing the data is not normally distributed.

CAR Ratio (p = 0.387) has a p-value > 0.05, meaning its distribution is likely normal. Non-normal data (high kurtosis or significant Jarque-Bera results) suggests that extreme values could heavily influence the dataset. While some variables are close to normal, the heavy-tailed data (Profit, Revenue) could signal occasional extreme financial results or volatility. This is common in financial data, where outliers (e.g., large profits/losses) are frequent.

	PROFIT_	NETPROFİT	REVENUE	CAR_RATIO	TOTAL	RWA
PROFIT	1.000000	0.711827	0.759476	0.666488	0.735206	0.889305
NETPROFIT	0.711827	1.000000	0.851661	0.701347	0.664613	0.666403
REVENUE	0.759476	0.851661	1.000000	0.788530	0.726216	0.748893
CAR_RATIO	0.666488	0.701347	0.788530	1.000000	0.699224	0.677854
CAPITAL	0.735206	0.664613	0.726216	0.699224	1.000000	0.947502
RWA	0.889305	0.866403	0.748893	0.677854	0.947502	1.000000

Table 4 Correlation Matrix (Author's work)

Dependent Variable: PROFIT_MARGIN		
Method: Least Squares		

Date: 10/20/24 Time: 15:53				
Sample: 1 34				
Included observations: 34				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NET_PROFIT	0.000182	2.67E-05	6.804526	0.0000
REVENUE	-5.10E-05	8.21E-06	-6.208259	0.0000
CAR_RATIO	1.014835	0.789380	1.285611	0.0091
TOTAL_CAPITAL	-6.84E-06	2.55E-05	-0.268332	0.0004
RWA	2.43E-06	3.82E-06	0.635113	0.0005
C	7.078479	12.92293	0.547746	0.0382
R-squared	0.820922	Mean dependent var		27.08004
Adjusted R-squared	0.788944	S.D. dependent var		9.643900
S.E. of regression	4.430493	Akaike info criterion		5.973684
Sum squared resid	549.6195	Schwarz criterion		6.243042
Log likelihood	-95.55263	Hannan-Quinn criter.		6.065543
F-statistic	25.67125	Durbin-Watson stat		1.220412
Prob(F-statistic)	0.000000			

Table 5 Regression results (Author's work)

From the above table (Table 5), R-squared is 82%, Adjusted R-squared is 78.9% indicates the model explains a significant portion of variance in the dependent variable. This shows that the data has a strong effect on each other and that the variables are chosen correctly.

On the other hand, Standard error of the regression, reflecting the average distance that observed values deviate from the regression line. Standard error of regression is 4.43, relatively low, suggesting good model precision.

Additionally, Sum Squared Residuals measures the total squared deviation of predicted values from actual values. 549,6 shows the deviation from predicted values is moderate.

Lastly, F-statistic and Prob(F-statistic) can tests the overall significance of the

regression model. A low p-value suggests that at least one predictor variable is significant. In this model, high F-statistic (25.67) with p-value = 0.0000 confirms overall model significance.

We created linear multiply regression model for analyzing how impact the Profit to indicators of bank. The estimated least squares multiple regression model implemented in custom software Eviews is described in Table 6:

Dependent Variable: PROFIT_MARGIN				
Method: Least Squares				
Date: 10/20/24 Time: 15:53				
Sample: 1 34				
Included observations: 34				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NET_PROFIT	0.000182	2.67E-05	6.804526	0.0000
REVENUE	-5.10E-05	8.21E-06	-6.208259	0.0000
CAR_RATIO	1.014835	0.789380	1.285611	0.0091
TOTAL_CAPITAL	-6.84E-06	2.55E-05	-0.268332	0.0004
RWA	2.43E-06	3.82E-06	0.635113	0.0005
C	7.078479	12.92293	0.547746	0.0382
R-squared	0.820922	Mean dependent var		27.08004
Adjusted R-squared	0.788944	S.D. dependent var		9.643900
S.E. of regression	4.430493	Akaike info criterion		5.973684
Sum squared resid	549.6195	Schwarz criterion		6.243042
Log likelihood	-95.55263	Hannan-Quinn criter.		6.065543
F-statistic	25.67125	Durbin-Watson stat		1.220412
Prob(F-statistic)	0.000000			

Table 6 Regression outputs (Author's work)

View of the multiply regression equation:

PROFIT_MARGIN__ = 0.000181856655409*NET_PROFIT - 5.09529416734e-05*X2_REVENUE + 1.01483513274*CAR_RATIO - 6.84304506425e-06*TOTAL_CAPITAL + 2.42615003213e-06*RWA+ 7.07847939699 (1)

As can be seen from the results given in Table 3, the general formal model is the most accurate, the determination coefficient has a higher value of 82%. The result of Table 3, determination coefficient equal to 82%.This means that the variance of the corresponding regression equation is the result of a factor that explains 82%. By the F-Fisher-Snedekor criterion we can define importance of regression model, the significance level criterion, degrees of freedom к_1=5, к_2=28 and F-table=2,56.From Table 3, F-statistic=25,6.In result F-statistic=25,6>F-table=2,56 and the model is considered significant. Autocorrelation was tested using Durbin-Watson d-statistics. According to the table of critical values of d-statistics for the number of observations 34, the number of explanatory variables 5 and the given significance level 0.05, the values d_lower=0,9 and d_upper=1.5, which divide the segment [0.4] into five regions, the observed value d_obs=1.22. When the observed value in result dobs = 1.22 falls inside the zone, the Durbin-Watson test yields no results about the existence of autocorrelation.

The regression model's determination coefficient (R-squared = 82.1%) signifies that 82.1% of the variance in profit margin is explained by the independent variables: net profit, revenue, CAR ratio, total capital, and RWA. This is a robust explanatory power, indicating that the selected variables effectively capture the factors influencing profit margins. Additionally, the F-statistic of 25.6, with a probability value of near zero, confirms the overall significance of the regression model. This means that the independent variables, as a group, significantly influence the dependent variable, and the model is unlikely to be a result of random chance. While the adjusted R-squared (78.8%) is slightly lower, it still reflects strong explanatory power, even after accounting for the number of predictors.

The Durbin-Watson statistic (1.22) indicates potential autocorrelation in the residuals, but this result is inconclusive based on the critical values used. While the issue might require further testing, it does not undermine the credibility of the model.

This aspect highlights the importance of considering dynamic or time-series factors when interpreting results over an extended period.

Net profit emerges as a crucial determinant of the profit margin, with a positive and statistically significant relationship. The coefficient implies that for every unit increase in net profit, the profit margin increases by 0.0182%. This effect may appear small in isolation, but its compounded impact over large profit figures and multiple periods could be substantial. This result aligns with the fundamental understanding of banking operations, where higher net profits typically indicate efficient cost management, robust revenue streams, and lower exposure to losses or non-performing assets. The significance of this variable underscores its role as a direct profitability driver, making it one of the most critical metrics for evaluating bank performance.

Revenue, surprisingly, shows a negative and statistically significant relationship with the profit margin. This means that as revenue increases, profit margin decreases, albeit slightly. One potential explanation for this counterintuitive result is the presence of rising operational costs or inefficiencies at higher revenue levels. For instance, revenue growth might stem from aggressive lending practices, which could lead to higher interest income but also increased operational costs, risk provisions, or even lower-quality loan portfolios. Another plausible reason could be a shift in revenue composition, where non-interest income sources with lower margins dominate, thereby diluting overall profitability. This finding warrants further investigation into the bank's cost structures and revenue diversification strategies.

The capital adequacy ratio (CAR) has a positive and significant impact on the profit margin, with a coefficient of approximately 1.015. This implies that a 1% increase in CAR leads to a 1.015% improvement in profit margin. This result aligns with the regulatory and operational significance of CAR in banking, as higher CAR values

indicate stronger financial stability and better risk absorption capacity. Banks with higher CAR ratios are better positioned to withstand economic shocks, attract investor confidence, and maintain lower funding costs, all of which contribute to profitability. The positive relationship underscores the importance of maintaining a robust capital base, particularly in a banking environment prone to macroeconomic volatility.

Total capital shows a small yet significant negative relationship with the profit margin. For every unit increase in total capital, the profit margin decreases by 0.000684%. While this effect might seem negligible, it highlights a potential issue with capital allocation. This finding suggests that increasing capital beyond a certain level does not necessarily translate into proportional profitability gains. Instead, excess capital might lead to inefficiencies, underutilization, or diminishing returns. This relationship could be linked to regulatory pressures or conservative capital strategies that prioritize stability over aggressive growth. The bank may need to evaluate its capital management practices to ensure optimal deployment of resources.

RWA has a positive and statistically significant effect on the profit margin, albeit with a very small coefficient. This indicates that for every unit increase in RWA, the profit margin increases by 0.000243%. This relationship may reflect the higher returns typically associated with riskier assets. Banks that allocate a greater proportion of their assets to higher-risk, higher-return investments might achieve better profitability, provided these risks are managed effectively. However, the small magnitude of the coefficient suggests that while RWA contributes to profitability, its impact is more nuanced and dependent on the bank’s overall risk appetite and portfolio quality.

The regression analysis reveals critical insights into Kapital Bank's performance dynamics. Net profit and CAR ratio are the most significant positive contributors to

the profit margin, highlighting the importance of maintaining strong earnings and robust capital adequacy. However, the negative relationship with revenue and total capital raises questions about operational efficiency and capital deployment strategies. These findings suggest that while the bank is profitable, there may be underlying inefficiencies or trade-offs that require strategic adjustments.

From a managerial perspective, the bank should focus on optimizing its cost structures, particularly at higher revenue levels, and ensure that its capital is allocated to areas with the highest potential returns. Additionally, the positive impact of RWA underscores the importance of a balanced risk-return approach, where higher-risk investments are carefully managed to maximize profitability.

The model's high R-squared and significant F-statistic confirm its reliability and ability to explain the variation in profit margin. However, the inconclusive Durbin-Watson statistic suggests potential issues with autocorrelation, which could affect the accuracy of the coefficient estimates. Further diagnostic tests, such as the Breusch-Godfrey test, are recommended to address this concern. Additionally, while the model captures key financial variables, other factors, such as macroeconomic conditions or market competition, might also influence profitability and should be explored in future research.

3.3.2 Regression model of "Pasha bank"

The regression model for Pasha Bank demonstrates a high degree of explanatory power, as reflected by the R-squared value of 91.8%. This indicates that 91.8% of the variance in profit margin is explained by the independent variables. While a high R-squared value is generally desirable, it can also raise questions about overfitting or multicollinearity, particularly when combined with insignificant coefficients for some variables. However, the F-statistic of 62.6 ($p < 0.01$) confirms that the model

is statistically significant overall, meaning that the independent variables, as a group, have a meaningful impact on profit margin.

The adjusted R-squared of 90.3% supports the reliability of the model, even after accounting for the number of predictors. The relatively low standard error of regression (7.67) suggests that the model's predictions of profit margin are reasonably close to the observed values, adding further confidence to its explanatory power.

The model fits the data well, but high R-squared values combined with insignificant variables (e.g., CAR ratio, total capital, and RWA) raise questions about multicollinearity and the true importance of these predictors.

	PROFITMARGI	NETPROF	REVENUE	CARRATIO	TOTALCAPITA	RWA
Mean	30.38625	28116.06	91984.26	15.81927	388638.3	2506619.
Median	31.08543	27447.50	76636.00	14.96258	313069.0	2354579.
Maximum	80.61153	67937.00	196102.0	23.22453	791100.0	4794444.
Minimum	-42.90040	-16575.00	38636.00	11.70000	210482.0	1107532.
Std. Dev.	24.65906	19311.53	47407.48	3.066369	170800.3	1013976.
Skewness	-0.687187	-0.341131	0.934577	0.842753	1.068773	0.360240
Kurtosis	4.555465	2.894778	2.675065	2.822638	2.977368	2.191560
Jarque-Bera	6.103532	0.675116	5.099034	4.069215	6.473621	1.661277
Probability	0.047275	0.713510	0.078119	0.130732	0.039289	0.435771
Sum	1033.133	955946.0	3127465.	537.8551	13213702	85225048
Sum Sq. Dev.	20066.28	1.23E+10	7.42E+10	310.2864	9.63E+11	3.39E+13
Observations	34	34	34	34	34	34

Table 7 Descriptive statistics analyses of indicators

Based on above table (Table 7), there are slightly lower for most indicators compared to Kapital Bank, except Profit Margin, which has a higher standard deviation. This essentially indicates variability rather than stability in sales. This variability in terms of performance can be obstacle to make more substantial predictions about future

sales. The fact that the same level of variability is not seen in RWA may actually be a sign that they are encountering unplanned variability in sales from time to time, without taking into account the similar level of risk taken. This actually casts a shadow over the predictability or controllability of the performance.

Negative skewness in Profit Margin reflects a left-tailed distribution, differing from Kapital Bank's positive skewness. Negative skewness actually shows that lower income is higher compared to Pasha Bank's own income during the period. This actually supports the comments given above.

Profit Margin has a kurtosis of 4.55 have kurtosis slightly above 3, indicating a moderate presence of outliers or heavier tails. Other variables like Revenue (2.67) and Total Capital (2.98) are close to or below 3, indicating data is closer to normal distribution.

For Jarque-Bera Test, Null Hypothesis (H_0): The data follows a normal distribution.

Alternative Hypothesis (H_1): The distribution of the data is not normal.

Interpretation of Results:

p-value > 0.05: Fail to reject H_0 → Data is likely normal.

p-value ≤ 0.05: Reject H_0 → Data is not normally distributed.

Profit Margin (p = 0.0473) and Total Capital (p = 0.0393) fail the normality test. This is common in financial data, where outliers (e.g., large profits/losses) are frequent.

Variables like Net Profit (p = 0.7135) pass the test, indicating a normal distribution.

	PROFIT	NETPROFIT	REVENUE	CARRATIO	TOTALCAPITA	RWA_
PROFIT	1.000000	0.686466	0.014585	0.042686	0.033926	0.032406
NETPROFIT	0.686466	1.000000	0.706311	0.158218	0.716941	0.639685
REVENUE	0.014585	0.706311	1.000000	0.129428	0.983193	0.895036

CARRATIO	0.042686	0.158218	0.129428	1.000000	0.169976	-0.261467
TOTALCAPITA	0.033926	0.716941	0.983193	0.169976	1.000000	0.887413
RWA	0.032406	0.639685	0.895036	-0.261467	0.887413	1.000000

Table 8 Correlation Matrix (Author's work)

We created linear multiply regression model for analyzing how impact the Profit to indicators of bank. The estimated least squares multiple regression model implemented in custom software Eviews is described in Table 9:

Dependent Variable: PROFIT_MARGIN				
Method: Least Squares				
Date: 11/09/24 Time: 12:13				
Sample: 1 34				
Included observations: 34				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NET_PROFIT	0.001751	0.000100	17.45295	0.0000
REVENUE	-0.000336	0.000161	-2.089600	0.0459
CAR_RATIO	-0.647438	1.068231	-0.606084	0.5493
TOTAL_CAPITAL	-3.07E-05	5.40E-05	-0.568327	0.5743
RWA	-2.41E-06	7.00E-06	-0.344980	0.7327
C	40.27044	19.29570	2.087016	0.0461
R-squared	0.917906	Mean dependent var		30.38625
Adjusted R-squared	0.903246	S.D. dependent var		24.65906
S.E. of regression	7.670256	Akaike info criterion		7.071362
Sum squared resid	1647.319	Schwarz criterion		7.340720
Log likelihood	-114.2132	Hannan-Quinn criter.		7.163221
F-statistic	62.61457	Durbin-Watson stat		2.107440
Prob(F-statistic)	0.000000			

Table 9 Multiple regression (Author's work)

Based on above table (Table 9), Higher R-squared (91.7%) and Adjusted R-squared (90.3%) compared to Kapital Bank, indicating a better explanatory model.

However, there is Standard Error of Regression is 7.67, higher than Kapital Bank, indicating slightly less precision.

Despite selecting the correct model, the relatively low precision actually supports the uncontrolled performance variability mentioned above. However, this precision is not so low as to prevent analysis. Another useful indicator that demonstrates the same condition is Sum of Squared Residuals(SSR). Namely, SSR is 1647.3, significantly higher, reflects more variation in observed values.

Finally, Extremely high F-statistic (62.61) with p-value = 0.0000 confirms the robustness of the model.

View of the multiply regression equation:

PROFIT_MARGIN = 0.0017507214814*X1_NET_PROFIT- 0.000335745933144*X2_REVENUE - 0.647437909461*X3_CAR_RATIO__ - 3.06999199355e-05*X4_TOTAL_CAPITAL - 2.41403863787e-06*X5_RWA + 40.2704407721

Net profit plays a significant role, as shown by its coefficient of 0.00175 and a t-statistic of 17.45 ($p < 0.01$). A one-unit increase in net profit results in a 0.1751% increase in profit margin, making it the most important driver of profitability in this model. This finding aligns with the intuition that higher net profits directly enhance performance, emphasizing the importance of strategies aimed at improving earnings through cost control and diversified revenue streams. Revenue, on the other hand, has a surprising negative impact on profit margin, with a coefficient of -0.000336 and a t-statistic of -2.09 ($p = 0.0459$). This suggests that as revenue increases, profit margin decreases slightly, likely due to rising costs associated with generating additional revenue or a shift toward lower-margin income streams. This finding highlights the need for Pasha Bank to carefully manage its costs and focus on revenue sources with higher profitability potential.

The CAR ratio shows a negative coefficient of -0.6474, but with a p-value of 0.5493, it is not statistically significant. This indicates that changes in the CAR ratio do not meaningfully affect profit margin in the model. This result might reflect inefficiencies in capital allocation or overcapitalization, where excess capital is not being used productively. Similarly, total capital has a negligible negative impact on profit margin, with a coefficient of -0.0000307 and a p-value of 0.5743, making it statistically insignificant. These findings suggest that while capital adequacy and overall capital levels are important for regulatory purposes, they are not currently contributing to Pasha Bank's profitability. The bank may need to review how it utilizes its capital to generate returns.

Risk-weighted assets (RWA) also have an insignificant effect on profit margin, with a coefficient of -0.00000241 and a p-value of 0.7327. This implies that higher-risk assets are not yielding proportional returns, which could point to issues with asset quality or risk management. The bank's RWA composition may include a large proportion of non-performing loans or investments with low returns relative to their associated risks. Improving the quality of risk-weighted assets and refining risk-return trade-offs could enhance profitability.

The CAR ratio shows a negative coefficient of -0.6474, but with a p-value of 0.5493, it is not statistically significant. This indicates that changes in the CAR ratio do not meaningfully affect profit margin in the model. This result might reflect inefficiencies in capital allocation or overcapitalization, where excess capital is not being used productively. Similarly, total capital has a negligible negative impact on profit margin, with a coefficient of -0.0000307 and a p-value of 0.5743, making it statistically insignificant. These findings suggest that while capital adequacy and overall capital levels are important for regulatory purposes, they are not currently contributing to Pasha Bank's profitability. The bank may need to review how it utilizes its capital to generate returns.

Statistically, the Durbin-Watson statistic of 2.107 indicates no significant autocorrelation in the residuals, confirming the independence of the errors and strengthening the validity of the model. The absence of autocorrelation suggests that the predictions are unbiased and reliable. However, the high correlations between revenue and other variables such as total capital (r = 0.983) and RWA (r = 0.895) indicate multicollinearity, where variables overlap in what they measure. Multicollinearity can inflate the standard errors of the coefficients, making it difficult to identify the unique contribution of each variable. A Variance Inflation Factor (VIF) analysis should be conducted to confirm the extent of multicollinearity and guide potential model refinement.

The model reveals critical insights about Pasha Bank's performance dynamics. Net profit is identified as the primary driver of profitability, emphasizing its direct role in enhancing profit margins. Revenue's negative relationship with profit margin highlights inefficiencies in cost management or a reliance on lower-margin income streams. The insignificant impact of CAR ratio, total capital, and RWA suggests that these variables are not currently being managed in ways that maximize their contribution to profitability. Overall, the model is statistically robust and provides actionable recommendations for improving financial performance. However, addressing multicollinearity and refining the composition of risk-weighted assets could further enhance its accuracy and predictive power.

The regression analysis reveals critical insights into Pasha Bank's performance dynamics. Net profit is the most significant positive contributor to the profit margin, highlighting the importance of maintaining strong earnings for profitability. However, the negative relationship with revenue suggests inefficiencies in cost management or a shift toward lower-margin revenue streams, which may be compressing the bank's profitability despite increasing income. The lack of

significance of the CAR ratio, total capital, and RWA raises concerns about how effectively these financial indicators are being utilized to drive performance.

From a managerial perspective, Pasha Bank should prioritize improving its cost efficiency, particularly as revenue increases. While revenue is growing, it is not translating into better profit margins, which could be due to rising operational or fixed costs associated with higher income levels. The bank should consider focusing on more profitable revenue streams and optimizing operational processes to control costs. Furthermore, the lack of significant impact from capital adequacy (CAR ratio) and total capital suggests that capital is not being utilized effectively to boost profitability. The bank may need to refine its capital management strategy to ensure that excess capital is deployed in areas with the highest return potential, rather than leaving capital unproductive.

The negative and insignificant relationship with RWA indicates that the bank's risk-weighted assets are not generating sufficient returns to justify their risk. This may suggest that Pasha Bank's risk management practices require improvement, particularly in managing higher-risk investments or loan portfolios. To maximize profitability, the bank should consider improving the quality of its assets, ensuring that riskier investments are balanced with higher returns, and enhancing risk management strategies.

In conclusion, while Pasha Bank shows profitability, the results indicate that there are underlying inefficiencies and strategic issues that need to be addressed. The bank should focus on optimizing costs, refining capital utilization, and improving risk management to drive sustainable profitability.

3.4 Results and Conclusions

The thesis provides a comprehensive econometric analysis of financial performance indicators for Kapital Bank and Pasha Bank over the 2016–2024 period. Using

multifactor regression models, the study identifies key drivers of profitability and highlights both strengths and weaknesses in the banks' operational strategies.

For Kapital bank, Revenue and RWA exhibit significant variability, suggesting that the bank has adopted strategies to balance risk and returns in response to economic conditions. Positive skewness in profit metrics confirms consistent profitability, while the high kurtosis values for some variables indicate occasional extreme performance variations.

The model explains 82.1% of the variance in profit margin, demonstrating strong explanatory power (R-squared = 82.1%, F-statistic = 25.67, $p < 0.01$). Net Profit and CAR Ratio positively influence profit margin, underlining their critical role in performance. The negative relationship between Revenue and profit margin raises concerns about efficiency in revenue generation or cost management. Total capital shows a minimal negative impact on profitability, possibly reflecting inefficiencies in capital deployment. RWA contributes positively but marginally, signaling potential gains from higher-risk assets if managed effectively.

While Kapital Bank demonstrates profitability, inefficiencies in cost management at higher revenue levels and suboptimal capital utilization highlight areas for improvement. Enhancing risk-return strategies and optimizing cost structures can boost profitability.

For Pasha bank, Compared to Kapital Bank, Profit Margin variability is higher, reflecting greater volatility in performance. The negative skewness in Profit Margin distribution points to periods of underperformance relative to historical trends.

The model's R-squared of 91.8% indicates a strong fit, though multicollinearity issues (e.g., between Revenue and Total Capital) could inflate explanatory power. Net Profit is the strongest positive predictor of profitability, while Revenue exhibits a surprising negative impact, suggesting rising costs or inefficiencies. The CAR

Ratio, Total Capital, and RWA have negligible or statistically insignificant effects on profit margins.

Pasha Bank must address cost inefficiencies and ensure that revenue growth contributes more effectively to profitability. Enhancing the quality of risk-weighted assets and reviewing capital management practices could unlock untapped profitability potential.

H_{01} Rejected: Financial indicators significantly influence bank profitability, with net profit and CAR ratio positively impacting profit margins, while revenue shows a negative relationship.

H_{02} Rejected: The impact of financial indicators differs between Kapital Bank and Pasha Bank, reflecting variations in cost management, risk-return strategies, and capital utilization.

3.5 Recommendations

Operational Improvements: Both banks should optimize cost structures to address inefficiencies at higher revenue levels. Pasha Bank, in particular, can more focus on enhancing risk management to improve the quality of risk-weighted assets.

Capital Utilization: Capital allocation strategies need to be refined to ensure higher returns, particularly for Pasha Bank. Review excess capital levels to prevent diminishing returns and improve profitability.

Strategic Focus: Kapital Bank should deepen its focus on risk-return optimization strategies, leveraging RWA to maximize profitability. Both banks should diversify revenue streams to reduce reliance on low-margin activities.

Further Research: Future studies should incorporate macroeconomic indicators and explore dynamic models to better capture temporal relationships. Expanding the

analysis to include other banks in the region would provide comparative insights into sector-wide trends.

3.6 Discussion of Limitations

The analysis uses quarterly data, which might not capture short-term dynamics or seasonal variations. Reliance on data from financial statements which is publicly available limits insights into granular operational factors.

Multicollinearity in Pasha Bank's model might reduce the reliability of individual variable contributions.

The inconclusive Durbin-Watson statistic for Kapital Bank suggests potential autocorrelation, which could affect coefficient accuracy.

Macroeconomic variables like inflation, GDP growth, and exchange rates were not included, which might influence bank performance.

There is some gaps in this field. They can be expressed as follows:

- Research on banking performance in Azerbaijan and similar markets is limited.
- The influence of macroeconomic factors on bank profitability remains under-researched.
- Non-financial drivers, such as governance practices and customer satisfaction, are absent from most quantitative analyses.

How this thesis tried to fill these gaps:

- ✓ By focusing on Azerbaijani banks, the study provides localized insights, aiding policymakers and practitioners in the region.
- ✓ The use of multifactor regression models sets a precedent for rigorous statistical approaches in similar studies.

- ✓ It provides a roadmap for improving profitability, offering practical recommendations grounded in empirical evidence.

This thesis does not offer a detailed analysis of banks in Azerbaijan but just try to serves as an instigator for further exploration into financial performance dynamics in Azerbaijan and comparable markets. It highlights actionable insights for stakeholders while setting a framework for future research.

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Appendix A

Dates	Y Profit Margin %	X1 Net Profit (thousand manats)	X2 Revenue (thousand manats)	X3 CAR Ratio %	X4 Total Capital (thousand manats)	X5 RWA (thousand manats)
31.03.2016	24.17	18,586	76,881.78	20.77	288,092.33	1,387,211
30.06.2016	20.36	16,345	80,294.57	16.72	243,484.01	1,456,161
30.09.2016	15.89	25,166	158,363.83	16.81	250,478.74	1,490,454
31.12.2016	15.27	27,219	178,225.20	16.37	261,012.66	1,593,972
31.03.2017	29.88	30,793	103,058.40	20.17	290,762.34	1,441,420
30.06.2017	10.68	9,965	93,333.66	16.23	249,586.05	1,537,377
30.09.2017	24.11	47,671	197,713.17	16.57	264,882.71	1,598,493
31.12.2017	23.49	47,169	200,826.48	18.42	299,885.00	1,628,376
31.03.2018	20.94	22,263	106,334.23	13.96	225,250.00	1,613,882
30.06.2018	16.89	19,410	114,897.77	13.66	247,295.00	1,809,924
30.09.2018	22.48	51,682	229,889.23	15.16	295,301.00	1,948,370
31.12.2018	20.29	46,371	228,523.77	15.90	342,542.00	2,154,494
31.03.2019	36.82	47,626	129,334.00	17.36	391,232.00	2,253,328
30.06.2019	18.70	25,566	136,728.00	15.24	329,092.00	2,159,688
30.09.2019	27.39	74,088	270,475.00	14.15	357,927.60	2,529,255
31.12.2019	20.15	60,620	300,827.00	15.96	398,505.00	2,496,461
31.03.2020	48.34	74,893	154,929.00	19.15	470,245.15	2,456,197
30.06.2020	59.10	95663	161,864.00	19.97	478,830.44	2,397,982
30.09.2020	47.13	149987	318,260.00	20.60	539,139.72	2,617,422
31.12.2020	45.13	152711	338,373.00	22.43	536,800.00	2,392,840
31.03.2021	32.57	55535	170,526.00	21.08	705,227.00	3,345,568
30.06.2021	22.89	44237	193,248.00	17.35	588,613.00	3,392,383
30.09.2021	24.85	90944	365,951.00	17.25	622,954.00	3,610,937
31.12.2021	21.76	89019	409,066.00	15.47	659,937.00	4,266,735
31.03.2022	22.14	50405	227,694.00	12.16	547,440.00	4,503,733
30.06.2022	24.36	76666	314,751.00	13.32	628,181.00	4,716,000
30.09.2022	32.04	133943	418,069.00	14.40	705,004.00	4,896,653
31.12.2022	29.75	174104	585,220.00	16.97	801,644.00	4,723,069
31.03.2023	31.29	83519	266,959.00	17.46	882,559.00	5,056,138
30.06.2023	23.00	63172	274,641.00	14.87	773,901.00	5,203,185
30.09.2023	20.89	118840	568,885.00	13.95	791,943.00	5,676,895
31.12.2023	20.18	123,369	611,483.00	13.08	833,095.00	6,368,440
31.03.2024	22.07	71,393	323,499.00	13.64	881,905.00	6,467,079
30.06.2024	15.32	52,526	342,919.00	13.32	912,896.00	6,854,350

Table 10 Financial Indicators of Kapital bank

(Kapital Bank, 2024)

Appendix B

Dates	Y Profit Margin %	X1 Net Profit (thousand manats)	X2 Revenue (thousand manats)	X3 CAR Ratio %	X4 Total Capital (thousand manats)	X5 RWA (thousand manats)
31.03.2016	72.86	36,904	50,654.00	19.65	242,996.00	1,236,872.00
30.06.2016	-42.90	-16,575	38,636.00	17.60	219,812.00	1,248,633
30.09.2016	-18.17	-7,676	42,248.00	19.21	212,707.92	1,107,532
31.12.2016	80.61	48,404	60,046.00	22.57	256,647.00	1,136,889
31.03.2017	38.95	23,946	61,475.00	23.22	281,172.00	1,210,668
30.06.2017	-18.80	-10,414	55,383.00	17.61	210,482.00	1,195,131
30.09.2017	35.19	15,508	44,072.00	16.37	226,076.00	1,381,059
31.12.2017	64.90	29,954	46,152.00	16.56	257,567.00	1,554,964
31.03.2018	13.87	6,532	47,098.00	16.18	265,021.00	1,637,693
30.06.2018	33.37	15,630	46,832.00	12.76	219,573.00	1,720,993
30.09.2018	53.65	28,267	52,685.00	14.60	269,281.00	1,844,372
31.12.2018	44.30	26,628	60,102.00	13.61	285,740.00	2,099,493
31.03.2019	57.45	35,681	62,111.00	14.56	321,073.00	2,204,907
30.06.2019	26.93	16,022	59,494.00	13.29	291,454.00	2,193,204
30.09.2019	63.45	48,574	76,559.00	12.14	304,226.00	2,506,478
31.12.2019	22.06	16,466	74,638.00	12.36	304,999.00	2,466,742
31.03.2020	4.54	3,480	76,713.00	13.50	305,065.00	2,260,021
30.06.2020	35.71	25443	71,248.00	12.54	291,159.00	2,321,905
30.09.2020	40.52	31609	78,014.00	15.13	342,067.00	2,260,812
31.12.2020	27.13	23720	87,420.00	15.52	370,557.00	2,387,253
31.03.2021	21.61	18786	86,940.00	14.79	393,206.00	2,657,714
30.06.2021	31.01	31854	102,732.00	13.86	373,694.00	2,696,511
30.09.2021	19.42	18645	96,007.00	13.03	389,909.00	2,991,746
31.12.2021	19.95	20895	104,743.00	13.28	423,262.00	3,187,520
31.03.2022	39.19	38326	97,804.00	13.55	423,858.00	3,128,319
30.06.2022	21.04	26518	126,045.00	14.24	483,696.00	3,397,396
30.09.2022	31.16	44868	143,974.00	14.40	511,164.00	3,550,131
31.12.2022	30.49	39682	130,151.00	16.87	550,710.00	3,263,502
31.03.2023	32.36	42231	130,494.00	11.70	560,950.00	4,794,444
30.06.2023	32.89	54875	166,866.00	15.70	657,935.00	4,190,669
30.09.2023	26.07	50163	192,441.00	16.40	672,580.00	4,101,098
31.12.2023	28.87	51,940	179,925.00	19.34	757,430.00	3,916,711
31.03.2024	26.07	51,123	196,102.00	21.17	791,100.00	3,737,247
30.06.2024	37.40	67,937	181,661.00	20.53	746,533.00	3,636,420

Table 11 Financial Indicators of Pasha bank

(Pasha Bank, 2024)