NATIONAL UNIVERSITY OF HO CHI MINH CITY

UNIVERSITY OF ECONOMICS AND LAW

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Fundamental to Data Analytics

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DATA LAKE (Group 1) with 5 members:

STT	**Full' name**	**MSSV**	**Task**	Employee performance evaluation
1	**Đặng Đức Duy**	K205030798	Leader - Visualazation	100%
2	**Phạm Thị Ngọc Thanh**	K204141930	Build model	100%
3	**Hứa Hoàn Châu**	K204141909	Data Clearning	100%
4	**Nguyễn Mai Phương**	K204141926	Data collection	100%
5	**Huỳnh Thị Hồng Nhung**	K204141925	Data collection	100%

TOPIC: Overview Financial Activity by CAMELS' model and Basic Research ACB stock price in 2021

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CHAPTER 1. OVERVIEW OF THESIS

1.1. The reason for choosing the topic

The health of a country's economy largely depends on the financial system. An effective banking system is a basic necessity of any society. The assessment and forecasting of the health of commercial banks is not a new job but never gets old because at different times, The situation of economic fluctuations in the world and in Vietnam is different and the development direction of commercial banks will be different, especially at a time when the economy is on the verge of recovery after the heavy losses of the Covid-19 pandemic. We have entered a phase of gradual adaptation and recovery as well as developing a new direction for the economy to return to a prosperous period. In order to have a look at the financial picture of the commercial banking sector in general and ACB in particular, thereby giving general comments as well as suggestions for development direction, the team would like to choose the topic Analysis ACB's financial health using the CAMELS model. From the financial knowledge as well as applying the tools in data analysis that we have learned in the past, the group hopes to form the most general picture of ACB so that we can evaluate performance as well as consider investing in ACB.

In the years 2010 - 2012, ACB faced a great challenge when Mr. Nguyen Duc Kien (Bau Kien) - Chairman of ACB Investment Council and held the position of Vice Chairman of the Board of Directors was prosecuted and arrested in 2012. . ACB faced many challenges and restructured the board of directors. With the change of typical personnel structure such as the inauguration of Mr. Tran Huy Hung as the Chairman of ACB and the reduction of the job as well as the development policy to help revive the bank to regain its position, among the top banks in terms of profitability. Through ups and downs, I believe that ACB will make steady progress and also have directions to help ACB overcome the pandemic, recover and regain growth momentum. That is also the reason why our group chose ACB for the analysis according to the CAMELS model

1.2. Topic goal

Through the presentation of this final project as well as during the learning process of Basic Data Analysis, the team members better understand the work of a real Data Analysis, from the approach to collecting data. data, clean up data, build a model that can speak more clearly about that data, present a visualization to help users and listeners understand the problem.

In addition, it is possible to combine specialized knowledge of Finance - Banking to solve requirements, evaluate as well as provide solutions when there is a raw data set. Especially through this project, we can analyze financial ratios to understand the performance of the banking sector in general and the overall financial health of ACB in particular. Apply knowledge of visualization tools, especially Power BI tools, to visualize numbers, making evaluation and commenting easier

1.3. Subject and research scope of the project

- Research object: Assessing the financial health of Asia Commercial Bank Vietnam.
- Research scope:
    + In terms of content: Research on bank performance
    + In terms of space: Asia Bank Vietnam

1.4. Tools used:

In this project, our team uses a visualization tool called Power BI to create reports showing important indicators in the CAMELS model. The Power BI tool makes the financial picture vivid and shareable for many people as well securesure the data.

Besides, we store and process raw dataset excel form. Excel makes it easier to calculate ratios and review financial statements.

1.5. Research implications

Apply the CAMELS model in analyzing banking performance. Analyze, evaluate and find out weak financial indicators in the operation of the bank, identify the causes, thereby taking measures to overcome and limit risks during the operation of the bank. In other word the bank is safe in the CAMELS framework.
Besides, the application of data analysis tools makes the process of calculating data, visualizing and evaluating the bank's performance easier.

By reviewing the rating system according to CAMELS standards, experts can comprehensively assess the financial situation of commercial banks in order to find countermeasures to potential risks. Therefore, commercial banks should not try to "beautify" targets to deal with regulatory and supervisory authorities, but must consider CAMELS as "your own health check".

1.6. Structure of report

-Part 1: Introduction to ACB Bank
-Part 2: Overview of ACB's financial performance in 2021
-Part 3: Evaluation of Asia Commercial Joint Stock Bank through CAMELS standard model – comparison with 2021.
-Part 4: Analyzing and commenting on ACB's stock price from the first quarter of 2021 to the end of the first quarter of 2022

CHAPTER 2. THEORETICAL BASIS

2.1. Overview of Data Analytics

Data Analytics is the process of examining data sets to find trends and draw conclusions about the information they contain. The purpose of Data Analysis is to extract useful information from data and take the decision based upon the data analysis .Data Analytics has four basic types: Descriptive analytics, Diagnostic analytics, Predictive Analytics, and Prescriptive analytics.

2.1.1. The benefits of Data Analytics in the business

- Personalize the customer experience: Businesses collect customer data from many different channels, including physical retail, e-commerce, and social media. By using data analytics to create comprehensive customer profiles from this data, businesses can gain insights into customer behavior to provide a more personalized experience.
- Better decision-making: One of the main benefits of DA is that it improves the decision-making process significantly. Rather than relying on intuition alone, companies are increasingly looking toward data before making decisions. Predictive analytics can suggest what could happen in response to changes to the business, and prescriptive analytics can indicate how the business should react to these changes.

Reduce costs: Another great benefit is to reduce costs. With the help of advanced technologies such as predictive analytics, businesses can spot improvement opportunities, trends, and patterns in their data and plan their strategies accordingly. In time, this will help you save money and resources on implementing the wrong strategies. And not just that, by predicting different scenarios such as sales and demand you can also anticipate production and supply

2.1.2. The process of doing data analytics project in business

The first step is to determine the data requirements or how the data is grouped. Data may be separated by age, demographic, income, or gender. Data values may be numerical or be divided by category.

The second step in data analytics is the process of collecting it. This can be done through a variety of sources such as computers, online sources, cameras, environmental sources, or through personnel. Once the data is collected, it must be organized so it can be analyzed. This may take place on a spreadsheet or other form of software that can take statistical data.

The data is then cleaned up before analysis. This means it is scrubbed and checked to ensure there is no duplication or error, and that it is not incomplete. This step helps correct any errors before it goes on to a data analyst to be analyzed.
Data Analysis: Here is where you use data analysis software and other tools to help you interpret and understand the data and arrive at conclusions. Data analysis tools include Excel, Python, R, Looker, Rapid Miner, Chartio, Metabase, Redash, and Microsoft Power BI.

Data Interpretation: Now that you have your results, you need to interpret them and come up with the best courses of action, based on your findings.

Data Visualization: Data visualization is a fancy way of saying, “graphically show your information in a way that people can read and understand it.” You can use charts, graphs, maps, bullet points, or a host of other methods. Visualization helps you derive valuable insights by helping you compare datasets and observe relationships.

2.2. Theory and methods in data analysis

The theory of the CAMELS model

The CAMELS rating system was developed by the National Credit Union Administration (NCUA) and approved in 1987, but not only in the United States but also in many countries around the world. After the 1997 Asian economic crisis, the CAMELS system was recommended by the International Monetary Fund and the World Bank Group to be applied in crisis-hit countries as one of the measures to rebuild the financial sector. This rating system is used by the federal banking supervisory board (Federal Reserve, FDIC, OCC) and other financial supervisory agencies to provide a convenient summary of banking conditions at a moment.

The CAMELS system is a rating and monitoring system for banks in the US and is considered the standard for most organizations around the world when assessing the effectiveness and risks of banks in particular and other financial institutions. credit institutions in general

CAMELS stands for :

C: Capital Adequacy - Capital adequacy level;

A: Asset Quality - Quality of assets available;

M: Management - Management;

E: Earnings - Profit

L: Liquidity - Liquidity;

S: Sensitivity to Market Risk - Sensitivity to market risk

The CAMEL model is mainly based on financial factors, through a rating scale based on 5 criteria of capital, asset quality, management, profitability and liquidity level of financial institutions. Sensitivity to market risk was added in 1997.

Currently, a number of countries around the world have pioneered in adjusting the system of analysis and assessment of credit institutions on the basis of CAMELS model, including Vietnam.

The aggregate ratings are rated on a scale of 1 to 5 in increasing risk. The composite rating is the result of ranking the 6 components. Rank 1 is the highest level with the meaning that commercial banks have the best system, quality assurance of risk management, and effective operation. A rating of 5 is the worst associated with poor performance, failure to manage risks well. The ranking for each component is done independently, but the relationship with other components should also be considered. Ratings that are too high or too low for one component may result in an up or down adjustment of ratings for other components

Capital Adequacy - Capital Adequacy

In the capital adequacy section, we select the capital adequacy ratio and tier 1 capital

The capital adequacy ratio (CAR), also known as capital to risk-weighted assets ratio, measures a bank's financial strength by using its capital and assets. It is used to protect depositors and promote the stability and efficiency of financial systems around the world.

The capital adequacy ratio is calculated by dividing a bank's capital by its risk-weighted assets. The capital used to calculate the capital adequacy ratio is divided into two tiers.

$$CAR = \frac{Tier\ 1\ Capital + Tier\ 2\ Capital}{Risk\ Weighted\ Assets}$$

Figure 1. Formula for calculating capital adequacy ratio

Tier-1 Capital

Tier-1 capital, or core capital, consists of equity capital, ordinary share capital, intangible assets and audited revenue reserves. Tier-1 capital is used to absorb losses and does not require a bank to cease operations. Tier-1 capital is the capital that is permanently and easily available to cushion losses suffered by a bank without it being required to stop operating. A good example of a bank's tier one capital is its ordinary share capital.

Tier-2 Capital

Tier-2 capital comprises unaudited retained earnings, unaudited reserves and general loss reserves. This capital absorbs losses in the event of a company winding up or liquidating. Tier-2 capital is the one that cushions losses in case the bank is winding up, so it provides a lesser degree of protection to depositors and creditors. It is used to absorb losses if a bank loses all its Tier-1 capital.

The two capital tiers are added together and divided by risk-weighted assets to calculate a bank's capital adequacy ratio. Risk-weighted assets are calculated by looking at a bank's loans, evaluating the risk and then assigning a weight. When measuring credit exposures, adjustments are made to the value of assets listed on a lender's balance sheet.

All of the loans the bank has issued are weighted based on their degree of credit risk. For example, loans issued to the government are weighted at 0.0%, while those given to individuals are assigned a weighted score of 100.0%.

Risk-weighted assets are used to determine the minimum amount of capital that must be held by banks and other institutions to reduce the risk of insolvency. The capital requirement is based on a risk assessment for each type of bank asset. For example, a loan that is secured by a letter of credit is considered to be riskier and requires more capital than a mortgage loan that is secured with collateral.

Currently, the minimum ratio of capital to risk-weighted assets is 8% under Basel II and 10.5% under Basel III.[12] High capital adequacy ratios are above the minimum requirements under Basel II and Basel III.

In addition, the group also calculates the Tier 1 Ratio. The Tier 1 Ratio is calculated by the formula:

Tier 1 capital / Total risk-adjusted assets

However, when using CAR, there are limitations. One limitation of the CAR is that it fails to account for expected losses during a bank run or financial crisis that can distort a bank's capital and cost of capital.

Many analysts and bank executives consider the economic capital measure to be a more accurate and reliable assessment of a bank's financial soundness and risk exposure than the capital adequacy ratio.

The calculation of economic capital, which estimates the amount of capital a bank needs to have on hand to ensure its ability to handle its current outstanding risk, is based on the bank's financial health, credit rating, expected losses and confidence level of solvency. By including such economic realities as expected losses, this measurement is thought to represent a more realistic appraisal of a bank's actual financial health and risk level.

Asset quality - Asset quality

The size, structure and quality of assets determine the existence and development of the bank. Asset quality is a composite indicator that speaks to the quality of management, solvency, profitability and sustainable prospects of a bank. Because asset quality is an important determinant of risk that profoundly impacts liquidity and costs, analysts go to great lengths to make sure they issue the most accurate evaluations possible. Indeed, their pronouncements can greatly affect the overall condition of a business, bank, or portfolio for years to come. The tool used to assess asset quality highlights the effectiveness of the NPL ratio.

A non performing loan (NPL) is a loan that is in default due to the fact that the borrower has not made the scheduled payments for a specified period. Although the exact elements of nonperforming status can vary depending on the specific loan's terms, "no payment" is usually defined as zero payments of either principal or interest.

The specified period also varies, depending on the industry and the type of loan. Generally, however, the period is 90 days or 180 days.

In banking, commercial loans are considered non performing if the debtor has made zero payments of interest or principal within 90 days, or is 90 days past due. For a consumer loan, 180 days past due classifies it as an NPL.

Types of Nonperforming Loans (NPLs)

A debt can achieve nonperforming loan status in several ways. Examples of NPLs include:

A loan in which 90 days' worth of interest has been capitalized, refinanced, or delayed due to an agreement or an amendment to the original agreement.

A loan in which payments are less than 90 days late, but the lender no longer believes the debtor will make future payments.

A loan in which the maturity date of principal repayment has occurred, but some fraction of the loan remains outstanding.

Management - The ability to manage

This is a factor to evaluate the management ability of managers because management capacity and quality are decisive factors for business efficiency and safety of the bank. In addition, the quality and capacity of management is also reflected in the ability to promptly grasp situations and identify risks threatening to the bank's safety in order to take timely countermeasures. The quality of management is ultimately reflected in the legal adequacy of the situation.

Our team would like to choose the CIR index to assess the bank's governance ability.

The cost-to-income ratio is a metric that allows you to gauge how efficiently a business or organization is functioning. It is used to compare the operating expenses of a bank to its income. The lower the cost to income ratio, the better the company's performance.

Cost to Income ratio = Operating cost/Operating income

Figure 2. Formula of Cost to Income ratio

In order to have a better analysis of the company's performance in terms of efficiency, the microfinance institution or bank (the company) may need to benchmark the ratio to the historical period or the industry average.

The lower the cost to income ratio is, the better it is for the company's performance. Likewise, the lower the ratio is, the more efficiency the company can achieve in the period.

In this case, in order to reduce cost to income, the company needs to either increase its operating income or reduce its operating costs. Operating costs, in this case, include both personnel expenses and administration expenses.

Earnings - Income

Profitability reflects the overall results of business activities. Profit is an indicator to evaluate whether the management and implementation of a manager's strategy is effective or not. Profits will lead to the formation of more capital, which is absolutely necessary to attract more capital and support for future development from investors. Profits are also needed to cover loan losses and provide adequate provision.

A company's earnings are its after-tax net income. This is the company's bottom line or its profits.Earnings are perhaps the single most important and most closely studied number in a company's financial statements. It shows a company's real profitability compared to the analyst estimates, its own historical performance, and the earnings of its competitors and industry peers.Earnings are the main determinant of a public company's share price because they can be used in only two ways: They can be invested in the business to increase its earnings in the future, or they can be used to reward stockholders with dividends.

To evaluate business performance, my team would like to choose ROA, ROE and NIM

Return on assets (ROA), also known as return on total assets, is a measure of how much profit a business is generating from its capital. This profitability ratio demonstrates the percentage growth rate in profits that are generated by the assets owned by a company.

$$Return\ on\ Assets = \frac{Net\ Income}{Total\ Assets}$$

Figure 3. Formula of ROA

Companies with a low ROA usually have more assets involved in generating their profits

Companies with a high ROA usually have fewer assets involved in generating their profits

Return on equity (ROE) is the measure of a company's net income divided by its shareholders' equity.ROE is a gauge of a corporation's profitability and how efficiently it generates those profits.ROEs will vary based on the industry the company operates in.

ROE is expressed as a percentage and can be calculated for any company if net income and equity are both positive numbers. Net income is calculated before dividends paid to common shareholders and after dividends to preferred shareholders and interest to lenders.

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Average Shareholders' Equity}}$$

Figure 4. Formula of ROE

The higher the ROE, the more efficient a company's management is at generating income and growth from its equity financing.

When utilizing ROE to compare companies, it is important to compare companies within the same industry, as with all financial ratios.

Both ROA and return on equity (ROE) measure how well a company utilizes its resources. But one of the key differences between the two is how they each treat a company's debt. ROA factors in how leveraged a company is or how much debt it carries. After all, its total assets include any capital it borrows to run its operations.

On the other hand, ROE only measures the return on a company's equity, which leaves out its liabilities. Thus, ROA accounts for a company's debt and ROE does not. The more leverage and debt a company takes on, the higher ROE will be relative to ROA. Thus, as a company takes on more debt, its ROE would be higher than its ROA.

Assuming returns are constant, assets are now higher than equity and the denominator of the return on assets calculation is higher because assets are higher. This means that a company's ROA falls while its ROE stays at its previous level.

Net interest margin or **NIM** denotes the difference between the interest income earned and the interest paid by a bank or financial institution relative to its interest-earning assets like cash.

For a bank, if the non-performing assets (NPAs) are rising, the interest earned would fall and the NIM will decline. In case the demand for savings increases relative to the demand for loans, the NIM will fall. Meanwhile, a higher NIM would increase the profitability of the lender. A negative NIM indicates that the lender has been unable to make good use of its assets, as returns produced by investments has failed to offset interest expenses. Thus, NIM is a significant indicator of financial stability of a lender. Big lenders in India, such as the SBI, ICICI Bank, HDFC Bank and Punjab National Bank, reported NIMs ranging between 3 per cent and 4.5 per cent for FY15. NIM has some limitations as well. The performance metric cannot be confused with profitability, as it does not account for fees and non-interest incomes that banks generate through services related to brokerage and deposit accounts. In addition, NIM of two banks can't be compared as their activities may differ due to asset sizes, composition of customer base, priority sector lending and other factors.

$$\text{Net Interest Margin} = \frac{\text{IR} - \text{IE}}{\text{Average Earning Assets}}$$

where:

$\text{IR} = \text{Investment returns}$

$\text{IE} = \text{Interest expenses}$

Figure 5. Formula of NIM

Liquidity - Liquidity

Is the basic standard to evaluate the quality and safety in the operation of a bank. To ensure solvency, banks must maintain a certain proportion of assets, especially liquid assets such as cash, deposits with central banks and other liquid reserve instruments.

Pursuant to Article 20, Circular 22/2019/TT-NHNN stipulating the ratio of outstanding loans to total deposits as follows:

Banks, foreign bank branches determine the maximum ratio of outstanding loans to total deposits in Vietnam Dong, including Vietnam Dong and foreign currencies converted into Vietnam Dong according to the following formula this:

$$\text{LDR (\%)} = \frac{L}{D} \times 100\%$$

Figure 6. Formula of LDR

In there:

- LDR: The ratio of outstanding loans to total deposits.

- L: Total loan balance

Total loan balance includes:

Outstanding loans to individuals and organizations (excluding outstanding loans to other credit institutions and foreign bank branches in Vietnam);

Loans entrusted to other credit institutions and foreign bank branches.

Total loan balance is deducted:

Outstanding loans by trust sources of the Government, individuals and other organizations (including credit institutions, other foreign bank branches in Vietnam; parent bank, overseas branches of the bank parent) whose risks related to this loan are borne by the Government, this individual and organization

Sources of capital borrowed from abroad by banks and foreign bank branches. For foreign bank branches, overseas loan capital sources include both parent bank's and parent bank's overseas branches;

The State Bank's refinancing loan balance, excluding the refinancing loan balance for temporary solvency support.

- D: Total deposit.

Deposits of domestic and foreign organizations (including deposits of other credit institutions and foreign bank branches), except for the following:

Deposits of all kinds of the State Treasury

Deposits and specialized capital deposits of customers

Deposits of individuals, excluding deposits and specialized capital deposits.

Money raised from issuing promissory notes, bills, certificates of deposit, bonds

Sensitivity - Sensitivity to market risk

Market risk in banking operations is a potential risk that causes negative impacts on the income or capital of commercial banks due to adverse fluctuations in market factors such as interest rates, stock prices, and prices. The bank cannot change these factors, but can only forecast the trend of calculating the influence level, thereby taking proactive measures to adjust the size of the asset structure so that the minimize possible loss.

Exploratory analysis - How to explore data relationships.

Inferential analysis: Analyze samples from complete data. In this type of Analysis you can find different conclusions from the same data by choosing different samples.

Statistical analysis: Statistical analysis reveals "What happens?" using past data in dashboard form. Statistical analysis includes the collection, analysis, interpretation, presentation, and modeling of data. It analyzes a data set or a data sample.

CHAPTER 3. ANALYSIS OF USER REQUIREMENTS AND DATA DESCRIPTION

3.1. Identify and analyze user requirements

Can ACB maintain the capital adequacy ratio below 8%?

What is the level of bad debt ACB is bearing?

The ratio between expenses and income of ACB?

What percentage is ACB's current profit rate?

What is ACB's interest rate and currency risk?

3.2. Overview of the source database

The user group data is taken from the audited individual financial statements of ACB for the 4 quarters of 2020 and 2021. Besides, the stock price of ACB in 2021.

3.2.1. Describe the source data

The report has 2 source database parts:
First, the financial statements of ACB
Financial statement is a term that is mentioned a lot in the financial - accounting industry today. It is simply understood as a system of tables with statistical data and numbers showing the financial position of the company and the cash flow in and out of the business activities of the enterprise. For managers and business owners, the financial statements are the basis for assessing the financial position and capital round of the company, from which they will make appropriate strategies and measures to solve the problem. situation and improve operational efficiency. As for investors, financial statements are the basis for analyzing the profitability and future potential of that company, from which they can make a decision whether to invest or not.
If the financial statements are considered to be the overall picture of a company's financial position and profitability, financial statement analysis is the process of reviewing, analyzing and synthesizing information. Information, single item is statistics in the report through the use of technical tools to make forecasts about the financial position of the company in the future. From there, it helps users of financial statements (business owners, investors, lenders, state agencies...) to easily make judgments and judgments accurately and correctly. than.
The group gets its data mainly from the balance sheet, income statement, a number of indicators in the notes to the report such as loan quality, outstanding balance over time, currency risk and interest rate risk. .
-The purpose of financial statement analysis: is to help users (business owners, investors, suppliers, state agencies...) can make assessments and comments about the situation. company's finances as well as prospects for future profitability to make the most accurate decisions.
Second, the ACB stock price list:

Currently, in Vietnam, there are 2 official stock exchanges: HNX (Hanoi Stock Exchange) and HOSE (Ho Chi Minh City Stock Exchange). As for ACB, from December 9, 2020, ACB has moved from HNX to HOSE to carry out stock transactions.
Data on ACB's stock prices are obtained by the team from Investing.com.
Investing.com is a platform that provides data, real-time quotes, charts, financial instruments, breaking news and analysis on over 250 exchanges around the world in 44 languages. . With over 21 million monthly users and over 180 million trading sessions, Investing.com is one of the top three financial websites in the world according to SimilarWeb and Alexa.
With over 300,000 financial instruments, Investing.com gives users unlimited and completely free access to cutting-edge financial market tools such as real-time quotes and alerts, and portfolios. Custom investments, personalized notifications, calendars, calculators, and in-depth financial information.
Investing.com aims to be a comprehensive financial information platform for traders and investors with apps available on iOS and Android operating systems - these are about Top rated financial markets on Google Play for five consecutive years.
Over the years, Investing.com has become a trusted provider, providing hundreds of loyal advertisers access to global and local users, across all available platforms.

CHAPTER 4. DATA ANALYSIS AND RESUTLS

4.1 Introduction to data analysis tools and solutions

Power BI: Visualize data.
Power BI is a home office application product from Microsoft. In more detail, Power BI belongs to the business intelligence group (Business Intelligence) with the main task of minimizing and improving the quality of data representation on financial reports, sales, ...
Enable users to access data from multiple sources and automate data processing.

Support for connecting, converting large-scale data analysis: Power BI's data processing ability is extremely powerful when it can work with 8-10 million data lines at a time.

Enhance data visualization

Use Analytical Expressions (DAX) to analyze data: DAX is an extremely powerful analytical expression with fast, efficient processing speed.

Build data models to combine data from multiple sources.

Built from the foundation of AI (artificial intelligence) and Machine Learning (machine learning), so it is sharp in data processing. Provides available reports and dashboards. High security in connecting data sources data (via cloud or enterprise system).Dashboards are always updated in real-time.Natural language queries in data mining.Integrate Python and R code to improve visualization quality .Power Query makes it easier for users to use and compact data.Website helps answer users' questions with an expanded database.Users can create schedules to update data automatically. action instead of time consuming manual operation.

Excel: Calculating and processing data

is a spreadsheet and data processing tool from Microsoft developers. Excel has always been an option for simple to complex data calculation software.

With organized data, analysis is a lot easier, especially when used to create graphs and other visual representations of data. Excel makes it easier to process numbers in batch calculations. With Excel it is possible to sort and filter data based on

4.2. Analyze, explore, and visualize data

The team uses the data on the individual financial statements of ACB to calculate the CAMELS model indexes including:

- Capital adequacy ratio (CAR)
- Capital adequacy ratio tier 1 (CAR tier 1)
- Nonperforming loan
- Ratio of debt group two to total debt

- Cost to Income Ratio
- Ratio of outstanding loans to total deposits
- Interest rate risk
- Currency risk

Besides, the group process that took the data and processed it:

-Step 1: The group determines the problem to be analyzed: ACB's business activities, Bank analysis according to CAMELS model standards.

-Step 2: Collect the necessary data for visualization. The data is collected from the financial statements of the Asia Commercial Bank (ACB), financial indicators, aggregated ACB shares on reputable web platforms such as Vietstock, Investing.com, etc.

-Step 3: After having all the necessary data, group 1 begins to clean and format according to the needs of data visualization.

-Step 4: Exploit existing data and Modeling data by building Data visualization Dashboard on Power Business Intelligence platform.

-Step 5: Analyze based on charts, visual numbers by quarter, by year, ...

-Step 6: Identify the problem encountered and provide solutions to do to fix the problem.

4.3 Discuss and evaluate the results, and implications from results to support decision making in business

4.3.1. Overview financial activity

To share some of the difficulties with customers affected by the Covid-19 epidemic and comply with the regulations of the State Bank of Vietnam, ACB has launched a number of credit packages to reduce interest and service fees, and restructured the repayment term for nearly 4,000 customers affected by the epidemic, equivalent to a total outstanding loan of 17 trillion dong. Especially, in the third quarter when the epidemic broke out strongly, had to social distance on a large scale, and production and business activities were stalled, only from July 15, 2021 to December 31, 2021, ACB has reduced lending interest rates for nearly 128 thousand customers, with the total outstanding loan interest rate reduction of more than 302 trillion dong. Following strict risk management principles, ACB proactively set aside 100% of the difference in provision for loans classified according to Circular No. 11/2021 (*) and classified under Circular No. 01/ 2020 (**) (instead of setting aside 30% in the first year as prescribed) led to a sudden increase in provision expenses during the year (254% compared to 2020.)

However, ACB still ensured that profit before tax for the year exceeded 13% of the plan (VND 10,602 billion) and achieved an increase of 25% compared to 2020. Profit in 2021 increased thanks to increased revenue, in which revenue Net interest income increased by 30% thanks to the improvement of profit margin from the good growth of demand deposits compared to the same period in 2020. Non-interest income accounted for 20% of total income, helping to reduce the risk of focusing on operations. Credit

Year-round operation with good growth, efficiency and safety. The performance compared to the plan is as follows:

• Total assets reached 528 trillion dong, up 19%, 10% higher than the plan.

• Customer deposits reached VND380 trillion, up 8%, 9% lower than the plan, because ACB proactively calculated capital sources.

• Outstanding loans reached VND 362 trillion, up 16% equal to the credit limit allocated by the State Bank of Vietnam during the year.

• Pre-tax profit was 11,998 billion dong, up 25%, 13% higher than the planned amount of 10,602 billion dong.

• Bad debt ratio is at 0.77%, among the lowest in the industry.

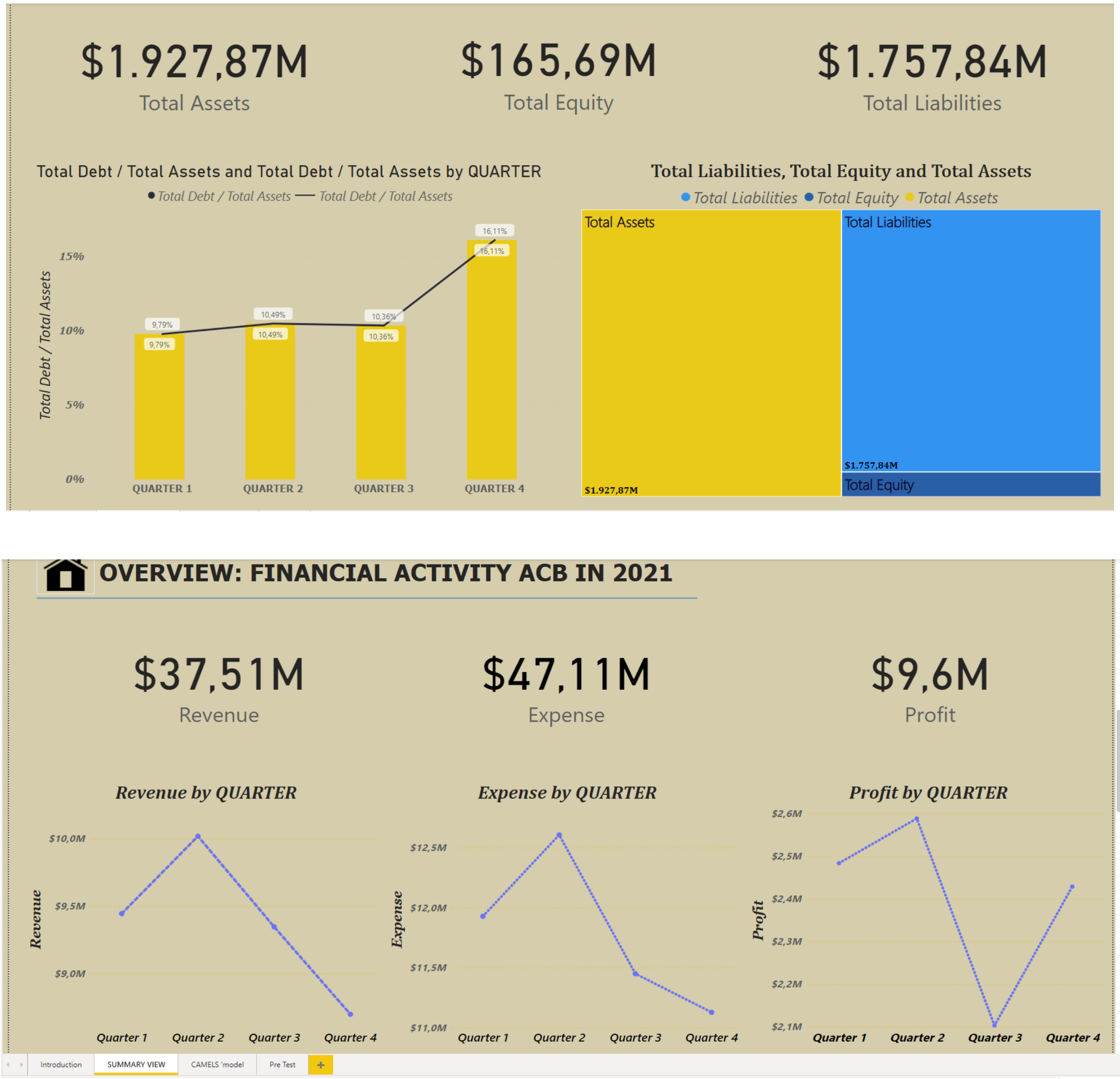


Figure 7. Overview of the financial situation at ACB Bank

Insight 1: Lợi nhuận quý 3 thấp đột ngột so với các quý khác là do:

Restructured debt increased sharply from 8,200 billion VND (at the end of June 2021) to 13,400 billion VND (at the end of September 2021). Accordingly, ACB has made a total provision of 2,000 billion dong for restructuring loans in the first 9 months of 2021 instead of making spread out over 3 years as prescribed in Circular 14, making the total cost ACB's provision in 9 months increased to 2,800 billion dong.

According to CFO of ACB: "Restructuring debt may continue to increase and it is expected that provision expenses related to restructuring debt may increase by 500 billion VND by year-end."

Fee income in the first 9 months of 2021 of ACB reached 1,900 billion VND, up 55% in which income from card and insurance is the main growth driver despite the significant impact of the Covid-19 pandemic. third quarter of 2021.

The second quarter profit increased the most because the growth engine mainly came from improved NIM net profit margin, strong increase in non-interest revenue plus reduced operating expenses.

Revenue from the second quarter to the end of the year decreased due to NIM's net profit margin because the bank will simultaneously cut lending rates to support customers affected by the Covid pandemic as well as attract new customers.

Expense in Q1 dropped sharply (16.7%) due to cost reduction for employees.

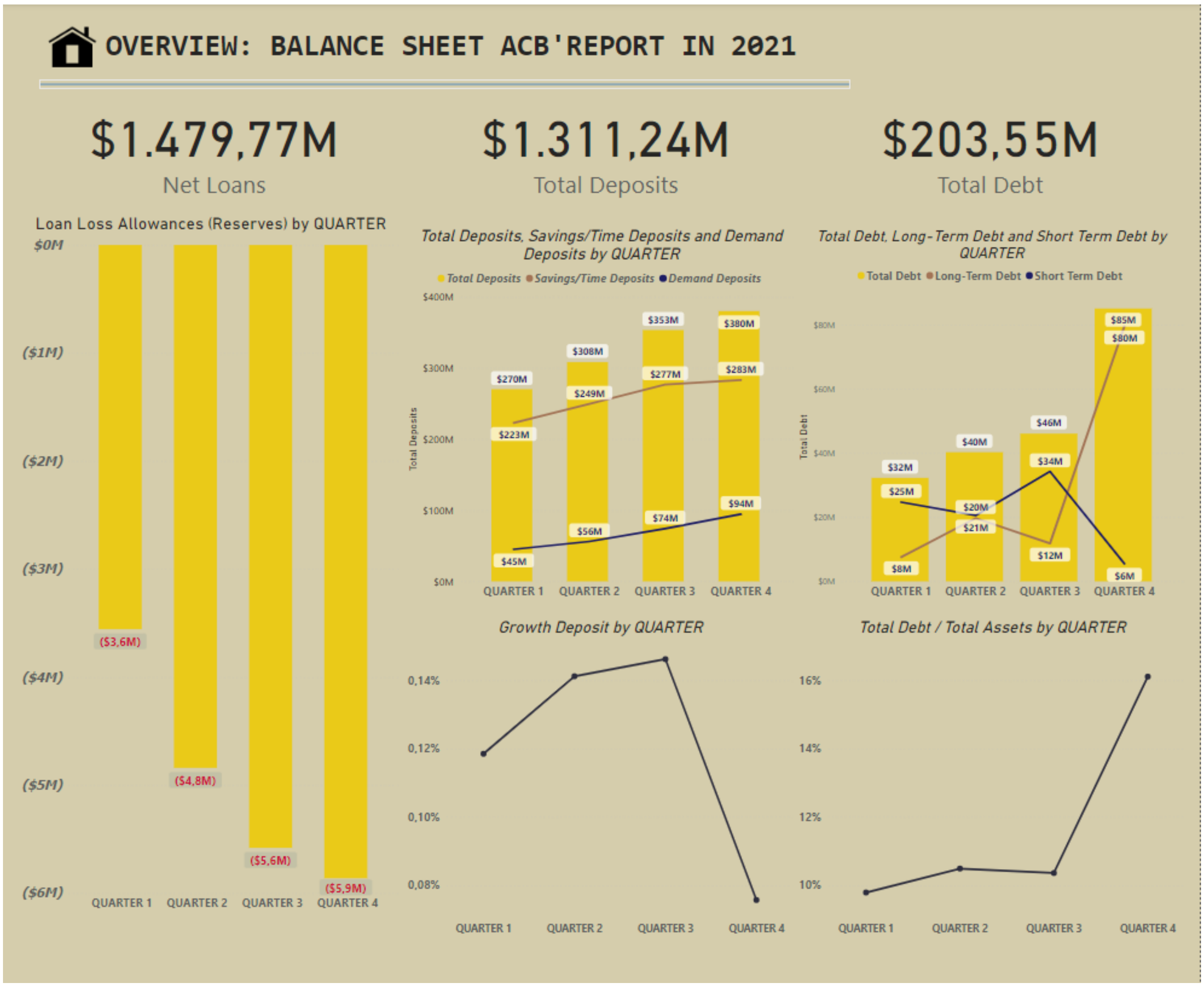


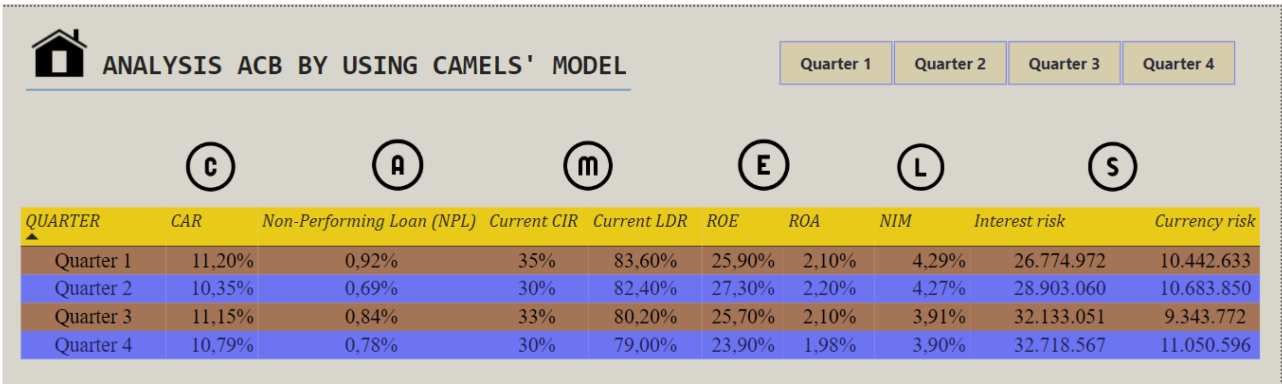
Figure 8. Overview of the balance sheet at ACB Bank

The service sector alone is still optimistic because ACB still has fee income ~ +1300 billion from fee revenue in 2021

Growth of Deposit in the third quarter increased sharply because at the end of the second quarter, the State Bank increased the credit room from 9.5% to 13.5%. ACB's customer loans slowed down in the first 9 months of this year, increasing by only 8% to VND 336,491 billion, just slightly higher than the credit growth of the entire industry as of the first month of October of 7.42%.

4.3.2. CAMELS' model:

Overview model:



QUARTER	CAR	Non-Performing Loan (NPL)	Current CIR	Current LDR	ROE	ROA	NIM	Interest risk	Currency risk
Quarter 1	11,20%	0,92%	35%	83,60%	25,90%	2,10%	4,29%	26.774.972	10.442.633
Quarter 2	10,35%	0,69%	30%	82,40%	27,30%	2,20%	4,27%	28.903.060	10.683.850
Quarter 3	11,15%	0,84%	33%	80,20%	25,70%	2,10%	3,91%	32.133.051	9.343.772
Quarter 4	10,79%	0,78%	30%	79,00%	23,90%	1,98%	3,90%	32.718.567	11.050.596

Figure 9. Overview of the CAMELS model at ACB Bank

Capital : Capital adequacy ratio and Tier 1 capital adequacy ratio

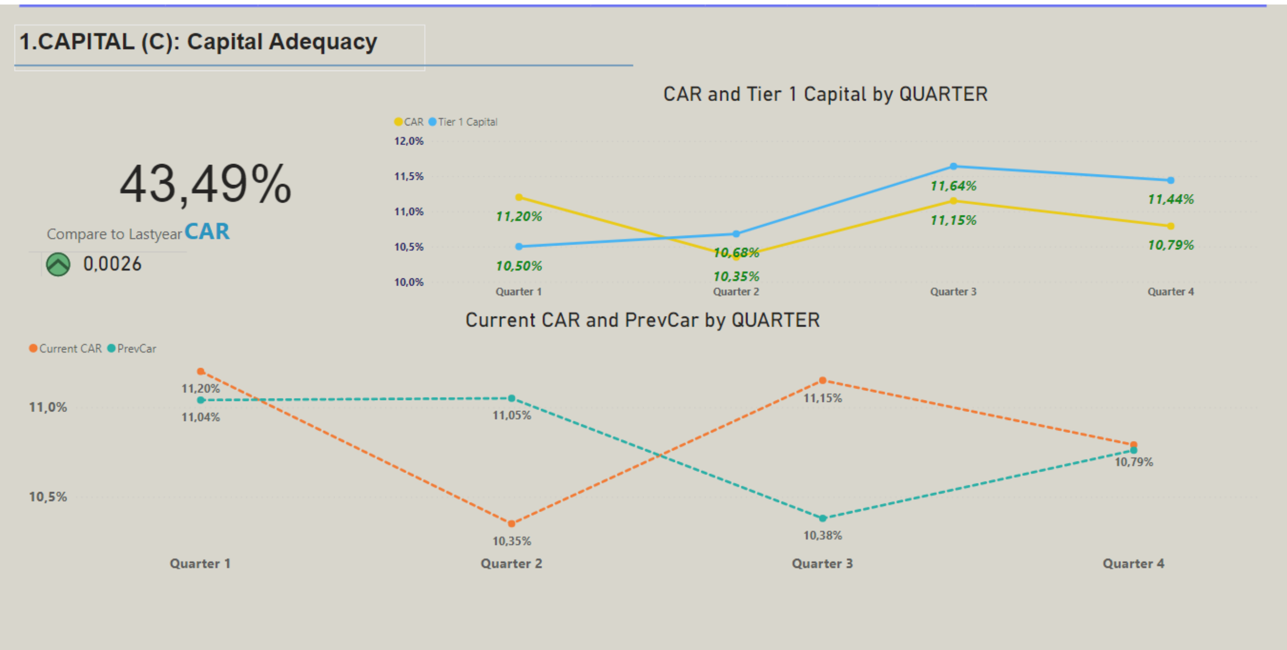


Figure 10. Capital adequacy ratio in the CAMELS model

Capital adequacy ratio is an indicator reflecting the relationship between equity capital and risk-adjusted assets of commercial banks. ACB always proactively manages its capital and complies with the regulations of the State Bank of Vietnam. By the end of the first quarter of 2021, ACB's CAR reached 11.2% and CAR tier 1 reached 10.5%, much higher than the required capital adequacy ratio of 8%. By the end of the second quarter, ACB's CAR ratio decreased to 10.5% due to the impact of social distancing and increased again to 11.15% in the third quarter but tended to decrease in the fourth quarter. In general, ACB has managed capital is good when the capital adequacy ratio and tier 1 capital ratio are always above the prescribed level and are classified as healthy growth.

Asset Quality

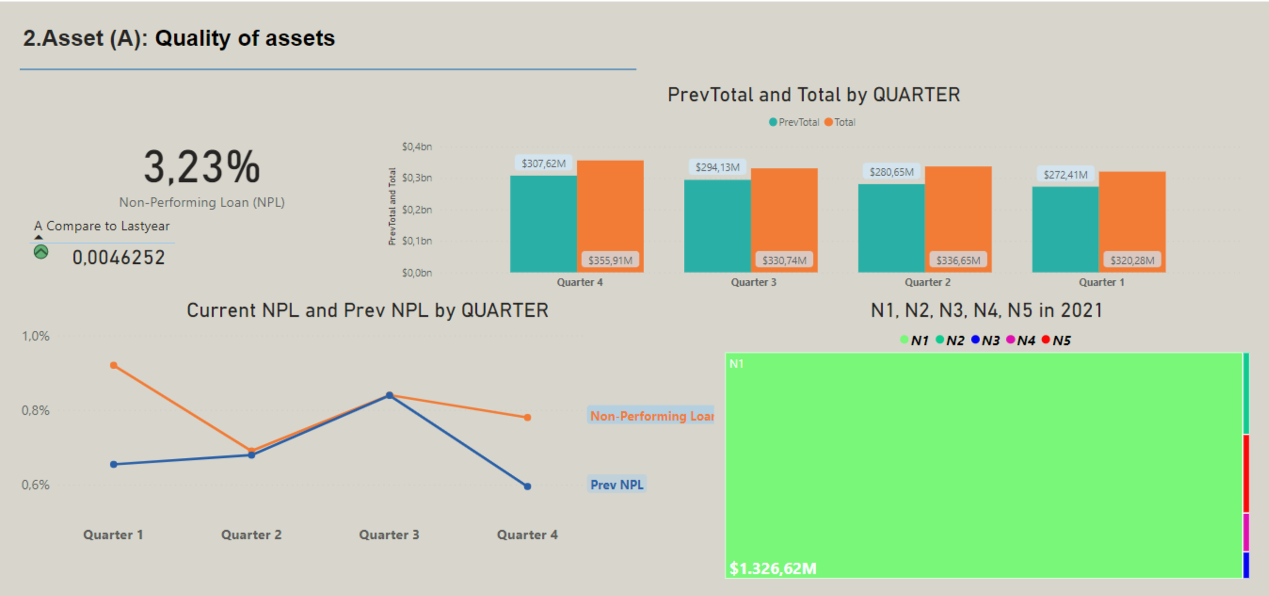


Figure 11. Asset quality in the CAMELS model

By the end of the year, ACB's total bad debt increased to VND 2,799 billion, equivalent to 0.77% of total outstanding loans, much lower than the industry standard of less than 2% and among the lowest in the banking system. system. Provision/total bad debt ratio is maintained at a high level in the whole industry at 209% Specifically, in the first quarter of 2021, ACB's bad debt ratio reached 0.92% because the bank actively reclassified loans earlier than required, because ACB is seeing signs of deterioration from some customers. This ratio decreased from quarter to quarter. In the second quarter, ACB's bad debt ratio was at 0.7%, up 0.09% over the same period in 2020 but still in good control. Lending quality was still well controlled until the end of the year with bad debt levels in the last two quarters of 0.84% and 0.78% respectively. However, in 2021, ACB will be in the top 10 banks with the highest bad debt, led by VPBank holding a lot of bad debt with more than VND 15,800 billion, up 60% compared to the previous year.

Management:

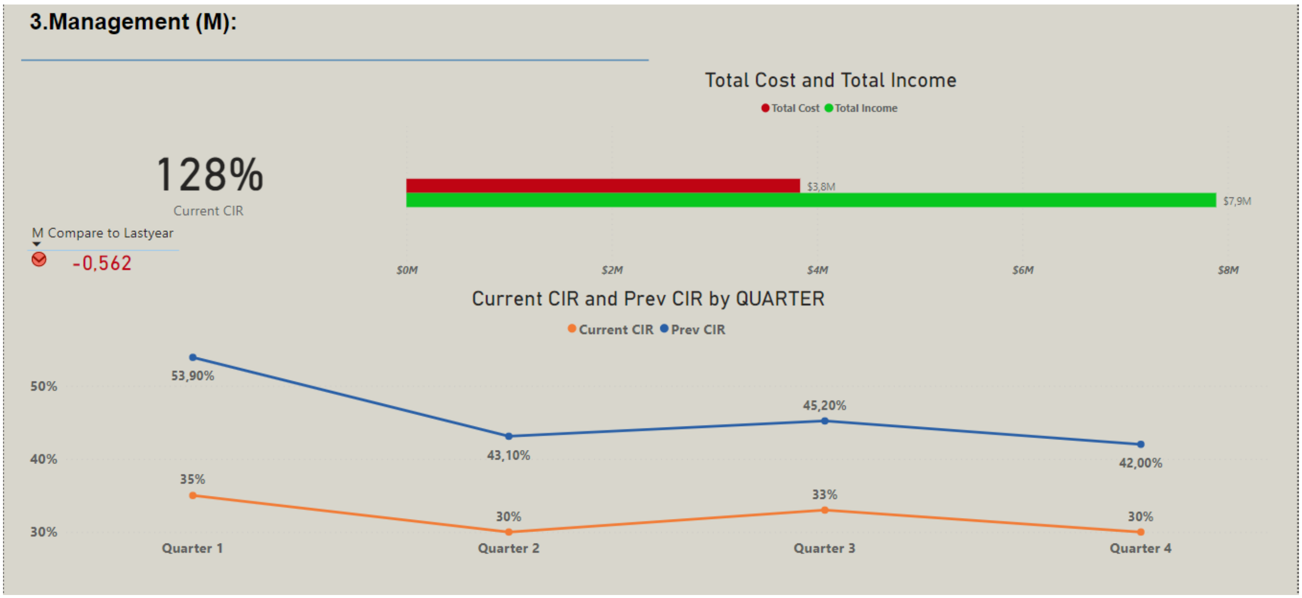


Figure 12. CIR index in the CAMELS model

Operating expenses in 2021 are strictly controlled with a slight increase of 8% compared to 2020 thanks to savings in travel expenses, reception, communication and related costs reduction, such as maintenance and repair, tooling tools, etc. The cost-to-income ratio (CIR) continued to improve, falling to 35% from 42% in 2020

Operating cost was well-controlled, down by 17% vs 2020, CIR was at 35%.

Operating expenses were well controlled with a 14% decrease compared to the same period in 2020, the cost/revenue ratio was low at 30%. This ratio continued to remain below 35% in the last two quarters of the year.

Earnings:

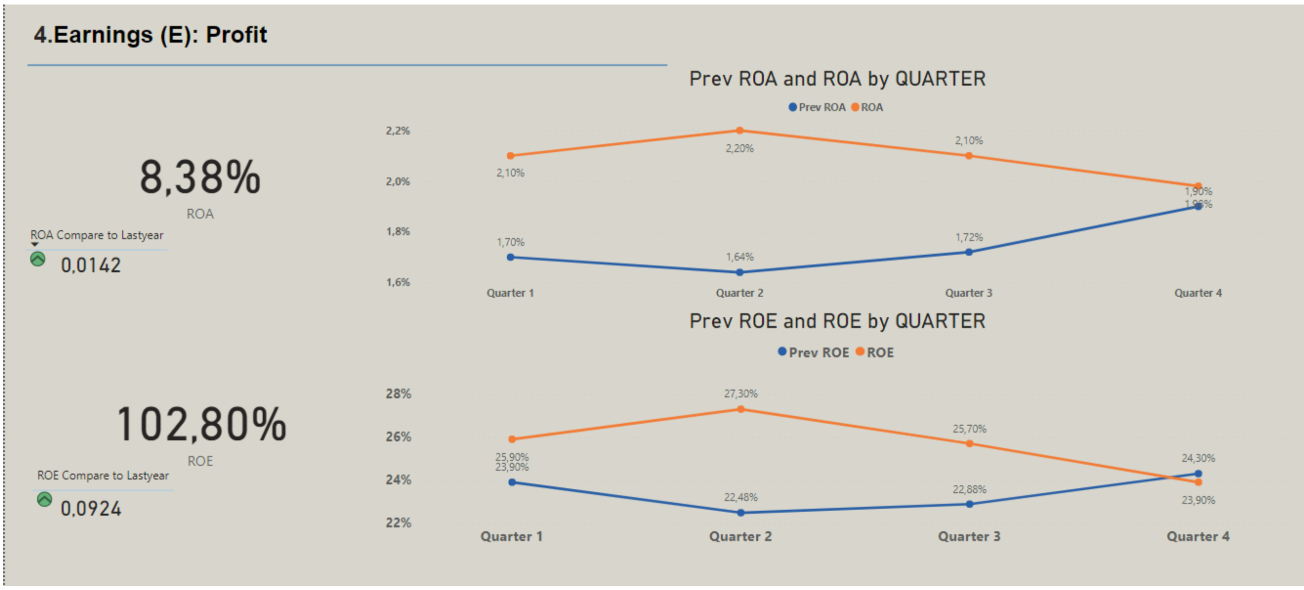


Figure 13. Business performance indicators in the CAMELS model

The ratio of profit after tax to average total assets (ROA) reached 1.98%, higher than the level of 1.86% in 2020. Profit after tax on average equity (ROE) reached 23 .90%, nearly equal to 24.31% of 2020. Specifically, in the first quarter of 2021, ACB's ROA and ROE reached 6.77% and 0.56%, respectively. By the end of the third quarter of 2021, ACB was in the top 10 banks with high ROA of the banking sector. Thanks to the 9-month profit growth of 39.8% over the same period, ACB continued to rank 2nd in the Top 10 banks with the highest ROE with 18.4% (same period last year was 16.9%). Specifically, ROE of ACB is always above 25% and the lowest in Q4 at 23.9% at 23.9%.

NIM trend will be stable at a level similar to the high of Q1/2021 thanks to the low interest rate environment. ACB's 9-month net profit margin NIM increased slightly to 4.1% (4% in the first 6 months) thanks to the impact of lower deposit costs than the reduction in lending rates that the bank had seen. goods made during the fourth Covid-19 epidemic. ACB's 4Q21 NIM is 3.91% (flat QoQ; -37 bps YoY), thanks to record low funding costs of 3.31%

Liquidity:

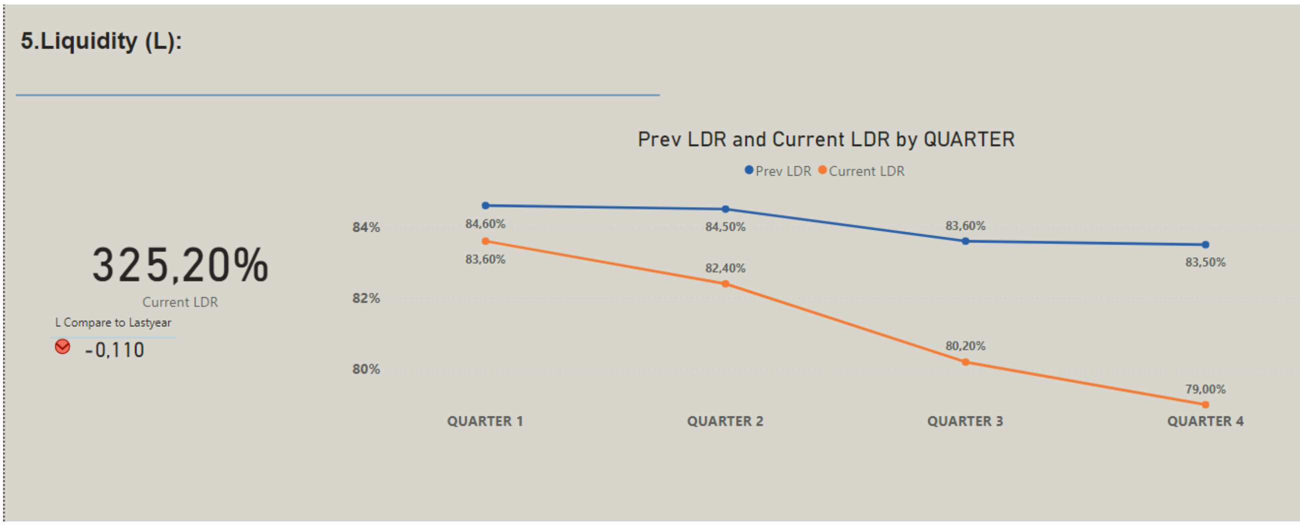


Figure 14. Liquidity Ratio in the CAMELS model

2021 will see a spike in market liquidity along with 1.5 million newly opened securities accounts, most of which are domestic individual accounts. Measures to support the economy, including lowering interest rates as well as new regulations to tighten corporate bond issuance, have helped increase stock market liquidity.

The slow growth of customer deposits in the first half of the year caused ACB's LDR to increase and partly contributed to the expansion of NIM's net profit margin. The slower growth rate of deposits compared to loans is a common phenomenon for many banks in the first period of the year because cash flows tend to seek other investment channels. The liquidity level of the banking system in general and ACB in particular is no longer abundant compared to the previous period.

ACB always maintains the liquidity safety level as regulated by the State Bank of less than 85%. Specifically, the 4 quarters of the year are 83.6%, 82.4%, 80.2% and 79% respectively for the last quarter of the year.

By the end of Q1/2021, the regulated LDR had increased to 83.6% from the ceiling of 85%, which management believes can be managed flexibly thanks to ACB's strong mobilization capacity.

Sensitivity

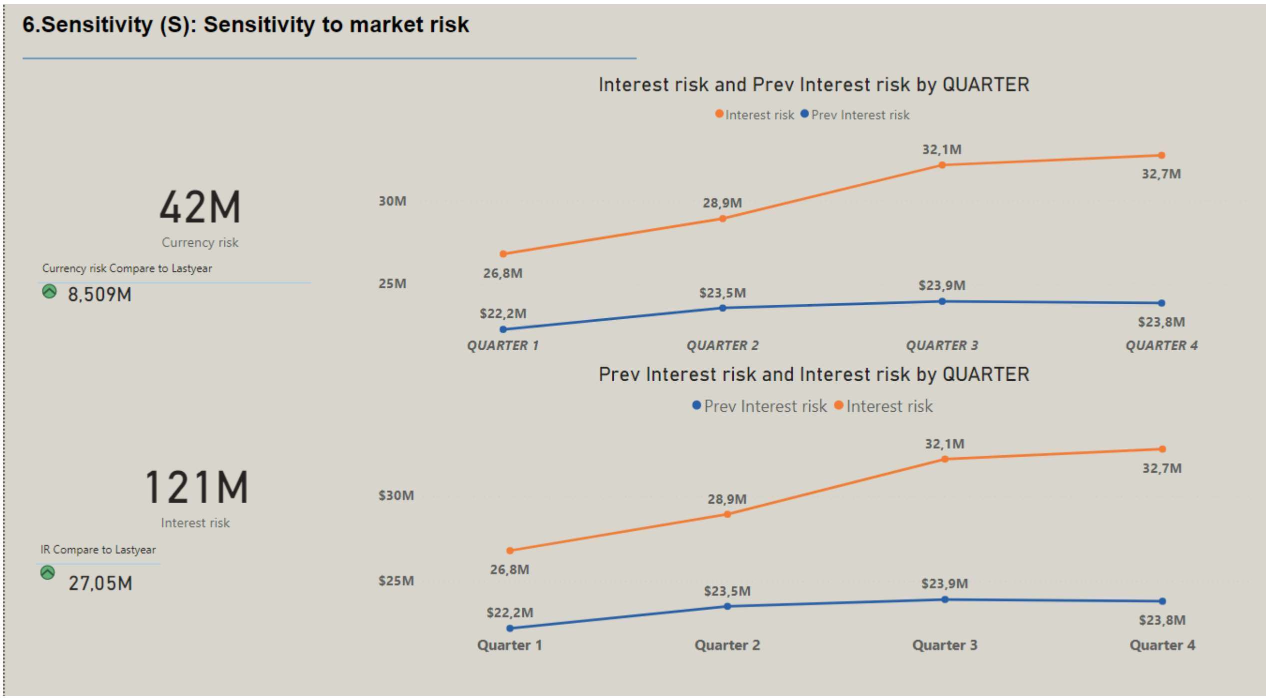


Figure 15. The data represents the level of market sensitivity

Interest rate risk is one of the specific risks of commercial banks, occurring when there is a difference between input deposit interest rates and output interest rates due to market fluctuations and the difference between interest rates and interest rates. deposit and investment terms. The fluctuation of market interest rates can negatively affect the bank's profit by increasing costs and reducing the bank's income. Therefore, fluctuations in interest rates will affect the bank's entire balance sheet and income statement.

Interest rate risk has the biggest impact on banking activities and bond investors. Therefore, interest rate risk is often referred to in two main categories:

- Bank interest rate risk
- Bond interest rate risk

Currency risk: Currency risk, commonly known as exchange rate risk, arises from changes in the price of one currency against another. Investors or companies whose assets or businesses cross national borders are subject to currency risks that can generate unpredictable profits and losses. Many institutional investors, such as hedge funds and mutual funds, and multinational corporations use foreign exchange, futures, options or other derivatives to hedge their risk. ro.

As for interest rate risk at ACB, there is an increase in the quarters of 2021. Specifically, in the first quarter, it only reached less than 27 million VND, by the third quarter it was more than 30 million and by the fourth quarter it was 32718567

In the currency risk segment, ACB recorded a small difference in risk in the quarters of the year. Specifically, in the first quarter, it was 10442633 million dong, slightly increased in the second quarter, in the third quarter it decreased but not significantly and in the fourth quarter it increased again and also the quarter recorded the highest monetary risk of the year, at above level. 11 million won

4.3.3. Stock Price of ACB from quarter 1-2021 to quarter 1-2022

After ACB pays dividends in 2021, ACB's charter capital is expected to increase by more than 5,400 billion dong, reaching 27,019 billion dong. This helps ensure safety ratios for the bank and at the same time increases resources. medium and long-term capital for credit extension activities, bond investment, additional capital for renovation and investment in strategic projects in the coming years.

DATE	OPEN	CLOSE	HIGH	LOW	VOLUME	%
31-03-2022	$32.700	$33.050	$33.200	$32.600	5520000	1,38%
30-03-2022	$32.400	$32.600	$32.900	$32.300	4150000	0,77%
29-03-2022	$32.450	$32.350	$32.650	$32.300	3660000	0,00%
28-03-2022	$32.700	$32.350	$32.800	$32.300	4880000	-1,07%
25-03-2022	$32.900	$32.700	$33.150	$32.700	3340000	-0,61%
24-03-2022	$33.050	$32.900	$33.200	$32.850	2870000	-0,90%
23-03-2022	$33.200	$33.200	$33.400	$33.150	2060000	-0,30%
22-03-2022	$33.000	$33.300	$33.400	$33.000	3320000	1,06%
21-03-2022	$32.900	$32.950	$33.000	$32.700	3300000	0,46%
18-03-2022	$33.000	$32.800	$33.100	$32.800	2600000	0,00%
17-03-2022	$33.150	$32.800	$33.200	$32.800	2620000	0,00%
16-03-2022	$32.900	$32.800	$33.050	$32.650	3290000	0,00%
15-03-2022	$32.800	$32.800	$33.150	$32.700	2750000	0,31%
14-03-2022	$32.500	$32.700	$32.800	$32.450	2720000	0,00%
11-03-2022	$32.800	$32.700	$32.950	$32.600	2710000	-0,61%
10-03-2022	$33.000	$32.900	$33.400	$32.900	2200000	0,61%
09-03-2022	$32.750	$32.700	$32.950	$32.400	4170000	0,31%
08-03-2022	$33.000	$32.600	$33.200	$32.550	7220000	-1,95%
07-03-2022	$33.500	$33.250	$33.800	$33.150	4690000	-3,06%
04-03-2022	$33.400	$34.300	$34.300	$33.000	6930000	2,54%
03-03-2022	$33.000	$33.450	$33.450	$32.900	8170000	1,67%
02-03-2022	$33.700	$32.900	$34.000	$32.900	13880000	-2,81%
01-03-2022	$34.000	$33.850	$34.000	$33.550	5610000	-0,15%
28-02-2022	$34.300	$33.900	$34.350	$33.900	3860000	-1,31%

Judging from the top 10 days with the largest trading volume for 5 consecutive quarters, the first 2 quarters of 2021 will have up to 7 days with the largest trading volume, the price fluctuation range is also in the first form - % change is marginal ~ 7%/session.

⇨ It is advisable to invest in ACB shares from the first quarter to the second quarter. It is best before June every year because at the beginning of June each year, ACB will close the dividend payment date, so Investors will benefit more.

CHAPTER 5. CONCLUSION

5.1. Result and Limitations

Through the CAMELS model, the group has analyzed and consulted many sources, the group would like to comment

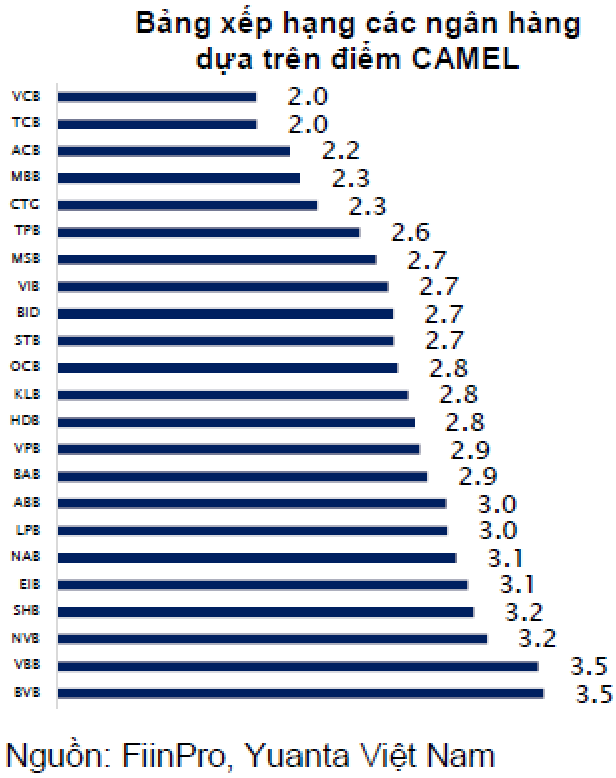


Figure 16. Bank ranking according to CAMLES model

In conclusion, VCB continues to be the leading bank in our CAMEL ranking. VCB's bad debt coverage ratio (LLR) was at 279%, but still the highest rate in the industry. This ratio shows that VCB is very cautious and proactive in limiting the decline in asset quality in the context of the macro economy facing many difficulties due to the impact of COVID-19. TCB, ACB and MBB are once again in the top 4 highest ranked banks in their CAMEL model I.

VCB is still the top bank in our CAMEL model. NPL ratio (NPL) was low in Q4/2021 at only 0.64%. The bad debt coverage ratio (LLR) skyrocketed to 424%, which is the highest LLR ratio in the industry. CASA ratio increased slightly to 35.7% by the end of Q4/2021.

Advantages

CAMELS is a model that synthesizes 6 important factors of a financial institution or a bank such as capital adequacy, asset quality, management, profitability, liquidity and sensitivity to market risks. school. These measurement factors help managers get important tools from which to find out the shortcomings and inadequacies in the operation to come up with solutions to overcome them.

The model uses many important indicators such as CAR, which is currently being used effectively by many banks in the world, or indicators appearing in other models such as ROA and ROE in the analytical model. Dupont is used to analyze the profitability of commercial banks

Through the use of the CAMELS model, it is possible to accurately distinguish current risks, and predict potential risks in the future. Financial managers will also have time to limit moral hazard.

Defect:

Based only on rates given by researchers. Observing and analyzing the quality of a financial institution's performance based on such predefined indicators easily makes the assessment dependent on the subjective opinions of analysts.

The necessary information for an effective CAMELS model needs to be transparent and the bank's ability to provide financial information, the truthfulness of the financial statement information.

5.2. Thread development direction

Make a proposal to ACB

Promoting products and services to increase charter capital, contributing to increasing the bank's capacity and competitiveness, contributing to the race to increase charter capital before state regulations on capital adequacy ratio.

Continue to have policies to deal with bad debt. must pay attention to regularly assess the operation situation, financial situation, debt repayment ability to take appropriate handling measures, in order to limit arising risks; strictly control investment activities in corporate bonds, especially investment in corporate bonds for purposes related to construction and real estate trading or to increase capital size of issuers operating in Vietnam. construction and real estate business; maintaining the ratio of bad debts on the balance sheet, debts sold to the Asset Management Company of credit institutions (VAMC) that have not been processed and the potential to become bad debts below 3% of the total loan balance, invest.

In fact, banks have no way to completely eliminate interest rate risk, but can only control it to an acceptable level so as not to adversely affect asset values in the future.

According to the experience of other countries, in order to control interest rate risk, banks take the following measures: Buy insurance against interest rate risk to transfer all interest rate risk to a professional insurance agency, apply commercial lending measures (short-term loans) so that banks can flexibly change lending rates when market interest rates change in an upward direction.

In addition, banks also apply a proactive strategy in interest rate risk management: If the bank can predict the direction of interest rate changes, the bank can actively adjust the interest rate sensitive gap. and a reasonable term gap. Apply interest hedging techniques such as forward contracts, futures contracts, options, swaps.

Before the fierce digital transformation race among banks today, ACB is considered to have not had outstanding achievements when friendly banks like Techcombank have launched F@st mobile application for banking transactions in a straightforward manner. Simple and economical, or VP-Bank's Cake digital bank and the indirect competition of e-wallets for transaction payment. Vietnam is a country with a strong growth rate in Mobile Banking reaching 200% and currently has about 30 million people using the bank payment system every day. These are the opportunities for banks to enter the digital transformation race. ACB needs to take stronger and faster steps to catch up with other banks like launching ACB One application is not enough, but it must have really outstanding features and meet the needs of customers. especially the gen Z segment - the user group that is being exploited today. ACB One can integrate payment features with savings with high interest rates as well as investment to attract customers. Reducing usage costs is also an advantage for the application. Integrating modern technologies such as QR codes or eKYC identification also helps ACB One attract more users. Ensuring safe, fast and effective application is also a remarkable point for ACB One if it wants to develop better in the future. And the old point but never ceases to care about information security as well as customer transactions. ACB One can use multiple layers of security or OTP code to confirm transactions, making transactions more secure.

The necessary information for an effective CAMELS model needs to be transparent and the bank's ability to provide financial information, the truthfulness of the financial statement information.

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