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Impact of Covid-19 on the Portuguese Banking Sector

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Abstract

The entire impact of COVID-19 has yet to be determined. However, it has become evident that the virus has infected banks and financial markets, resulting in severe reductions in global capital flows. The purpose of this study is to find the elements that influence the profitability of banks in Portugal and the impact of the pandemic on the Portuguese banking industry. To achieve the goals of this study, the performance of 26 banks in Portugal is assessed in terms of return on assets from 2016 to 2021. The dependent variable (ROA) is regressed on independent variables including asset utilization, bank size, equity multiplier and operating costs. According to the findings, the profitability of the Portuguese banking sector fell from 0.42 percent in 2019 to 0.06 percent in 2020. In terms of the econometric findings, it's worth noting that while asset utilization ratio has a positive and significant impact on bank profitability, increased operating costs will greatly reduce ROA.

Key Words: Banks in Portugal, Profitability, Impact of Covid-19, Regression analysis

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Introduction

The relationship between banks performance and its determinants has long been a subject of study. While earlier studies had predominantly focused on internal and external factors, more recent studies pay more attention to the internal factors. Understanding crisis will allow us to learn from it and make more acceptable explanations and judgements about the onset and trend of the issue across a broader time frame.

Therefore, questions related to determinants of banks performance and the impact of crisis have attracted a large share of attention in debates concerning banking sector and crisis. The role of crisis of Covid-19 factors in explaining banks performance is quite under-researched. The purpose of this study is to find the elements that influence the profitability of banks in Portugal and the impact of the pandemic on the Portuguese banking industry. We will use quantitative and regression analysis to determine the regression equation. ROA is chosen as the dependent variable and four independent variables to create the appropriate regression model, data required are from all banks in Portugal during the last five years and using Stata to implement the regression model to answer the following questions: What factors influence bank profitability? What effect do these variables have? What was the impact of the pandemic on Portugal's banking sector? What is the extent to which it is impacted?

The results uncover: return on assets of banks in Portugal had a sharply decrease of 0.36 percent in 2020. Asset utilization ratio positively and significantly influences bank profitability while operating costs have a large and negative impact. Although the equity multiplier and the bank size have negative and positive effects, respectively, they are not significant. The pandemic has mostly reduced the bank's asset utilization rate and operating costs, and the drop in these two indicators has shown the concerns of the bank's net income, asset quality deterioration and business reduction. On the other hand, loan loss provision has

been boosted, reducing banks' profits indirectly. Companies have been burdened by the pandemic-related limitations, which have slowed GDP growth and investment and posed a threat to the rise of non-performing loan portfolios. Banks are also forced to hunt for sources of interest-free income due to the low interest rate environment. The pandemic has altered consumer tastes and behaviors, supply shocks are accompanied by demand shocks.

The key contribution is identifying the issues that have the greatest impact on bank performance and to inspiring bank management to help the banking industry cope with difficult situations. Another significant contribution is to fill up the gaps in this sort of pandemic and banking study, as well as to provide data and guidance for future studies on the Portuguese banking system.

The first section of the rest of this research is literature review focusing on previous scholars' research on banking sector and crisis; the second section is a comprehensive picture of Europe's banking industry in recent years; the third section is the establishment of a regression model, analysis of various data, and conclusions drawn through the model; the fourth section is the discussion; the final section is the conclusion.

Literature Review

This chapter provides a review of the relevant literature in the field of the determinants of banks profitability and the virus's impact on the banking industry. Overall, return on assets is a regularly used dependent variable and explanatory variables include a variety of indicators such as bank size, leverage ratios, operating costs, capital adequacy ratios and others.

This view is supported by Atanasoglou et al., (2002), who agreed that return on assets and return on equity can be used as key variables to gauge bank performance. Internal determinants such as capital, liquidity, asset quality, diverse investment, operating costs and

size were used to classify the explanatory variables of performance. Although their choice of residual ROE as the independent variable differs from this paper's variables, it can be utilized as a guide to help with this work.

Jiyang Bai (2010) investigated the primary elements determining commercial bank profitability and concluded that profitability is primarily determined by internal factors. Commercial banks' profitability is significantly impacted by their credit and fee businesses.

Similarity, Dan Li (2014) discovered that, the most essential factors influencing commercial bank profitability are macro-control and micro-management. Increase asset utilization, reducing asset impairment losses, expanding the debt ratio, change the debt structure and finance through diversified debt can increase profitability.

A major criticism of Dan Li's work is that he acknowledged the positive impact of asset utilization on ROA and the negative impact of asset impairment losses, but didn't use much data to back it up, and the data wasn't from the European banking industry, which could lead to deviations. In addition, all determinants come from asset subjects, with no mention of the coefficient with other subjects.

Christos and Greek (2004) made up for this gap admirably. They used a lot of data from European banks, using cross-sectional time series regression and year-by-year cross-sectional regression to show that banks with larger equity levels and substantial amounts of non-loan-income assets are more profitable than banks that rely more on assets.

Some preliminary work was carried out several years ago, the profitability of European banks has been studied by many academics using the same method. Bourke (1989) developed linear equations for bank profitability based on multiple internal (employee expenses, capital ratios, liquidity ratios) and external (concentration ratios, government ownership, interest rates, market growth, and inflation) drivers. On this foundation, Philip and Jonh re-created Bourke's

technique in 1992, collecting data from eighteen European banks between 1986 and 1989 to investigate the factors that influence bank profitability in Europe. The limitation is that it is too ancient.

Saira, Jamil, Khalid, and Abdul (2011) in their research, created a regression model to identify determinants of bank profitability. They used data from Pakistan's top ten banks over a five-year period, with ROA representing the bank's profitability and the other four internal indicators representing the bank's performance. Independent variables are factors, and a linear regression equation is formed. The findings revealed that loans, equity, deposits and bank size have a linear connection with ROA.

There is also a link between a bank's size and its profitability. In Boyd and Runkle (1993)'s study, they discovered that bank size and profitability had an inverse relationship. Conversely, Flamini and Schumacher (2009) pointed out in their study that larger banks size connects with better return on assets. The difference in their research results may be related to the national strategy, the structure of the selected bank, the local economic growth, and other factors. The same view is supported by the report of Kristen and Rajdeep (2016), which pointed out that banks do not need to be large to prosper; business strategy and local economic growth are just as crucial in determining bank profitability as scale. Jada et al. (2020) looked at the elements that determine the profitability of Iraqi banks, addressed that bank size had a positive impact on the bank's return on assets.

In conclusion, both internal and external factors influence bank profitability, ROA and ROE can be used as indicators to gauge profitability. Regression analysis is widely used by scholars to explore their relationship. However, some studies are outdated and seldom research focus on the collective effect of the Asset Utilization Ratio, Operating Cost Ratio, Bank Size, and Equity Multiplier on ROA. As a result, we propose the following as the first hypothesis of this

study: Some internal bank variables, such as the four stated above, can have a significant impact on the bank's profitability and follow a linear connection. The goal of boosting bank profitability can be reached by influencing these determinants and taking appropriate measures. So as to find the direction of recovery.

Muhanned, Ahmad, Mohammad and Ghassan (2021) did their research of the performance of all listed Jordanian banks during the period 2010-2020, found that the total mean return on bank assets has plummeted from 1.43 percent in 2019 to 0.74 percent in 2020. The increase in loan loss reserves, according to their analysis, is the cause of the fall in profitability. their study insights this paper, which we use data from all banks in Portugal, calculating average to evaluate what determinants have been destroyed and how.

Parvin et al. (2020) found that there are considerable variations between before and after the COVID-19 pandemic, particularly in factors like TPF, accounts, and bank financing.

Companies with a larger scale, stronger profitability and development prospects, higher comprehensive leverage, and less fixed assets will be less impacted, according to Hao, Zuofeng, Fei, and Jun (2020). Their positions appear to be extremely rational on the surface, but they lack data to back them up.

And Aldasoro, Fender, Hardy, and Tarashev (2020) were able to fill in the gaps in their data. They remind us of that COVID-19 will have a minor impact on banks that are more funded and profitable. According to their finding, well-capitalized banks have recovered far faster than undercapitalized banks. 108 rated institutions were analyzed in a follow-up study and found that credit rating activities resembled bank profitability, particularly for European banks, which have long struggled with low profitability. Banks that were less lucrative were more likely to be downgraded. Their data later revealed that during the pandemic, banks that

were well financed and profitable, as well as those with healthy balance sheets, enjoyed a minor stabilization.

We hereby propose the second hypothesis of this paper: The Coronavirus has a negative impact on the bank's profitability by destroying assets and disrupting business activities.

Portugal Banking System Overview

Portugal had declared a state of emergency on March 19 and extending it until May 2 in response to the Covid-19. The lockdown period has had a huge impact on citizens' daily life, which has not only harmed people mentally, but has also undermined economic activity.

The pandemic resulted in an 8% decline in GDP and a 7% increase in unemployment, according to research undertaken by the Bank of Portugal (BoP) and has heightened the pressure on banks to incur credit impairment losses, as seen by the following two factors. First, business production and operations have stagnated, while demand has decreased. In comparison to the same period last year, total profitability has decreased dramatically, and debt solvency has also decreased. As a result, the risk of default has increased, forcing banks to incur credit impairment losses. Second, the credit characteristics of companies in different industries and with varying ratings are more diverse, requiring banks to make loan loss provisions based on local circumstances.

The inability of customers and companies to repay on time or to repay the interest directly resulted in an increase in the bank's provision for bad debts and credit impairment losses, which constituted an increase in current operating expenses, and a decrease in asset utilization, ultimately resulted in a drop in banks profitability.

To protect borrowers and financial institutions, the government has put in place several moratorium measures to suppress the increase of NPL ratios and default rates.

Credit moratoria allows businesses to defer credit payments, minimizing short-term liabilities, reducing bills in arrears, and avoiding defaults. Overdue credits were lowered, and potential credits were enhanced, as a result of the moratoria. Those who benefited from the moratoria had an average rise of 32.64 percent in traditional credit after the shock, compared to companies that did not receive any assistance. The drop-in debt service rates relieved liquidity constraints improved financial conditions, and reduced credit risk. The better the financial state, the more collateral the company can guarantee, the smaller the risk, and the easier it is to receive additional loans through the balance sheet channel, so increasing economic activities. This shift also permits financial institutions to take on regulators' responsibilities for market monitoring and preventing defaults by consumers with worsening credit risks.

Furthermore, as a result of lower household consumption, deposits in Portuguese banks have climbed. Interest rates are trending in the same direction as the euro zone average. In 2020, the cost of financing for private non-financial firms will average 2 percent. The banking sector, on the other hand, has seen a drop in returns, with an average ROE of 1 percent to 2 percent and a cost-to-income ratio of 58 percent to 60 percent in 2020 for the Portuguese banking sector.

Table 1 shows Portugal’s PSI general stock price from the beginning of 2020 to the end of November of 2021.

In the second quarter of 2021, the Portuguese banking system's total assets increased by 2.8 percent. The return on assets was able to recover from zero due to an increase in income from the financial industry and a reduction in provisions and impairments. Loans to credit institutions remained stable at around 9.5 billion euros in 2019 and 10.2 billion euros in 2020 but fell to 8.0 billion euros in the second quarter of 2021. The amount of consumer loans issued by banks increased by 14.8 billion, while debt securities and other assets increased by

8.5 billion and 26.9 billion, respectively. Equity instruments had declined from 8.5 billion to 6.8 billion. Total assets as a percentage of nominal GDP are likewise continuously increasing, with a significant increase of 22.7 percent. Due to an increase in total revenue, the cost-to-income ratio was 53.2 percent, down 3.9 percent from the same period two years ago.

Due to a faster growth in client deposits (13.3 percent) than in customer loans, the loan-to-deposit ratio declined 6.3 percent to 82.5 percent (6.5 percent). Deposits at central banks grew by 0.3 percent to 9.3 percent of total assets.

The total non-performing loans ratio in the second quarter was 4.3 percent, up 4.6 percent from the first quarter of 2019, representing a drop in non-performing loans and a rise in performing loans. The total non-performing loans ratio, excluding impairments, dropped from 2.4 percent to 1.9 percent. On the other hand, the total non-performing loan coverage ratio has risen to 55.5 percent from 52.2 percent in the first quarter of 2019. The decline in non-performing loans has resulted in a decrease in accumulated impairments. Due to a drop in NPLs, the household NPL ratio decreased by 1.7 percent to 3.1 percent. In terms of numbers, household non-performing loans fell by nearly half in the first quarter of 2019, from 4579 million to 6514 million. Total non-performing loans fell from 24429 to 13467 million, and non-performing loans net of impairments fell from 11672 to 5990 million, a nearly 50% drop. Over the last ten quarters, the non-performing loan coverage ratio of households increased marginally from 41.6 percent to 51.2 percent.

The main goal of the current chapter was to employ data to illustrate how various components of the pandemic have impacted bank profitability, as well as to provide some insights for the following discussion chapter.

Bad debts cause banks to incur credit impairment losses, which raises current operating costs and declines asset utilization ratio, as a result, diminishes asset quality and lead in a drop in

bank profits; economic activity slows, GDP growth falls, and the unemployment rate rises, client's deposits to the bank have decreased as a result of the drop in demand, thus lowering the bank's business and profitability. Moratoria measures made traditional credit rise, accumulated impairments and non-performing loans fell, which led to an increase in financial industry income, an improvement in economic activities and a faster growth in client deposits, eventually made return on assets was able to recover from zero.

Methodology

Research Principals

The following are the three types of quantitative analysis methodologies used in this essay: 1). Ratio analysis method: This study used the data collected to determine the required variable values, which are then expressed as ratios. It is intuitively grasping the company's financial situation and operations results using the determined ratio. 2). Method of structural analysis. The proportion of each data was used to intuitively depict the bank's scale, debt status, and other factors. 3). using a multivariate regression to measure the relationship between variables while controlling for systematic differences. This paper employed Stata to create a multivariate linear regression model based on the collected data. The dependent variable ROA is influenced by the five independent variables and the collinearity between the variables, as well as data such as the model's degree of fit, according to the created model. Stata was chosen to create this model since its instructions are easy and the output findings are clear and full. Many scholars employ this strategy in their research. In their research, for example, Saira (2011) developed a linear regression model on ROA to investigate the four components that influence ROA. stated in his report that the epidemic's impact on bank performance was investigated using a linear regression model. As a result, this paper employed the same method of analysis.

Indicators that affect bank profitability can be classified into external and internal elements from a macro perspective. Internal factors are closely related to various bank indicators, such as the bank's size, debt ratio, loan ratio, and management expense ratio. External factors are primarily related to national policies and global economic trends, whereas internal factors are closely related to various bank indicators, such as the bank's size, debt ratio, loan ratio, and management expense ratio. This article will extract important factors from the possible influencing factors, analyze the profitability of banks using multiple linear regression methods, find out the indicators that affect bank profitability, and explore how they affect the profitability of banks and under the epidemic Condition.

Linear regression analysis uses analytical methods in mathematical statistics to determine the quantitative relationship between two or more variables. This paper selects one dependent variable and four independent variables, selects data from 26 banks that occupy a major share of the Portuguese market and have clearly financial statements with all data needed during the last five years, As of June 30, 2021, the combined assets of the banks researched accounted for 98.966 percent of the banking sector's assets in Portugal. then uses multiple linear regression equations to analyze the profitability of banks.

This study also sets up dummy variables to distinguish whether a pandemic exists, which are dummy equal to 0 from the beginning of 2016 to the beginning of March 2020 and dummy equal to 1 from the beginning of March 2020 to the end of June of 2021.

Research Data and Collection

These data cover Asset, Equity, Debt, Operation Cost, Total Revenue and Net Profit in the balance sheet and income sheet of each bank. Then calculated the dependent variable ROA and the five independent variables AU, OCTA, EM and SIZE that were needed through adequate formulas. The panel data set spans six years, from 2016 to 2021, and included a

sample of twenty-six banks in Portugal (Table 2), eight of which have yet to release their 2021 financial statements.

After completing the data collection step, the data was converted into Excel and sorted out, some unnecessary data was hidden and deleted. After that, in order to facilitate understanding, it was adjusted into a unified format and a unified unit. Afterwards, the regression model was established by Stata with required test.

Data Analysis

Through the regression equation established by Stata and various detection icons derived, all indicators were compared with standard values to judge whether the model was feasible and the degree of influence of independent variables on ROA.

The most basic method of estimate is to combine observations from multiple banks and perform regression analysis on the resulting sample. To put it another way, a pooled OLS (POLS) equation is calculated as follows:

$Y_{it}= \alpha+\beta_1*X1_{it}+ \beta_2*X2_{it} + \beta_3*X3_{it}+ \beta_4* X4_{it}+\varepsilon$

Where in this paper:

α is the regression constant, β is the dependent variable that affect bank profitability, ε is Error Term

Y_{it} = ROA represents Return on Assets of bank i in year t.

$X1_{it}$ = AU represents Asset Utilization Ratio of bank i in year t.

Asset Utilization Ratio is calculated as Total Revenue/Total Assets.

$X2_{it}$ = OCTA represents Operating Costs Ratio of bank i in year t.

Operating Costs Ratio is calculated as Operating Costs/Total Assets.

$X3_{it}$ = EM represents Equity Multiplier of bank i in year t.

Equity Multiplier is calculated as Shareholder's Equity/Total Assets.

$X4_{it}$ = SIZE represents Bank i Size in year t.

SIZE is calculated as LN (Total Assets)

The dependent variable index used in this study is the return on assets, which is used to measure how much net profit per unit of assets creates. A useful indicator for assessing the profitability of a company relative to its total asset value.

This paper uses the following five main factors affecting banks as independent variables: asset utilization (AU), management expense ratio (OCTA), equity multiplier (EM) and bank size (SIZE).

In summary our regression equation shows as following:

$ROA_{it}=\alpha+\beta1*AU_{it}+ \beta2*OCTA_{it}+ \beta3*EM_{it}+ \beta4*SIZE_{it}+\varepsilon$

Results

The following part discusses the study's findings, including variable interpretation, the correlation coefficient matrix, descriptive statistics, the model's econometric results, and tests for robustness that are pertinent to the study. The empirical evidence on the factors that influence bank profitability (ROA) is based on balanced panel data, which includes all variables for each cross-section and time period.

Variables interpretation

The descriptive statistics shows in **Table 3**

Table 3: Descriptive statistics

variable	N	mean	p50	sd	min	max
ROA	148	0.00300	0.00500	0.0200	-0.123	0.0620
AU	148	0.0270	0.0240	0.0170	0.00200	0.0920
OCTA	148	0.0200	0.0140	0.0180	0.00200	0.149
EM	148	2.626	2.368	0.599	0.102	3.709
SIZE	148	8.754	7.735	2.401	4.956	14.15

In this model, the dependent variable ROA and the four independent variables each take 148 values. The average value of ROA is 0.3 percent, the P50 index is 0.005, and the standard deviation is 2 percent. Smaller means these values are close to the average, the minimum and the maximum values are -12.3 percent and 6.2 percent, respectively, indicating the variation range of the dependent variable; the average value of the independent variable AU is 2.7 percent, the P50 index is 0.024, and the standard deviation is 1.7 percent, which is also small, indicating that most of the AU values are closer to the average, and the smallest the value and maximum value are 0.2 percent and 9.2 percent respectively; the average value of the independent variable OCTA is 2 percent, the P50 index is 0.014, and the standard deviation is 1.8 percent. The same small value indicates that most of the OCTA values are closer to the average value. The minimum and maximum values are 0.2 percent and 14.9 percent respectively; The average value of the independent variable EM is 2.626, the P50 index is 2.368, and the standard deviation is 0.599. A slightly larger standard deviation indicates that most of the EM values are slightly away from the average. The minimum and maximum values are 0.102 and 3.709 respectively; the average of the independent variable SIZE The value is 8.754, the P50 indicator is 7.735, and the standard deviation is 2.401, which indicates that most of the values of SIZE are slightly far from the average. The minimum and maximum values are 4.956 and 14.15 respectively.

The correlation coefficient matrix of all variables results shows in **Table 4**

Table 4: Correlation coefficient matrix

	ROA	AU	OCTA	EM	SIZE
ROA	1	0.42*	-0.13	-0.31*	0.02
AU	0.41***	1	0.44*	-0.32*	-0.15*
OCTA	-0.47*	0.13	1	-0.44*	-0.43*
EM	-0.02	-0.20*	-0.55*	1	0.38*
SIZE	0.11	-0.17*	-0.16*	0.26*	1

Lower-triangular cells report Person's correlation coefficients, upper-triangular cells are Spearman's rank correlation

***p<0.01, **p<0.05, *p<0.1

From the correlation coefficient table, taking ROA as an example, the independent variables AU, SIZE and ROA are positively correlated, and the correlation coefficients are 0.41, 0.11, 0.13, respectively, while OCTA and EM are negatively correlated with ROA, and the correlation coefficients are respectively -0.47 and -0.02. From the perspective of the relationship between other independent variables, AU has a certain positive correlation with OCTA, and a negative correlation with EM and SIZE, but the degree of correlation is not high from a numerical point of view; OCTA has a certain degree with EM and SIZE The negative correlation between. EM and SIZE have a small positive correlation and other variables have a small negative correlation; SIZE and EM have a small positive correlation, and other variables There is a small negative correlation.

Table 5 divides the situation into two categories according to whether there is a pandemic or not.

Table 5

Variables	G1(0)	Mean1	G2(1)	Mean2	MeanDiff
ROA	104	0.00300	44	0.00200	0.00200
AU	104	0.0290	44	0.0210	0.008***
OCTA	104	0.0220	44	0.0140	0.009***
EM	104	2.245	44	2.301	-0.055
SIZE	104	8.788	44	8.676	0.111

From the table, we can see that there are 104 variables in each group when there is no epidemic, and the average values are 0.003, 0.029, 0.022, 2.245, 8.788, respectively. The average values when there is an epidemic all have a small decrease, respectively. 0.002, 0.021, 0.014, 2.301, 8.676. It can also be seen from the table that the average difference of each variable is not very large, indicating that the deviation of each value from its arithmetic mean is not large.

Table 7 shows that we have controlled these dummy variables, but due to space limitations, the estimated coefficients of these variables are not presented.

Table 7

	AU	OCTA	EM	SIZE	_IDummy_1	_cons	N	R2
ROA	0.515***	-0.781***	-0.013***	0.001***	-0.003	0.024**	148.000	0.555
	(0.069)	(0.075)	(0.002)	(0.000)	(0.003)	(0.009)		

Standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.001

Table 8 presents the results of regression

Table 8: Regression Results

i.Dummy	IDummy 0-1	(naturally	coded;	IDummy 0	omitted)	
Source	SS	df	MS	Number of obs	=	148
Model	0.0309	5	0.00619	Prob>F	=	0
Residual	0.0250	142	0.000176	R-squared	=	0.553
Total	0.0559	147	0.000380	Root MSE	=	0.0133

ROA	Coef.	Std.Err.	t	P>|t|	95% Conf.	Interval
AU	0.508	0.0676	7.510	0	0.374	0.641
OCTA	-0.770	0.0735	-10.48	0	-0.916	-0.625
EM	-0.0122	0.00227	-5.350	0	-0.0167	-0.00767
SIZE	0.00138	0.000477	2.880	0.00500	0.000433	0.00232
IDummy 1	-0.00355	0.00251	-1.410	0.160	-0.00852	0.00141
cons	0.0208	0.00766	2.720	0.00700	0.00571	0.0360

AU and ROA

According to the empirical study, the asset utilization ratio AU and the return on assets (ROA) are positively related. The p-value is equal to 0, which is less than 0.01 and shows that it is very significant. ROA increases by 0.508 units for every unit increase in AU. Asset utilization ratios are used to determine how well a company utilizes its assets to generate sales revenue in order to reach a profit goal. According to this study, a bank's assets utilization ratio is directly linked to its profitability, and an increase in the AU ratio can significantly boost the bank's profitability. Based on the collected data, each bank's AU ratio is found to be high or low, indicating that banks in Portugal still have potential to tap. The bank's profitability will improve if the asset utilization ratio is improved.

OCTA and ROA

According to the empirical study, the operational cost ratio OCTA and the return on assets (ROA) are negatively related. When OCTA is increased by one unit, ROA decreases by 0.770 units, and the p-value is less than 0.01 indicating that the effect is very significant. According to the findings, an increase in operating costs will significantly reduce bank profitability; however, because operating costs are associated with the day-to-day maintenance and administration of a business, this does not imply that we must significantly reduce costs in order to increase ROA. Rent, labor, and other overhead costs, as well as raw materials and maintenance costs, are included in direct costs of goods sold (COGS) and other operational expenses, often known as selling, general, and administrative (SG&A) costs. It's also worth noting that a high operating expense equals a high revenue. As a result, we can reduce costs appropriately to increase ROA, but not to zero. The growth of new businesses is linked to the commercial bank business management expense ratio, and new business growth can lead to new profit growth. If the banking business diminishes or even shrinks, the bank's management expenses will decrease, but this will also limit the bank's ability to improve its profitability.

EM and ROA

From the empirical analysis, the equity multiplier EM has a negative correlation with ROA. When EM increases by 1 unit, ROA decreases by 0.0122 units, and p-value<0.01 is very significant. The banking business is distinct from other industries in that banks are not corporations. The core adequacy ratio of venture capital for commercial banks, according to the Basel Accord, is 8%, implying that the bank's asset-liability ratio is less than 92 percent. The equity multiplier shows how the bank's financial leverage and profitability are related. The higher the equity multiplier, the higher the financial leverage multiple of the company's external financing, and the higher the company's risk tolerance. A bigger equity multiplier, on

the other hand, can provide more rewards if the company is on the rise. It will provide a positive incentive impact by improving the return on equity. According to the findings of this study, the equity multiplier EM is adversely connected with the profitability of Portuguese banks, implying that the banks' overall operating circumstances are deteriorating and that there is minimal potential for bank business expansion.

SIZE and ROA

Every industry has a scale that suits them well. Expanding the scale when it is less than this optimal value can help you make more money. Another name for this is the scaling effect. If it reaches this optimal scale, however, continued investment will result in lesser profits. The size of the same assets has a similar effect on commercial bank profitability. In this article, the LN function is used to calculate the impact of bank scale on profitability. We can see from the regression results that the bank size variable SIZE and ROA have a positive link. ROA increases by 0.00132 units for every 1 unit increase in SIZE, and the p-value0.01 is very significant. This implies that the Portuguese banking industry is not operating at maximum capacity, meaning that room for improvement still exists.

On the whole, the R Squared of the overall model is 0.553, and the simulation fit of the model is better.

Thus, the regression equation of this experiment is

ROA=0.0208+0.508*AU-0.770*OCTA-0.0122*EM+0.00138*SIZE

In the multiple linear regression model, the degree of linear correlation between variables is reflected by calculating the partial correlation coefficient matrix between independent variables (as shown in the figure above). The absolute value of the value> 0.8 indicates that

the variables have a strong degree of correlation, and less than 0.3 indicates that the variables have a weak linear relationship. From the table, the linear relationship of other variables is weak, indicating the linear relationship between variables will not affect the analysis results of this article.

This paper argues that the major determinants determining bank profitability are asset utilization rate AU, equity multiplier EM, bank size SIZE, and operational cost ratio, based on this section of the regression analysis (OCTA). In a nutshell, banks' profitability is influenced by both external and internal variables. You can start with macro-control and micro-management if you wish to increase bank profitability. Internally, it can strengthen asset management, reduce asset impairment losses, appropriately expand the scale, appropriately adjust operating income and expenses, and develop new businesses; externally, it can open up the interest spread policy, reasonably adjust the bank's tax base, and optimize the tax policy; and externally, it can open up the interest spread policy, reasonably adjust the bank's tax base, and optimize the tax policy; and internally, it can strengthen asset management, reduce asset impairment losses, appropriately expand the scale, appropriately adjust operating income and expenses, and It can also increase the dangers. The debt ratio is increased at the same time as management, so increasing the leverage ratio and increasing profitability.

Covid Impact on Portugal’s Banking Sector

According to the line chart in **Table 9**, the average ROA of the Portuguese banking industry was largely on the rise in the four years leading up to the outbreak, remaining at 0.37 percent and 0.42 percent in 2018 and 2019, respectively. The ROA plunged to 0.06 percent after the introduction of the 2020 epidemic, and then steadily rebounded to 0.29 percent by the end of June 2021. The initial sharp reduction was due to panic during the epidemic and inadequacy of reaction measures, which resulted in massive losses for the banking industry as a whole,

and then a sluggish recovery as response methods matured and people were accustomed to the epidemic era, etc. Factors are present.

Table 10 depicts the changing trend of the Portuguese banking industry's asset utilization rate over the same time period. We can see that the AU curve tended to be a straight line prior to the outbreak. It began to decline after the outbreak of the epidemic. It was still in a decreasing trend as of the end of June 2021. This suggests that the bank's asset management has been harmed as a result of the outbreak. The return rate and usage efficiency are both reduced, which has a negative impact on the ROA.

The OCTA curve (**Table 11**) has always been on the decline. This might be excellent news (before the epidemic) because lower management expenses indicate higher net profit, which can help boost ROA. By the end of June 2021, the curve had reached a ratio of 0.79 percent. This appears to be positive news from a numerical standpoint. However, as previously said, the decrease in administrative expenses also means a drop in banking business, and the growth of new business is not easy. Yes, reducing the banking business to a certain level will limit the increase in profitability.

Table 12 EM curve fails to recognize the epidemic's influence on bank leverage ratios, and the entire curve exhibits a flat trend.

Table 13 From 2020 until the end of June 2021, the bank's size has declined, indicating that the average total assets of the Portuguese banking industry have fallen.

Based on the observed data and changes in the selected independent variables, the pandemic mostly resulted in a decrease in bank scale, asset utilization, and management fees, according to the models and assumptions of this research. In 2020, ROA dropped the most, but it gradually recovered after that.

Discussion

This paper's approaches are based on Saira et al. (2011), Muhanned et al. (2021), Bourke (1989), Philip and Jonh (1992), who employed regression analysis to study the factors that influence bank performance. The results agree with Jiyang Bai (2010) and Philip and Jonh (1992), who both stated that there is substantial evidence that internal factors have a significant impact on profitability. Similarly, Flamini and Schumacher (2009) asserted that bank size had a positive connection with bank performance.

The relationship between factors and bank performance, as well as the influence of Covid-19 on the Portuguese banking industry, is mostly consistent with Aldasoro et al. (2020) and Hao et al. (2020) works and provides substantial evidence in support of Hypothesis.

This study shares links closely with Muhanned, Ahmad, Mohammad, and Ghassan (2021), whose research focused on the Jordanian banking system.

The findings of the Covid impact are consistent with Muhanned, Ahmad, Mohammad, and Ghassan (2021), who stated that the pandemic caused a decline in total mean return on bank assets, with the rationale being an increase in loan loss provision. when the dependent variable is return on assets, the coefficients of bank size (Size) are not significant. The difference is that equity capital (Equity) is not significant in their studies.

One possible explanation for the disparity is that Portugal is a member of the Eurozone and is led by the European Union, banks are typically small or medium-sized, with plenty of room for expansion and little state ownership. While Jordan is not in the Eurozone, the government maintains strict banking industry supervision and in terms of fiscal policy, it adopts tax postponement, reductions in social security contributions, salary reductions for specific

groups of employees, and suspension of payments, the capital adequacy ratio criteria for banks are not the same as in Europe.

They also investigated the effects of loan loss provisions. According to their findings, loan loss provisions have a negative and considerable influence on bank profitability. On average, the cost of loan loss provisions is passed on to bank customers, at least in part, in the form of higher financial intermediation charges. Although the impact of loan loss provisions was not studied in this paper, it does include the variable of operating costs. As previously stated, there is a link between the two. Taking into account the aforementioned factors, the research findings are, to a level, consistent.

One of the most significant contributions of this work is that it provides the chosen bank with a concept and algorithm for determining the best approach for survival or recovery from the crisis. Dan Li's (2014) data on European banks is further supplemented in this study.

Although the pandemic has affected physical business, the Internet industry has grown, and moratoria measures can help reduce impairment losses. As a result, the bank extends its online business to strengthens, and keep customer relationships, and actively responds to government initiatives aimed at growing deposits, enhancing asset utilization, and reducing bad debts, allowing banks to cope with difficult situations and recover faster.

Conclusion

Focusing on Portuguese banks performance, this study has analysed what factors correlate with banks return on assets and how the crisis acts on banking sector in Portugal.

This paper examines the effects of variables AU, OCTA, EM and SIZE on banks performance (ROA) using linear regression model based on panel data of banks in Portugal from 2016 to

2021. For empirical investigations, the study employed longitudinal comparison to capture the effect on those variables and on Portuguese banking sector caused by the pandemic.

The independent factors Assets Utilization Ratio and Bank Size have a positive impact on bank profitability, while Operating Costs Ratio and Equity Multiplier have a negative impact on bank return on assets, according to this study. Further research revealed that the correlation between EM and SIZE were not significant, these two indicators had not been affected by the pandemic. Which indicates that focusing on these two to enhance ROA will yield minor results. It is far better to begin increasing ROA by working on improve asset utilization and lowering operating costs, as these two factors have a close and significant relationship with the bank's performance.

Evidence from this study, together with recent experience during the financial crisis, leads us to conclude that Banks can restore profitability and survive the crisis by implementing internal controls and responding to national policies. The use of linear regression analysis to assess the relationship between ROA and other internal factors is a useful method for understanding the impact of the crisis on the Portuguese banking sector. Overall, the findings of this paper highlight the important role of asset utilization and operating activity in determining banks performance. Finally, policy makers should also keep a close eye on improving asset quality, mitigating risk, increasing financial technology investment, and exploring the "Internet + Bank" business model.

However, for example, some banks have high operating costs but high ROA which proves that the operating cost ratio is related to the expansion of new businesses, means that the expansion of new business will bring new profit growth for the bank. The distinction between banks and companies is that banks' leverage ratios are often high because to people's deposits, therefore a greater equity multiplier indicates that the bank is on the increase, and the EM

rises, and profit rises as well. Increased shareholder equity can also act as a motivator. This study also explains what aspects of Portuguese banks that the epidemic has wreaked havoc on. The collapse of the catering, tourism, and other physical businesses, rather than the financial sector, precipitated this disaster. In 2020, ROA is 0.36 percent lower than it was before Covid, but it is slowly rising in 2021. The outbreak caused huge losses to the Portuguese banking industry in 2020, but the situation has improved in 2021 due to a sustained recovery phase.

This study was limited by the absence of a small number of banks' 2021 financial statements. The absence makes these findings less generalizable to a detailed study of the impact of the 2021 pandemic on the overall banking industry in Portugal, so this paper focuses on 2020. Second, the focal point of this paper is the influence of internal factors. Third, The outbreak is far from ending, and the scope and consequences of its effects are still unknown.

Future research would benefit greatly from, subject to data availability, better measurement of the pandemic's unique and broad impact on the Portuguese financial industry by controlling for, for example, Synergy of external and internal factors.

Appendices

Table 1:

Table 1 exhibits Portugal general stock prices from 2020 to 2021.

Table 2: Banks in Portugal

Table 2 exhibits all banks name in Portugal.

- Abanca
- ActivoBank
- Banco BAI Europa
- Banco EuroBIC
- Banco BIG
- Banco Bilbao Vizcaya Argentaria

- Banco Carregosa
- Banco CTT
- Banco Comercial Português
- Banco Credibom
- Banco de Negócios Internacional
- Banco do Brasil
- Banco Efisa
- Banco Finantia
- Banco Invest
- Banco Popular
- Banco Português de Gestão
- Banco Português de Investimento
- Banco Primus
- Banco Privado Atlantico Europa
- BCT bank
- Caixa Geral de Depósitos
- Crédito Agrícola
- Deutsche Bank,AG
- Montepio Geral
- Novo Banco

Table 6: VIF

Table 6 exhibits the results of VIF test

The VIF value between the variables in the table is close to 1, indicating that the multicollinearity between the variables is low.

Variable	VIF	1/VIF
EM	1.770	0.565
OCTA	1.590	0.628
AU	1.140	0.880
SIZE	1.120	0.890
IDummy 1	1.120	0.893
Mean	1.340	

Table 9: Average ROA

Table 9 exhibits the annual average ROA of all 26 banks selected in Portugal from period 2016 to 2021.

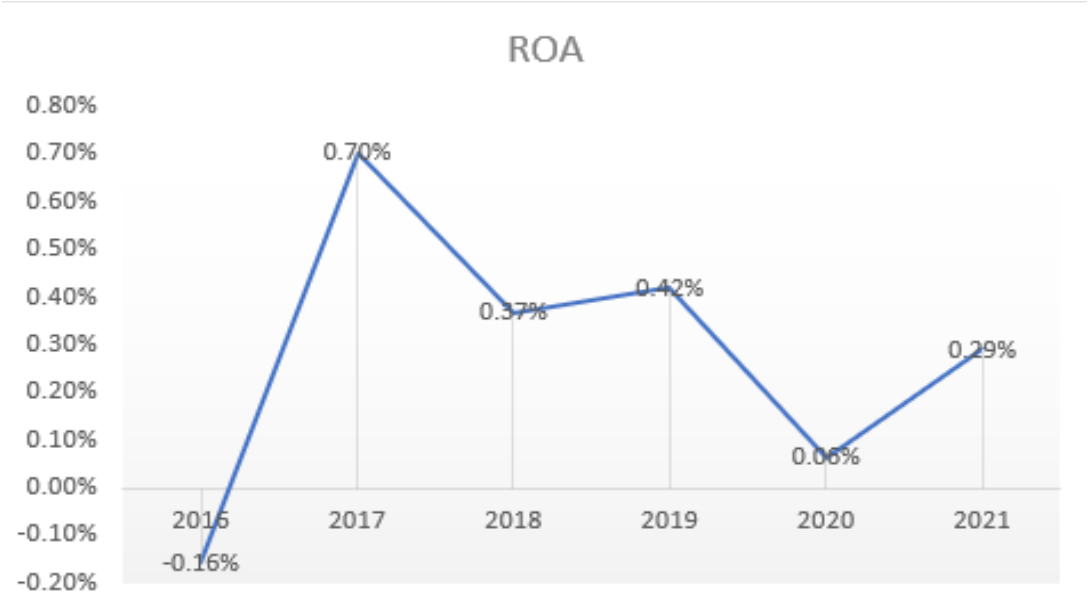


Table 10: AU

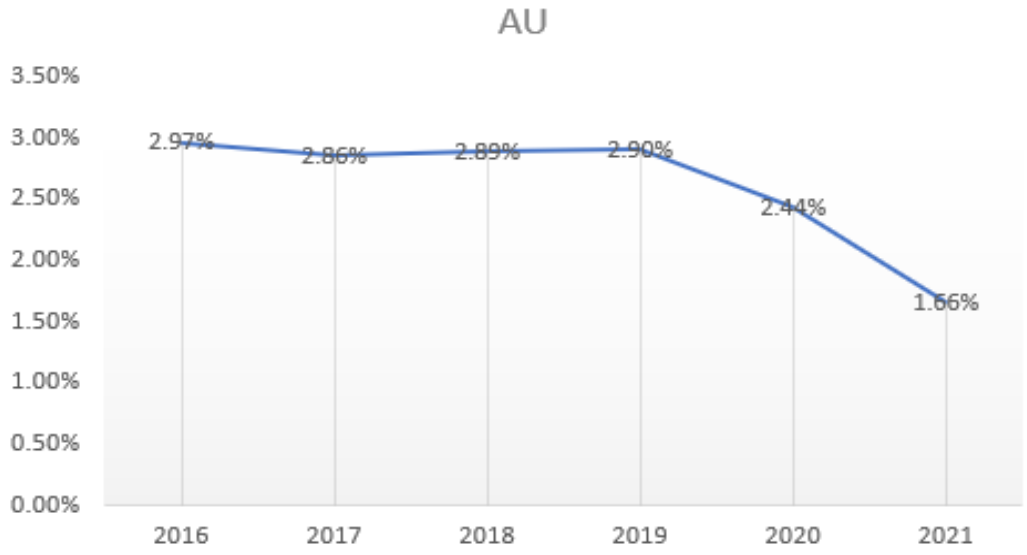


Table 11: OCTA

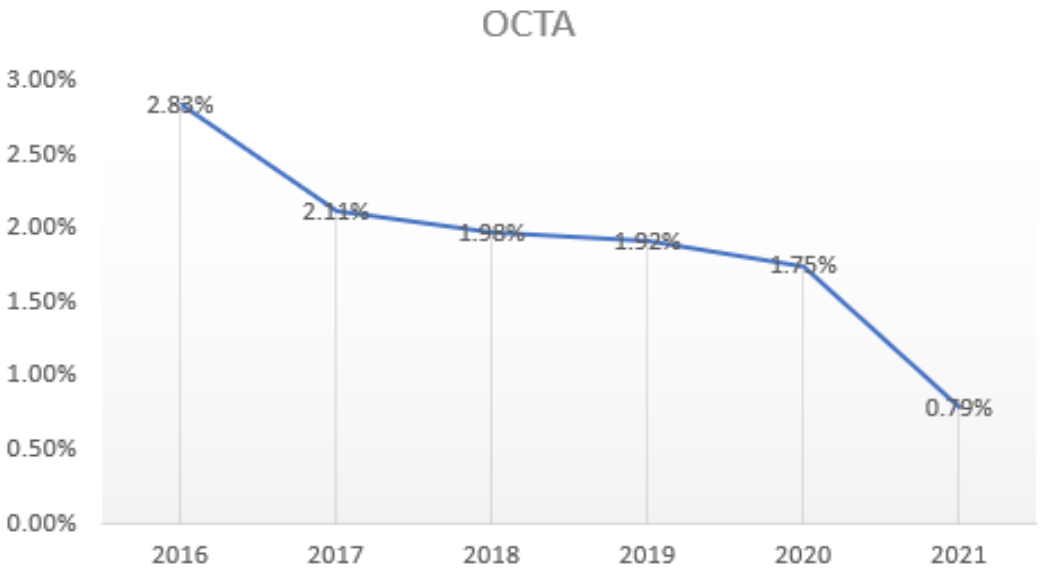


Table 12: Equity Multiplier Ratio

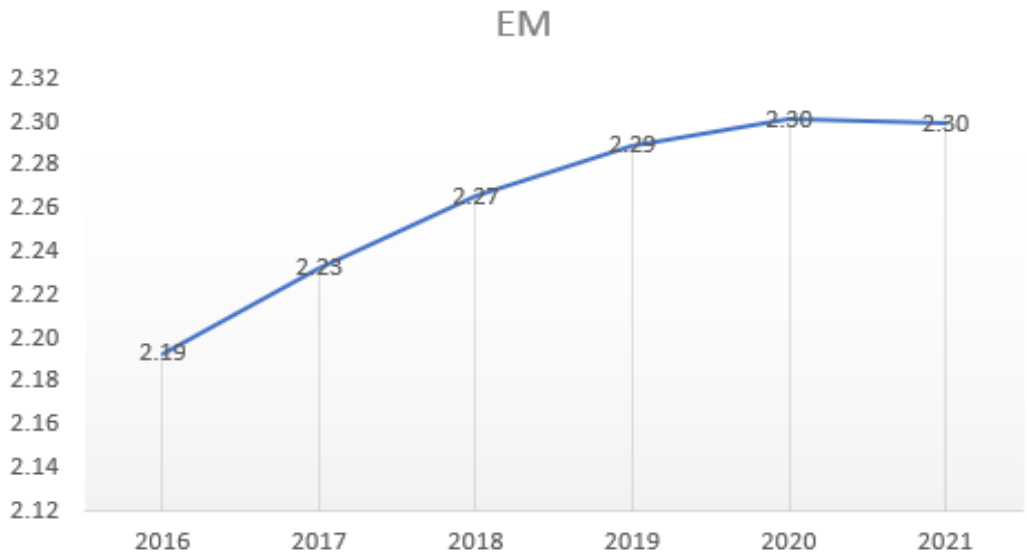
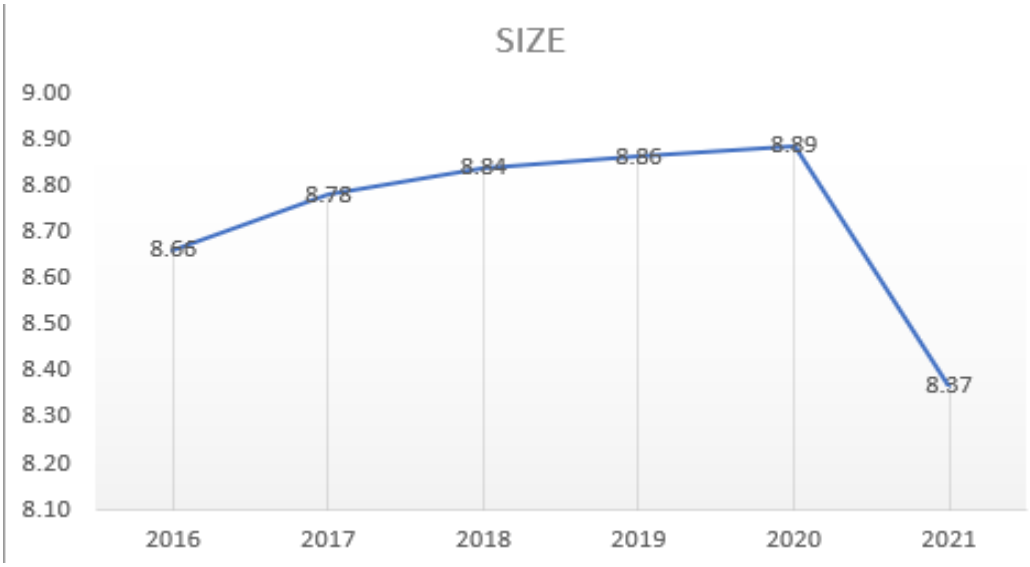


Table 13: Bank Size



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