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**Title: Did diversified and less risky banks perform better amid the pandemic?**

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**Abstract**

This research shows that amid tightened credit conditions and deteriorating asset quality induced by the pandemic economic hardships, credit risk adversely affected bank performance. However, income diversification is positively related to performance and offers alternative means of enhancing sustainable performance.

**Keywords:** Bank Performance, Credit Risk, Income Diversification, Covid-19, Europe

**JEL classification:** G21, F65, O16

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## 1. Introduction

An important phrase that frequently resonates in finance and investment decisions is “don’t put all your eggs in one basket”. This clearly illustrates the concept of diversification as one of the principles of contemporary finance. The concept of diversification postulates that *ceteris paribus*, expanding investment across a variety of asset classes arguably eliminates some associated risk (Ross et al., 2016). Portfolio theory holds that diversified banks enjoy greater economies of scope which enhances performance and reduces risk (Klein and Saidenberg 2000; Elsas et al., 2010). Banks can increase their performance by minimizing traditional interest income revenue variability as they limit their risk from single obligor exposures through their loan concentration mix. Beyond the revenue generation from the classical lending activities, the concept of diversification offers banks an avenue to boost their revenue by expanding more into noninterest-related income sources such as fees and commission income, income from forex and fixed income trading activities, service charges among others.

The past decade has witnessed a growing stream of literature examining the nexus between bank revenue diversification, bank profitability and stability. Investigating bank stability among 15 EU countries, Kohler (2015) found that banks with high noninterest income are more stable and profitable. Similarly, using a sample of Italian banks, Chiorazzo et al. (2008) showed that income diversification is associated with higher risk-adjusted returns. With 216 observations of U.S. sample of banks, Li et al. (2021) recently examined the impact of income diversification on profitability and risk during the Covid-19 crisis. Interestingly, their findings show that revenue diversification via noninterest income sources positively affects performance but exhibits inverse relation with risk. In recent times, the European Central Bank has bemoaned weak bank profitability as one of the main challenges confronting the Euro area banking sector, with potential systemic risks threat to financial stability in the region<sup>2</sup>. Also, the pandemic induced tightened credit conditions and deteriorating asset quality imply dwindling interest income with rising levels of loan loss provision to accommodate the rise in credit risk. In this context, examining the impact of income diversification and credit risk on bank performance in the Euro area amid the pandemic is important. The economic effects of the COVID-19 pandemic have been so glaring in the Euro area with GDP for the second quarter of 2020 plummeting by 11.8%, an all-time low since 1995<sup>3</sup>.

Using Factset Fundamentals quarterly data on a sample of listed EU commercial banks, this paper investigates whether more diversified banks and less risky banks benefitted in terms of financial performance during the pandemic. The results suggest that rising credit risk amid the pandemic adversely affected bank performance. However, income diversification is positively related to bank performance and offers alternative means of enhancing sustainable financial performance.

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<sup>2</sup>How can euro area banks reach sustainable profitability in the future?

[https://www.ecb.europa.eu/pub/financial-stability/fsr/special/html/ecb.fsrart201811\\_1.en.html](https://www.ecb.europa.eu/pub/financial-stability/fsr/special/html/ecb.fsrart201811_1.en.html)

<sup>3</sup> Eurostat newsrelease euroindicators

<https://ec.europa.eu/eurostat/documents/2995521/10545471/2-08092020-AP-EN.pdf/43764613-3547-2e40-7a24-d20c30a20f64>

## 2. Data and methodology

This research examines the relation between income diversification and credit risk on bank performance amid the pandemic by estimating the following multiple regression equations:

$$ROE_{i,t} = \alpha_0 + \alpha_1 NII_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 LOANS_{i,t} + \alpha_4 DEPOSIT_{i,t} + \alpha_5 LLP_{i,t} + \alpha_6 LROE_{i,t} + \alpha_7 CAR_{i,t} + \alpha_8 CE_{i,t} + \alpha_9 GDP_{i,t} + \mu_{i,t} \quad (1)$$

$$ROA_{i,t} = \alpha_0 + \alpha_1 NII_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 LOANS_{i,t} + \alpha_4 DEPOSIT_{i,t} + \alpha_5 LLP_{i,t} + \alpha_6 LROA_{i,t} + \alpha_7 CAR_{i,t} + \alpha_8 CE_{i,t} + \alpha_9 GDP_{i,t} + \mu_{i,t} \quad (2)$$

where:

ROE = bank performance measured by return on equity

ROA = bank performance measured by return on asset

NII = income diversification measured by the natural logarithm of noninterest income

LLP = credit risk measured by the ratio of loan loss provision to total assets

The control variables include:

CE = cost-efficiency measured by the ratio of operating expenses to operating income

SIZE = 1-quarter lagged total assets

DEPOSIT = ratio of deposit to total assets

CAR = capital adequacy ratio

LOANS = ratio of loans to total assets

LROE = 1-quarter lagged return on equity

LROA = 1-quarter lagged return on assets

GDP = growth rate of gross domestic product

The data for this study are European sample of listed commercial banks drawn from the Factset Fundamentals Quarterly database. GDP data is obtained from the OECD database. Equations (1) and (2) are estimated to investigate the effect of credit risk and income diversification on bank performance when the Covid-19 crisis struck. Specifically, I test the following hypotheses:

H1: Income diversification affects bank performance measured by return on assets and return on equity amid the COVID-19 crisis.

H2: Credit risk affects bank performance denoted by return on assets and return on equity amid the COVID-19 crisis.

Table 1 reports the descriptive statistics and correlation. While LLP (credit risk) shows a significant negative correlation with both measures of performance, CAR is significantly and positively correlated with bank performance. Consistent with (Hair et al., 1995), the highest variance inflation factor in our models is 2.71 which falls within acceptable levels and hence our models are devoid of multicollinearity.

Table 1: Descriptive statistics and correlation

Variable	Mean	SD	ROE	ROA	NII	TA	LOANS	DEPOSIT	CAR	LLP	CE	GDP
ROE	0.084	0.159	1.000									
ROA	0.003	0.010	0.454***	1.000								
NII	3.930	2.358	-0.027	-0.021	1.000							
TA	156866.8	398752.5	-0.084**	-0.060	0.669***	1.000						
LOANS	0.642	0.182	-0.051	-0.056	-0.473***	-0.366***	1.000					
DEPOSIT	0.623	0.165	-0.061*	0.044	-0.319***	-0.330***	0.217***	1.000				
CAR	0.105	0.088	0.169***	0.525***	-0.449***	-0.190***	-0.020	0.085**	1.000			
LLP	0.001	0.004	-0.298***	-0.505***	-0.020	-0.054	-0.024	0.012	0.172***	1.000		
CE	1.818	6.318	0.011	-0.019	0.061*	0.075**	0.003	-0.028	0.007	-0.043	1.000	
GDP	-0.066	6.222	-0.024	0.030	0.003	0.005	-0.021	0.004	0.008	-0.054	0.014	1.000

\*\*\* significance at the 1% level, \*\* significance at the 5% level, \* significance at the 10% level.

### 3. Empirical Results

Tables 2 and 3 present the results. I begin with a univariate analysis by comparing performance for banks with high credit risk with those having a low level of credit risk. Similarly, the performance of banks with high-income diversification is compared with less diversified banks. In Table 3, I report the means and standard deviations for performance (ROA and ROE) by credit risk measured by LLP and income diversification represented by (NII) on a quartile basis. From Panel A of Table 2, it is observed that the quartile mean values of performance decreases with high levels of credit risk. It also appears from Panel B that, on average, income diversification increases performance. The other half of Table 2 reports the results of two non-parametric tests; Kruskal-Wallis Test and Wilcoxon Test of differences in performance (ROA and ROE) between the top and bottom quartiles based on LLP and NII. In panel A, both test results reveal significant differences in performance between banks with more credit risk and those with less credit risk. Panel B also shows that for both measures of performance, there exist significant differences between more diversified and less diversified banks. These results provide preliminary evidence that at the height of the pandemic, while banks with more credit risk were less profitable, conversely, banks with more noninterest income sources were more profitable. Nevertheless, it is imperative to employ multivariate tests stemming from the myriad factors that may affect bank performance.

Table 2: Comparison of quartile performance based on credit risk and income diversification.

Performance		Bottom	2nd Quartile	3rd Quartile	Top	Test of Differences Top - Bottom	
<u>Panel A:LLP</u>	Obs.	203	203	203	201	<u>Kruskal-Wallis Test</u>	
ROA		0.004 (0.006)	0.002 (0.002)	0.002 (0.003)	0.000 (0.009)	Chi-squared (tie-adj) 58.109***	Wilcoxon Test Z= 7.263***
ROE	Obs.	190	197	194	183	Chi-squared (tie-adj) 26.968***	
		0.095 (0.094)	0.071 (0.057)	0.081 (0.221)	0.023 (0.145)		Z= 5.193***
<u>Panel B:NII</u>	Obs.	196	194	193	194	Chi-squared (tie-adj) 60.099***	
ROA		0.002 (0.008)	0.003 (0.003)	0.002 (0.003)	0.001 (0.005)		Z= 7.752***
ROE	Obs.	174	176	187	194	Chi-squared (tie-adj) 3.380*	
		0.060 (0.137)	0.088 (0.171)	0.074 (0.148)	0.054 (0.104)		Z= 1.838*

The table reports the mean value with the standard deviation shown in parentheses below the mean.

\*\*\*significance at the 1% level, \*\*significance at the 5% level, \*significance at the 10% level.

Consistent with the Hausman specification test outcome, I estimate the models with fixed effect. For robust results, all models are estimated with robust standard errors. Table 4 reports the results of equations (1) and (2). The F-statistics in both models are significant at 1% level depicting the global significance of the models. The estimated coefficients of the income diversification proxy (NII) are positive and statistically significant at 5% and 1% with return on equity and return on assets respectively, suggesting that income diversification is associated with an increase in bank performance during the pandemic. Credit risk measured by LLP is negative and highly significant at 1% level with both measures of performance, signaling that the high rate of Covid-19 induced default risk adversely affected bank performance. For the control variables, while lagged return on equity is positive and significantly related to performance, lagged return on assets shows a negative significant relationship with performance. This suggests that, at the onset of the pandemic, best-performing banks in terms of return on equity continue to post higher returns on equity. In contrast, due to the sharp deterioration in the asset quality of banks due to the high default risk induced by the Covid-19 economic hardship, banks' performance in terms of return on assets began to dwindle when the pandemic struck. Also, the capital adequacy ratio is positive and significantly related to bank performance measured by returns on assets. For further robustness checks of the sensitivity of our results to outliers, the winsorized results not presented are consistent with the earlier estimates.

Table 3: Regression Results

	ROE	ROA
LROE	0.763580*** (0.043839)	
LROA		-0.256813*** (0.000000)
NII	0.042051** (0.018305)	0.002822*** (0.000645)
TA	7.83e-08 (7.49e-08)	-6.60e-09** (3.02e-09)
LOANS	-0.053731 (0.036849)	-0.002792 (0.001867)
DEPOSIT	-0.055876 (0.104546)	-0.003911 (0.002903)
CAR	0.606617 (0.644335)	0.057126** (0.026752)
LLP	-11.627490*** (0.413821)	-1.041161*** (0.032962)
CE	-0.000570 (0.000695)	-0.000021 (0.000032)
GDP	-0.000494* (0.000268)	8.35e-07 (0.000015)
Intercept	-0.156936 (0.131695)	-0.007777 (0.004960)
Adjusted R <sup>2</sup>	39.82%	22.1%
F statistic	182.46***	197.84***
N	552	566

Robust standard errors in parentheses. \*\*\*significance at the 1% level, \*\*significance at the 5% level, \*significance at the 10% level.

#### 4. Conclusion

This study thrives on the Covid-19 induced economic crisis to examine the effects of income diversification and credit risk on bank performance. The results suggest that amid tightened credit conditions and deteriorating asset quality due to the pandemic-induced economic and financial hardships, income diversification offers alternative means of fostering bank performance. Consistent with literature, income diversification gains increase bank performance. Finally, given the low-interest rate regime in Europe and rise in credit risk due to the pandemic, revenue diversification through non-interest income sources coupled with efficient and prudent cost management are imperative to position banks on the path of sustainable performance amid the ongoing pandemic. As a direction for future research, it will be insightful to replicate this study in Sub-Saharan Africa given the availability of data.

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