

# **A Comparative Analysis of the Determinants of the United States and U.K. Banks' Profitability**

**Ikechukwu Ndu**  
**University of Southern Maine**

**Emmanuel Anoruo**  
**Coppin State University**

**Chiaku Chukwuogor**  
**Eastern Connecticut State University**

*This study investigates the determinants of the profitability of U.K. banks and compares them with already established and published determinants of the profitability of U.S. banks. Employing quarterly data, this paper further examines the historical and recent trends for all U.K. banks from 1996 to 2019 in the relationship between return and assets (ROA) and other bank internal (or endogenous) profitability contributors such as net interest margin (NIM), loan loss reserves, and external (or exogenous) macroeconomic variables, such as the 30-year average mortgage rate, Gross Domestic Product (GDP) economic growth rate, unemployment rate, interest rate, and inflation rate by using the Generalized Method of Moments (GMM) estimator technique. The results show evidence of divergence in profit performance between U.S. and U.K. banks. Plausible explanations are put forward for these anomalous findings.*

*Keywords: return on assets, loan loss reserves, provisioning, GMM, net interest margin, bank profitability*

## **INTRODUCTION**

The last decade or more, in fact since the 2008 financial crisis, banks in the United States (U.S.) and the United Kingdom (U.K.) have experienced poor and fluctuating profit performance, in terms of Return on Assets (ROA). To state it bluntly, the U.K. banks' performance has been abysmal since 2008, while the U.S. banks recovery has fluctuated in an unflatter territory of profit performance. The unimpressive profit performance of the banks in both countries during this period is not surprising. This is because of the nature of banks' services and how the banking sector has responded to several economic maladies in the last two decades. In both countries, banks serve as one of the important vehicles that channel funds from saving units to investing units in the financial system. A successful flow of investments to households, corporations, and individual investors in both countries, and globally, depends heavily on a healthy banking sector. During the U.S. financial crisis and economic recession that reverberated all over Europe and most countries of the world, there was a near collapse of the financial system in the U.S. and many European countries

including the U.K. This crisis was ignited by irregular lending practices by U.S. banks in the real estate sector.

In addition to the financial crisis, the ensuing economic recession, the European debt crisis, the U.K. decided in a non-binding referendum, to withdraw from the European Union (BREXIT) in January 2020. This is significant. According to the European Banking Federation, “In cross-border financial services, the U.K. banking sector has historically generated a Balance of Payments trade surplus. In 2017 and 2018 (the latest available figures), the surplus was €31.8 billion, reflecting one quarter of the UK’s total trade surplus in services. The 60 percent of the banking sector surplus is generated from trade with Europe, 27 percent with the Americas and 13% elsewhere<sup>1</sup>”.

Furthermore, the various safeguards against the COVID-19 pandemic, such as shut downs of businesses, schools, government establishments, etc., struck a blow to the profitability of the U.S. and U.K. banks. Their intermediation function was reduced as many individuals as possible, businesses, families, governments, and government institutions experienced reduced incomes during the period. Despite government aids, the economies of both countries contracted. Banks in both the U.S. and the U.K. provide financial intermediation banking-related financial intermediation services, such as: credit cards, acceptance of deposits, loans’ extensions, foreign exchange services, and delivering payments-related services. Since the passage of the Gramm-Leach-Bliley Act (1999) in the U.S. extended the banking industry’s ability to offer securities and insurance services through the creation of financial holding companies, the activities of U.S. banks in this regard have become more like those of U.K. banks. This is not to say that differences no longer exist. Even though the number of U.S. has shrunk from 10,175<sup>2</sup> in 1995 to 4,375<sup>3</sup>, many U.S banks are still small. In 2020, there were 135 financial institutions operating in the U.K<sup>4</sup>. According to the European Banking Federation, the number of banks in the U.K. was 327 in 2010<sup>5</sup>. Despite these similarities between the U.S. and the U.K. banks, the U.S. ROA increased from 0.123percent in 2008 to 2.46 percent in 2018, while the U.K. banks’ ROA declined from 0.123 percent in 2008 to -0.236 percent in 2012 and achieved the highest ROA of 0.472 percent in 2015.<sup>6</sup>

Thus, this discrepancy in profit performance needs scholarly investigation. This poses the research question – Could this difference in ROA between the U.S. and U.K. banks be due to some exogenous or endogenous variables? The research objective of this study is therefore to investigate the determinants of the profitability of U.K. banks and compare them with already established and published determinants of the profitability U.S. banks.

Employing annual data, this paper further examines the historical and recent trends for all U.K. banks from 1996 to 2019 in the relationship between return and assets (ROA) and other bank internal (or endogenous) profitability contributors such as net interest margin (NIM), loan loss reserves, and external (or exogenous) macroeconomic variables, such as the 30-year average mortgage rate, gross domestic product (GDP) economic growth rate, unemployment rate, interest rate, and inflation rate by using the Generalized Method of Moments (GMM) estimator technique.

This paper adds to the literature in several ways. First, we find a significantly negative relationship between the ROA and Inflation variables for U.K. banks while this is significantly positive for US banks. Second, there is a significantly negative relationship between the ROA and GDP growth variables for U.K. banks while this is significantly positive for US banks. Third, there is a significantly positive relationship between the ROA and the Average Mortgage Rate for U.K. banks while this is significantly negative for U.S, banks. Fourth, there is a significantly negative relationship between the ROA and Unemployment Rate variables for U.K. banks while this is insignificant for U.S. banks. Fifth, there is a significantly negative relationship between the ROA and Loan Loss Reserve variables for both U.K. and U.S. banks. Sixth, there is a significantly positive relationship between the ROA and Net Interest Margin variables for both U.K. and U.S. banks.

The rest of the paper is structured as follows. Following the present Introduction, Section 2 offers the Literature Review. Section 3 presents the Data and the Descriptive Statistics. Section 4 describes the Methodology. Section 5 discusses the empirical results. Section 6 presents the conclusions of the paper.

## LITERATURE REVIEW

Profitability is *sine qua non* for long term survival of any business, including banks. Therefore, investigating the determinants of profitability of banks is very important. Even though the ROA does not include off balance sheet assets and liabilities, this study will focus on the profit definition of net bank revenue expressed as a percent of total assets (ROA), because using total equity as a denominator will lead to extensive risk analysis, which this study is not focused on. There have been many studies on the determinants of different countries' banks' profitability using various bank characteristics. Examples include Kosmidou et al. (2005), (Braun & Raddatz, 2007; Wagner, 2013; Luo et al., 2016) Ashraf et al. (2017), (Wagner, 2012), and Rahman et al. (2020).

Hoffmann (2011), examined the determinants of the profitability of the U.S. banks during the period 1995 to 2007, using an empirical analysis that combined bank specific (endogenous) and macroeconomic (exogenous) variables based on the GMM (Generalized Method of Moments) system estimator. The empirical findings document a negative link between the capital ratio and the profitability, which supports the notion that banks are operating over-cautiously and ignoring potentially profitable trading opportunities.

Chukwuogor et al. (2022) examine the determinants of the profitability of the U.S. banks. Using quarterly data, their study investigates the historical and recent trends for all U.S. banks from 1996 to 2019 in the relationship between return and assets (ROA) and other bank internal or (endogenous) profitability contributors such as net interest margin (NIM), loan loss reserves, and external or (exogenous) macroeconomic variables, such as the 30-year average mortgage rate, Gross Domestic Product (GDP) economic growth rate, unemployment rate, interest rate and inflation rate through implementing the Generalized Method of Moments (GMM) estimator technique. The authors find that bank-specific variables including net interest margin and loan loss reserves have a significant impact on bank profitability in the United States. They also conclude that macroeconomic variables namely the average mortgage rate, economic growth, and unemployment rate exert significant effects on the U.S. banks' probabilities.

Kosmidou et al. (2005) investigated the effects of bank characteristics, macroeconomic conditions, and financial market structure on net interest margin (NIM) and return on average assets (ROAA) in the united kingdom commercial banking industry from 1995 to 2002. They found that the ratio of cost to income is negative and statistically significant in all the cases. they further found that liquidity was negatively related to NIM and positively related to ROAA. In addition, they found that loan loss reserves have a significantly positive effect on NIM whether bank characteristics are considered alone. based on this finding, they concluded that higher risks engender higher margins. Their results further revealed that the relationship between size and performance is only significant in the case of NIM. regarding macroeconomic variables, the authors found that both inflation and GDP growth rate have a significantly positive effect on bank performance. Lastly, they found that the proxies for banking industry development and the stock market have a significantly positive influence on performance, regard less whether NIM or ROAA is the independent variable. There seems to be an absence of literature on studies that have focused on the traditional linkages of ROA and fundamental contributors to profit such as net interest margin, provision for loan losses and expenses. Most of the earlier studies on bank profitability relied on a panel data approach. however, this study uses aggregate data on bank specific and macroeconomic variables to explore the determinants of bank profitability. This study adopts the GMM estimator technique, since unlike the standard OLS (Ordinary Least Squares), it can correct for endogeneity and heteroscedasticity that might be present between the variables in the model.

The overview of the literature reveals a paucity of literature of studies that investigate and compare the determinants of the profitability of U.K. banks and U.S. banks. This study attempts to close this identified gap in the literature investigates the determinants of the profitability of U.K. banks and compares them with already established and published determinants of the profitability U.S. banks.

Based on availability of data and for uniformity in the comparison of the determinants of U.K. and U.S. banks' profitability, the following variables are used: net interest margin (NIM), loan loss reserves, and external (or exogenous) macroeconomic variables, such as the 30-year average mortgage rate, gross domestic product (GDP) economic growth rate, unemployment rate, interest rate and inflation rate.

Variability in interest rates affects all bank interest rates including average mortgage rates and bank's profitability. The degree to which banks' profitability is affected by interest rates movements depends on their assets and liability positions. In general, increases in interest rates increases the banking sector profitability. This is because about 60 to 70 percent of bank's assets are in loans. Any new loans, adjustable mortgage rate adjustments, refinancing of old loans will adopt higher interest rates. On the other hand, low interest rates, as has prevailed in recent years encourages more borrowing. According to the Federal Reserve Bank of St. Louis<sup>7</sup>, the total loans and leases of U.S commercial banks increased from \$10, 789.6 billion on February 9, 2009, to \$10,789.6 billion in Feb 9, 2022, representing an increase of about 56 percent.

Trends in banks' internal variables such as net interest margin and loan loss reserves can serve as pointers to banks' profitability. For example, high net interest margins should in general indicate high profitability and higher loan loss reserves indicates bank management's action against potential decline in bank profitability. External factors, such as positive or negative economic growth, inflation rate, and unemployment rate variables may also affect the profitability of banks. Banks prosper in periods of economic growth, that is increase in gross domestic product (GDP) because of general increases in consumers' incomes. Inflation, general rise in price level of goods and services, on the other hand, may diminish the disposable income of consumers and may detract on bank's profitability. Banks in both countries serve as one of the important vehicles that channel funds from saving units to investing units in the financial system. A successful flow of investments to households, corporations, individual investors, and different levels of governments in the U.S. and the U.K. depends to a large extent on a healthy and stable banking sector. It is important to note that this is more so for the U.K. than the U.S. as the U.K. is more reliant on the banking system for financial intermediation.

This study investigates the determinants of the profitability of U.K. banks and compares them with those of the United States banks. Employing annual data, this paper further examines the historical and recent trends for all U.K. banks from 1996 to 2019 in the relationship between return on assets (ROA) and other bank internal (or endogenous) profitability contributors such as net interest margin (NIM), loan loss reserves, and external (or exogenous) macroeconomic variables, such as the 30-year average mortgage rate, gross domestic product (GDP) economic growth rate, unemployment rate, interest rate and inflation rate by using the Generalized Method of Moments (GMM) estimator technique.

## **DATA AND DESCRIPTIVE STATISTICS**

This study employs annual data on the 30-year average mortgage rate, economic growth, inflation rate, loan loss reserves, net interest margin, return on assets and unemployment rate variables. Data were sourced from the U.S. Call Report Data and Uniform Bank Performance Reports, Reports of Condition and Income for All Insured U.S. Commercial Banks, Federal Reserve Bank of St. Louis and World Bank and several banks and financial institutions' websites. The sample period runs from 1996 through 2019.

Table 1 displays the descriptive statistics for the 30-year average mortgage rate, economic growth, inflation rate, loan loss reserves, net interest margin, return on assets and unemployment rate variables for U.K. banks. The mean values for the 30-year average mortgage rate, economic growth, inflation rate, loan loss reserves, net interest margin, return on assets and unemployment rate variables are 4.67, 2.10, 2.03, 0.72, 1.60, 1.11 and 5.85 respectively. The Unemployment rate variable posted the highest mean value of 5.85 percent while the Loan loss reserves variable exhibited the lowest mean value of 0.72%. The minimum and maximum statistics shown in Table 1 indicate that the underlying values of the variables changed over the sample period implying variability. For example, the minimum and maximum values for the Unemployment rate variable ranged from a low of 3.85 to a high of 8.19. The 30-year Average mortgage rate variable displayed the highest standard deviation while the Loan Loss Reserves variable posted the least. The Economic growth rate variable is negatively skewed while all the other variables are positively skewed. The kurtosis statistics for the Economic growth rate, Inflation and Loan loss reserves variables exceed 3 indicating that these series are not normally distributed. However, the Jarque-Bera statistics reveal that the null hypothesis that the Economic growth rate variable is normally distributed should be rejected at the 1 percent level of significance.

**TABLE 1**  
**DESCRIPTIVE STATISTICS FOR U.K. BANKS**

Statistics	AMR	GR	INF	LLR	NIM	ROA	UR
Mean	4.67	2.10	2.03	0.72	1.60	0.56	5.85
Median	4.95	2.36	2.03	0.73	1.58	0.55	5.46
Maximum	8.29	3.85	3.86	1.56	2.91	1.90	8.19
Minimum	1.98	-4.25	0.37	0.20	0.31	-0.24	3.85
Std. Dev.	1.90	1.63	0.78	0.35	0.69	0.52	1.37
Skewness	0.14	-2.57	0.31	0.60	0.33	0.61	0.42
Kurtosis	1.87	10.74	3.31	3.05	2.53	2.92	1.85
Jarque-Bera	1.36	86.43***	0.48	1.42	0.67	1.48	2.03
Probability	0.51	0.00	0.79	0.49	0.72	0.48	0.36
Observations	24	24	24	24	24	24	24

\*\*\*, \*\* and \* indicate level of significance at the 1%, 5% and 10%, respectively. AMR = Average mortgage interest rate, GR = GDP growth rate, INF = Inflation rate, LLR = Loan loss reserves, NIM = Net interest margin, ROA =

Table 1A displays the descriptive statistics for the 30-year average mortgage rate, economic growth, inflation rate, loan loss reserves, net interest margin, return on assets and unemployment rate variables for U.S. banks. The mean values for the 30-year average mortgage rate, economic growth, inflation rate, loan loss reserves, net interest margin, return on assets and unemployment rate variables are 0.06, 0.02, 2.47, 1.81, 3.57, 1.11 and 5.70 respectively. The Unemployment rate variable posted the highest mean value of 5.70 percent while the Inflation variable exhibited the lowest mean value of 0.02 percent. The minimum and maximum statistics shown in Table 1A indicate that the underlying values of the variables changed over the sample period implying variability. For example, the minimum and maximum values for the Unemployment rate variable ranged from a low of 3.70 to a high of 9.60. The Unemployment rate variable displayed the highest standard deviation while the Average mortgage rate and Inflation variables posted the least. The Inflation and Economic growth rate variables are negatively skewed while all the other variables are positively skewed. The Kurtosis statistics for the Economic growth rate, Loan loss reserves and Return on Asset variables exceed 3 indicating that these series are not normally distributed. However, the Jarque-Bera statistics reveal that the null hypothesis that the Economic growth rate, Loan loss reserve and Return on Asset variables are normally distributed should be rejected at the 1 percent level of significance.

**TABLE 1A**  
**DESCRIPTIVE STATISTICS FOR U.S. BANKS**

	AMR	INF	GR	LLR	NIM	ROA	UR
Mean	0.06	0.02	2.47	1.81	3.57	1.11	5.70
Median	0.06	0.02	2.51	1.74	3.50	1.15	5.20
Maximum	0.08	0.04	4.75	3.52	4.30	2.46	9.60
Minimum	0.04	0.00	-2.54	1.18	2.99	0.10	3.70
Std. Dev.	0.01	0.01	1.60	0.60	0.39	0.44	1.72
Skewness	0.18	-0.09	-1.21	1.37	0.37	0.31	1.10
Kurtosis	1.68	2.65	5.30	4.36	2.04	6.18	3.07
Jarque-Bera	1.86	0.15	11.19***	9.41***	1.47	10.50***	4.84*
Probability	0.39	0.93	0.00	0.01	0.48	0.01	0.09
Observations	24	24	24	24	24	24	24

\*\*\*, \*\* and \* indicate level of significance at the 1%, 5% and 10%, respectively. AMR = Average mortgage interest rate, GR = GDP growth rate, INF = Inflation rate, LLR = Loan loss reserves, NIM = Net interest margin, ROA = Return on assets, UR = Unemployment rate.

Table 2 depicts the pairwise Pearson correlation coefficients between average mortgage rate, economic growth rate, inflation rate, loan loss reserves, net interest margin, return on assets and unemployment rate for U.K. banks. The correlation coefficients between return on assets and the average mortgage rate and economic growth rate are statistically significant at the 1 percent level and with the inflation variable it is statistically significant at the 5 percent level. The highest correlation coefficient (0.64) is reported between Return on assets and the Average mortgage rate variables. However, the least correlation coefficient (-0.48) is reported between Net interest margin and the Average mortgage rate variables. Although, the Pearson correlation coefficients analysis has provided cursory evidence of the associations between the Return on assets and the other variables for U.K. banks, however, in order to obtain a deeper understanding, a more robust and rigorous econometric model such as the GMM is required.

**TABLE 2  
PEARSON CORRELATION COEFFICIENTS FOR UK BANKS**

	AMR	GR	INF	LLR	NIM	ROA	UR
AMR	1.00						
GR	0.36**	1.00					
INF	0.08	-0.25	1.00				
LLR	0.40**	-0.44**	0.37**	1.00			
NIM	-0.48***	0.26	-0.16	-0.43**	1.00		
ROA	0.64***	0.55***	-0.38**	-0.11	0.07	1.00	
UR	0.20	-0.21	0.46**	0.21	-0.42**	-0.27	1.00

\*\*\*, \*\* and \* indicate level of significance at the 1%, 5% and 10%, respectively. AMR = Average mortgage interest rate, GR = GDP growth rate, INF = Inflation rate, LLR = Loan loss reserves, NIM = Net interest margin, ROA = Return on assets, UR = Unemployment rate.

Table 2A displays the pairwise Pearson correlation coefficients between average mortgage rate, economic growth rate, inflation rate, loan loss reserves, net interest margin, return on assets and unemployment rate for U.S. banks. The correlation coefficients between return on assets and the economic growth rate and loan loss reserves are statistically significant at the 1 percent level. The highest correlation coefficient (0.89) is reported between the Unemployment rate and the Loan loss reserves variables. Although, the Pearson correlation coefficients analysis has provided perfunctory evidence of the associations between the Return on assets and the other variables for U.S. banks, however, in order to obtain a stronger understanding, a more robust and rigorous econometric model such as the GMM is needed.

**TABLE 2A  
PEARSON CORRELATION COEFFICIENTS FOR U.S. BANKS**

	AMR	INF	GR	LLR	NIM	ROA	UR
AMR	1.00						
INF	0.37**	1.00					
GR	0.39**	0.19	1.00				
LLR	-0.07	-0.09	-0.35**	1.00			
NIM	0.84***	0.31	0.47***	0.24	1.00		
ROA	0.11	0.19	0.66***	-0.52***	0.20	1.00	
UR	-0.39**	-0.14	-0.51***	0.89***	-0.11	-0.57***	1.00

\*\*\*, \*\* and \* indicate level of significance at the 1%, 5% and 10%, respectively. AMR = Average mortgage interest rate, GR = GDP growth rate, INF = Inflation rate, LLR = Loan loss reserves, NIM = Net interest margin, ROA = Return on assets, UR = Unemployment rate.

## METHODOLOGY

The empirical analysis combines bank specific dependent variables such as the net interest margin (NIM), loan loss reserves, and macroeconomic variables, such as Gross Domestic Product (GDP) growth rates, unemployment rates, interest rates and inflation rates using the Generalized Method of Moments (GMM) estimator. In particular, the study implements the Generalized Method of Moments (GMM) system estimator technique to underpin the effects of average mortgage rate, economic growth, inflation rate, loan loss reserves, net interest margin, and unemployment rate on bank profitability. The model is based on the following expression:

$$ROA = f(AMR, GR, INF, LLR, NIM, UR) \quad (1)$$

For econometric purposes, equation (1) is rewritten as follows:

$$ROA_t = \beta_0 + \beta_1 AMR_t + \beta_2 GR_t + \beta_3 INF_t + \beta_4 LLR_t + \beta_5 NIM_t + \beta_6 UR_t + \varepsilon_t \quad (2)$$

where equations (1) and (2), ROA represents return on assets (proxy for bank profitability), AMR is the average mortgage rate, GR stands for GDP growth rate, INF represent inflation rate, LLR stands for loan loss reserves, NIM is the net interest margin, and UR is the unemployment rate. In equation (2)  $\beta_1 \dots \beta_8$  are the coefficient estimators of the independent variables and  $\varepsilon$  represents the error term.

## EMPIRICAL RESULTS

The GMM estimation results for equation (2) displayed in Table 3 for U.K. banks reveal that positive changes in the inflation, economic growth, unemployment rate, and loan loss reserves variables have negative effects on bank profitability. The coefficient estimators of these variables are all negative with the inflation, economic growth and loan loss reserve variables being statistically significant at the 1% level while the unemployment rate variable is statistically significant at the 5% level. The results in Table 3 also show that positive changes in the 30-year average mortgage rate and net interest margin variables exert positive effects on bank profitability. The coefficient estimators of these variables are both positive and statistically significant at the 1% level. Taken together, the results from the GMM estimator indicate that inflation, economic growth, unemployment rate, and loan loss reserves variables have detrimental effects on bank profitability for U.K. banks. However, the 30-year average mortgage rate and net interest margin variables beget bank profitability in the United Kingdom. The coefficient of determination ( $R^2=0.60$ ) suggests that the model explained approximately 60% of the variation in bank profitability for U.K. banks.

**TABLE 3**  
**GMM ESTIMATION RESULTS FOR U.K. BANKS (DEPENDENT VARIABLE: ROA)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.35	0.25	-1.38	0.19
INF	-0.28***	0.04	-6.46	0.00
GR	-0.12***	0.04	-2.82	0.01
UR	-0.05**	0.02	-2.47	0.03
AMR	0.42***	0.05	9.36	0.00
LLR	-0.76***	0.12	-6.38	0.00
NIM	0.44***	0.09	4.76	0.00

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R-squared	0.60	J-statistic		5.03
Adjusted R-squared	0.44	Prob(J-statistic)		0.75
Durbin-Watson stat	0.81			

\*\*\*, \*\* and \* indicate level of significance at the 1%, 5% and 10%, respectively. AMR = Average mortgage interest rate, GR = GDP growth rate, INF = Inflation rate, LLR = Loan loss reserves, NIM = Net interest margin, ROA = Return on assets, UR = Unemployment rate.

In contrast to U.K. banks, the GMM estimation results for equation (2) displayed in Table 3A for U.S. banks reveal that positive changes in the inflation and economic growth variables have positive effects on bank profitability. The coefficient estimators of these variables are both positive and statistically significant at the 1% level. Similar to the U.K. banks, the net interest margin variable is positively correlated to bank profitability for U.S. banks and is statistically significant at the 1% level. In contrast to U.K. banks, the results in Table 3A also show that a positive change in the 30-year average mortgage rate exerts a negative effect on bank profitability for U.S. banks and the coefficient estimator is both positive and statistically significant at the 1% level. Similar to U.S. banks, the loan loss reserve variable is negatively correlated to bank profitability for U.S. banks and is statistically significant at the 1% level. Taken together, the results from the GMM estimator indicate that inflation, economic growth, and net interest margin variables are positively associated bank profitability for U.S. banks. However, the 30-year average mortgage rate and loan loss reserves variables exert a detrimental effect on bank profitability in the United States. The coefficient of determination ( $R^2=0.73$ ) suggests that the model explained approximately 73% of the variation in bank profitability for U.S. banks.

**TABLE 3A**  
**GMM ESTIMATION RESULTS FOR U.S. BANKS (DEPENDENT VARIABLE: ROA)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.15	0.20	-0.77	0.46
INF	13.01***	2.02	6.45	0.00
GR	0.16***	0.02	8.59	0.00
UR	0.06	0.05	1.20	0.25
AMR	-17.43***	3.52	-4.95	0.00
LLR	-0.38***	0.12	-3.11	0.01
NIM	0.51***	0.10	5.15	0.00
R-squared	0.73	J-statistic		4.13
Adjusted R-squared	0.63	Prob(J-statistic)		0.85
Durbin-Watson stat	0.21			

\*\*\*, \*\* and \* indicate level of significance at the 1%, 5% and 10%, respectively. AMR = Average mortgage interest rate, GR = GDP growth rate, INF = Inflation rate, LLR = Loan loss reserves, NIM = Net interest margin, ROA = Return on assets, UR = Unemployment rate.

## CONCLUSIONS

This study examines the determinants of the profitability of U.K. banks and compares them with already established and published determinants of the profitability U.S. banks. This study is important because of the noted discrepancy in profit performance between U.S. and U.K. banks for the period between 1996 and 2019 which required further scholarly investigation to deduce whether the difference was due to some exogenous or endogenous variables. Overall, results are surprising and contrasting. First, there is a significantly negative relationship between the Return on asset and Inflation variables for U.K. banks while this is significantly positive for U.S. banks. A plausible explanation for this is that during inflationary



periods, there is an increased demand for credit by U.S. households while there is a reduced demand for credit by U.K. households in comparison.

Second, there is a surprisingly significantly negative relationship between the Return on asset and Economic growth variables for U.K. banks which is consistent with Issah and Antwi (2017) who found that economic growth negates ROA as a measure of profitability for UK firms. However, the relationship between the Return on asset and Economic growth variables is significantly positive for U.S. banks which is consistent with Anandarajan et al.'s (2007) paper and that of Curcio and Hasan (2013) in that when the economy is growing, there is the tendency for firms to borrow more money, thus increasing business and profitability for U.S. banks.

Third, there is a surprisingly significantly positive relationship between the Return on Asset and Average mortgage rate variables for U.K. banks. This finding is consistent with Khan and Sattar (2014) who found a positive relationship between interest rate and profitability for four major commercial banks in Pakistan. On the other hand, the relationship between Return on assets and the Average mortgage rate variables is significantly negative for U.S. banks as expected and is consistent with Chukwuogor et al. (2022).

These surprising results for U.K. banks in regards to the relationships between the Return on asset dependent variable and the Economic growth and Average mortgage rate explanatory variables might be due to income smoothing practices by U.K. banks relative to U.S. banks. This is because U.K. banks are subject to International Financial Reporting Standards (IFRS) which are principle based and more flexible and subjective accounting standards compared to the rules based more rigid and more objective U.S. Generally Accepted Accounting Principles (GAAP) accounting standards that apply to U.S. banks.

Fourth, there is a significantly negative relationship between the Return on asset and the Loan loss reserve variables for both U.K. and U.S. banks. This finding is intuitive and consistent with the literature such as Ramlall (2009), Vong (2005), Miller and Noulas (1997) and Sufian and Habibullah (2009) in that higher loan loss reserve provisioning reduces profitability.

Fifth, there is a significantly positive relationship between the Return on asset and the Net interest margin variables for both U.K. and U.S. banks. This observation is consistent with that of the finding by Chukwuogor et al. (2022). Again, this result is intuitive and consistent with the literature in that U.K. and U.S. banks are net lenders and thus profitability will have a positive association with net interest margin.

Sixth, there is a significantly negative relationship between the Return on asset and Unemployment rate variables for U.K. banks. This is expected as consumer spending is likely to decrease for firms and individuals with a rise in national unemployment thus reducing profitability for U.K. banks due to less bank lending activity. There is also relatively much more well-established social welfare system and safety net that is accessible by U.K. households that are unemployed in comparison to the United States. In contrast, the relationship between the Return on asset and Unemployment rate variables for U.S. banks is insignificant. In contrast, Chukwuogor et al. (2022) in their paper show that the Unemployment rate variable has a positive effect on bank profitability, and that this is statistically significant at the 1% level. This implies that higher rates of unemployment lead to a higher demand for credit by affected households that need to meet their living expenses and maintain their standards of living. There is especially the case as there is a relatively weaker social welfare system and safety net that is accessible by U.S. households that are unemployed in comparison to the United Kingdom. The reason why the significant positive association observed in the Chukwuogor et al. (2022) paper differs from the insignificant result obtained in this study is that Chukwuogor et al. (2022) include other explanatory variables such as the Changes in openness measure and Non-performing loans parameters in their model specification. However, these variables were not used in this study because empirical data on these variables were not available for the U.K. banks for the sample period.

Finally, a suggested area for future research is to perform a panel data modelling analysis for U.S. and U.K. listed banks to validate the applicability and generalizability of the findings of this study. This is because the methodology of trend time series analysis that has been implemented in this study has the limitation of comparing a highly diversified US banking data to a less diversified UK data. This limitation

arises due to the much higher number of U.S. banks relative to U.K. banks which may introduce bias as the U.K. banking time series data is likely to be riskier than that of the U.S. in comparison.

## ENDNOTES

1. European Banking Federation, (2020) Banking in Europe: EBF Facts & Figures 2020, [https://www.ebf.eu/wp-content/uploads/2020/11/EBF\\_043537-Banking-in-Europe-EBF-Facts-and-Figures-2020.pdf](https://www.ebf.eu/wp-content/uploads/2020/11/EBF_043537-Banking-in-Europe-EBF-Facts-and-Figures-2020.pdf)
2. Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org>.
3. Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org>.
4. Statista, <https://www.statista.com/statistics/870166/number-of-banks-operating-in-the-uk-by-country-of-From-residence>.
5. European Banking Federation, EU Banking Sector: The world's largest banking system in the world's largest economic space, Facts and Figures 2011/2012, <https://www.ebf.eu/wp-content/uploads/2018/02/Facts-Figures-2011.pdf>
6. Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org>.
7. Federal Reserve Bank of St. Louis, Loans and Leases in Bank Credit, All Commercial Banks, <https://fred.stlouisfed.org/series/TOTLL>

## REFERENCES

- Afanasieff, T., Lhacer P., & Nakane, M. (2001). *The Determinants of Bank Interest Spreads in Brazil*. Joint Research of the Central Bank of Brazil and the University of Sao Paulo. Retrieved from <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.522.3006&rep=rep1&type=pdf>
- Agu, C.C. (1992). Analysis of the Determinants of the Nigerian Banking System's Profits and Profitability Performance. *Savings and Development*, 16(4), 353–369. Retrieved from <https://www.jstor.org/stable/25830315>
- Anandarajan, A., Hasan, I., & McCarthy, C.H. (2007). Use of Loan Loss Provisions for capital, earnings Management and Signalling by Australian bank. *Accounting and Finance*, 47(3), 357–379.
- Ashraf, B.N., Arshad, S., & Liang, Y. (2017). Trade Openness and Bank Risk-Taking Behavior: Evidence from Emerging Economies. *Journal of Risk and Financial Management*, 10(3), 15. <https://doi.org/10.3390/jrfm10030015>
- Braun, M., & Raddat C. (2007). Trade liberalization, capital account liberalization and the real effects of financial development. *Journal of International Money and Finance*, 26, 730–761. Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=995320](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=995320)
- Chukwuogor, C.N., Anoruo, E., & Ndu, I. (2021). An empirical analysis of the determinants of the U.S. banks' profitability. *Banks and Bank Systems*, 16(4), 209–217. [https://doi.org/10.21511/bbs.16\(4\).2021.17](https://doi.org/10.21511/bbs.16(4).2021.17)
- Curcio, D., & Hasan, I. (2015). Earnings and capital management and signaling: The use of loan-loss provisions by European banks. *The European Journal of Finance*, 21(1), 26–50. DOI:10.1080/1351847X.2012.762408
- Demircug-Kunt, A., & Huizinga, H. (2000). *Financial Structure and Bank Profitability* (Policy Research Working Paper No. 2430). World Bank. Retrieved from <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/364151468749353823/pdf>
- Dickey, D., & Fuller, W. (1981). The Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica*, 49(4), 1057–1072. <https://doi.org/10.2307/1912517>
- Elliott, G., Rothenberg, T., & Stock, J. (1996). Efficient Test for an Autoregressive Unit Root. *Econometrica*, 64(4), 813–836. <https://doi.org/10.2307/2171846>
- European Banking Federation. (2021, December). *United Kingdom's Banking Sector: Facts and Figures*. Retrieved from <https://www.ebf.eu/united-kingdom>

- European Banking Federation. (2022, December). *Banking in Europe, Facts and Figures 2010 to 2021*. Retrieved from <https://www.ebf.eu/facts-and-figures/previous-editions>
- Federal Reserve bank of San Francisco. (2002, April). How does the U.S. banking system compare with foreign banking systems? *San Francisco Fed*. Retrieved from <https://www.frbsf.org/education/publications/doctor-econ/2002/april/us-banking-system-foreign/>
- FRED. (n.d.). *Loans and Leases in Bank Credit, All Commercial Banks*. Retrieved from <https://fred.stlouisfed.org/series/TOTLL>
- Fu, Q., & Heffernan, S. (2010). Determinants of financial performance in Chinese banking. *Applied Financial Economics*, 20(20), 1585–1600. <https://doi.org/10.1080/09603107.2010.505553>
- Hanweck, G., & Ryu, L. (2005). *The Sensitivity of Bank Net Interest Margins and Profitability to Credit, Interest-Rate, and Term-Structure Shocks Across Bank Product Specializations* (Working Paper No. 2005-02). Retrieved from <https://www.fdic.gov/bank/analytical/working/wp05-02.pdf>
- Heggestad, A.A., & Mingo, J.J. (1976). Prices, Nonprices, and Concentration in Commercial Banking. *Journal of Money, Credit and Banking*, 8(1), 107. <https://doi.org/10.2307/1991923>
- Issah, M., & Antwi, S. (2017). Role of macroeconomic variables on firms' performance: Evidence from the UK. *Cogent Economics and Finance*, 5(1), 1405581. <https://doi.org/10.1080/23322039>
- Khan, W.A., & Sattar, A. (2014). Impact of Interest Rate Changes on the Profitability of four Major Commercial Banks in Pakistan. *International Journal of Accounting and Financial Reporting*, 4(1), 142–154. <https://doi.org/10.5296/ijafr.v4i1.5630>
- Kosmidou, K., Tanna, S., & Pasiouras, F. (2008). *Determinants of profitability of domestic UK commercial banks: Panel evidence from the period 1995-2002*. (Economics, finance and accounting applied research working paper series no. RP08- 4). Coventry: Coventry University. Retrieved from <http://wwwm.coventry.ac.uk/bes/cubs/aboutthebusinessschool/Economicsfinanceandaccounting/Pages/AppliedResearchWorkingPapers.asp>
- Kwiatkowski, D., Phillips, P.C.B., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root. *Journal of Econometrics*, 54(1–3), 159–178.
- Lartey, V.C., Antwi, S., & Kofi, B.F. (2013). The Relationship between Net Interest Margin and Return on Assets of Listed Banks in Ghana. *Research Journal of Finance and Accounting*, 4(16), 73–79. Retrieved from <https://www.iiste.org/Journals/index.php/RJFA/article/view/8287>
- Luo, Y., Tanna, S., & De Vita, G. (2016). Financial openness, risk, and bank efficiency: Cross-country evidence. *Journal of Financial Stability*, 24, 132–148. <https://doi.org/10.1016/j.jfs.2016.05.003>
- Miller, S.M., & Noulas, A.G. (1997). Portfolio mix and large-bank profitability in the USA. *Applied Economics*, 24(4), 505–512. <https://doi.org/10.1080/000368497326994>
- Ndu, I., & Chukwuogor, C. (2021). *Modelling Earnings Management, Corporate Governance, Capital Management and Risk Using Dynamic Panel Data Estimation: The Case of Listed Commercial Banks in the United States* (Working Research Paper). Presented at the 50th NEDSI Annual Conference (virtual). United States.
- Ng, S., & Perron, P. (2002). PPP May not Hold Afterall: A Further Investigation. *Annals of Economics and Finance*, 3, 43–64. Retrieved from <http://www.columbia.edu/~sn2294/pub/annals02.pdf>
- Rahman, M.M., Begum, M., Ashraf, B.N., & Masud, Md.A.K. (2020). Does Trade Openness Affect Bank Risk-Taking Behavior? Evidence from BRICS Countries. *Economies*, 8(3), 75. <https://doi.org/10.3390/economies8030075>
- Ramlall, I. (2009). Bank Specific, Industry-Specific and Macroeconomic Determinants of Profitability in Taiwanese Banking System: Under Panel Data Estimation. *International Research Journal of Finance and Economics*, 34, 160–167.
- Statista. (n.d.). *Number of banks operating in the UK 2023, by country of origin*. Retrieved from <https://www.statista.com/statistics/870166/number-of-banks-operating-in-the-uk-by-country-of-residence>

- Sufian, F., & Habibullah, M.S. (2009). Determinants of bank profitability in a developing economy: Empirical evidence from Bangladesh. *Journal of Business Economics and Management*, 10(3), 207–217. <https://doi.org/10.3846/1611-1699.2009.10.207-217>
- Vong, L.K. (2005). Loans and Profitability of Banks in Macao. *AMCM Quarterly Bulletin*, 15, 91–107. Retrieved from <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.598.5205&rep=rep1&type=pdf>
- Wagner, J. (2012). International trade and firm performance: A survey of empirical studies since 2006. *Review of World Economics*, 148(2), 235–267. Retrieved from <https://www.jstor.org/stable/41485795>
- Wagner, J. (2013). Exports, imports and firm survival: First evidence for manufacturing enterprises in Germany. *Review of World Economics*, 149(1), 113–130. Retrieved from <https://www.jstor.org/stable/42636094>