European Journal of Accounting, Finance and Investment
Vol. 7, No.12; December-2021;
ISSN (3466 – 7037);
p –ISSN 4242 – 405X
Impact factor: 6.34

MACROECONOMIC AGGREGATES AND FINANCIAL SOUNDNESS OF AMERICAN BANKS

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Abstract: *The study examines the impact of macroeconomic aggregates on banks' financial soundness in the United State of America (US). The precise objectives are to: evaluate the effect of Broad Money Stock on banks financial soundness in America, examine how unemployment rate affects banks financial soundness in America, evaluate the effect of inflation rate on banks' financial soundness in America and determine the extent to which interest rate affects banks' financial soundness in America. The study employs secondary data sourced from database of the World Bank. The methods of Data analysis include the co-integration technique as well as the error correction mechanism (ECM) on a time series data for thirty five years period (1985-2019). The results of the study revealed that unemployment rate has positive and significant effect on bank soundness in both the short and long run, while its one year lag has negative but significant effect on bank soundness. Also money supply has positive and statistically significant effect on bank soundness in the short and long run. The one year lag has negative and significant effect on soundness. Similarly, the one year lag of inflation rate has negative but significant effect on bank soundness. The effect of the other macroeconomic variables varied but not statistically significant. The study recommended that for banks in the United State of America to attain the desired level of financial soundness, adequate attention must be paid to macroeconomic aggregates that strongly influence banks soundness such as the unemployment rate, broad money Stock and inflation rate, by regulating the stock of money in the economy, stemming inflation as well as providing employment opportunities for more American men and women that are able and willing to work.*

Keywords: Financial Soundness and Macroeconomic aggregates.

1. Introduction

The financial sector is regarded as one of the most essential areas in any economy as it plays vital role of provision of information as well as liquidity (Ismail, Ab-Rahim & Pei-Chin, 2019). The role of the financial system in any economy cannot be understated as it plays the role of oiling the wheel of the economy. The American financial system in which US banks constitute an integral part has undergone a tremendous transformation over the years in ownership structure, deepness and coverage of regulations planned to station it as one of the world's most important financial hubs (Damena, 2011). There is no doubt that United States (US) banks like other banks worldwide have provided effective financial intermediation services that have greatly contributed to the growth of the world's largest economy. They provide credit to Americans for the procurement of consumer and durable goods, procurement of homes for new business startups as well as create secured places for American societies to store their valuables (Mercia, 2002). Thus, an effective running of the monetary system and all-encompassing and stable

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macroeconomic setting go hand in hand for the growth and development of any nation. Volz (2015) opines that financial framework makes an increasingly great condition for savers and speculators to make intertemporal contracts, upgrades the productivity of monetary intermediation and improves allotment of real assets. It gives an increasingly favorable condition to the usage of macroeconomic aggregates. The efficient working of the financial system which achieves monetary soundness relies upon national or local financial conditions (Muaza & Paul, 2018). In this way, financial soundness is firmly reliant on the exogenous and progressively changing monetary and social conditions, the institutional condition of the nation, law, political cycle, and the view of a given nation by remote markets and assessment of the quality of the budgetary state in the given nation which is the macroeconomic condition of the financial system.

Financial soundness as avers by Dietrich (2009) is the nonexistence of stresses with the capacity to cause reckonable damage to the economy which is beyond a strictly limited group of counterparties as well as customers. Financial soundness is the ease with which business and financial institutions can be used by investors to determine the performance level of their portfolio investment and this could have significant impact on the national economy (Prasad, 2018). Several factors like weighted assets risk to regulatory capital, regulatory capital Tier 1 to weighted assets- risk have been found to affect financial soundness (Dietrich, 2009). Other factors are regulatory capacity to risk weighted assets, quality asset, loans regarded as non performing to total loans, sectorial loans supply to total loans, incomes and productivity and equity yield (Flamini, McDonald & Schumacher, 2009). As banks remain one of the driving forces of the United States economy (Solovjova, 2011), it is necessary to relate their financial soundness with the nation's economic advancement. Therefore, to identify and examine the influence of macroeconomic aggregates on financial soundness of America banks would add value to the approaches developed for the soundness of banking organizations.

The subject of macroeconomic aggregates and the impact on financial soundness of banks have been examined widely, yet there is no consensus. Solovjova (2011) examines the influence of macro economy on five top banks in US. He opined that total national output advancement influences the US banking sector soundness level. Ongore (2013) avers that the impact of macroeconomic factors are not restricted to real economy since various examinations showed huge effects of macroeconomic factors on the banking sector. Along these lines, this investigation centers on the relationship between macroeconomic aggregates and financial soundness of US banks.

Statement of the Research Problem

So many studies already cover the influence of Macroeconomic aggregates and financial soundness in developed economies such as the United States of America, and in many emerging economics. Prominent in these studies are Almazari (2012), Mariusz and Katarzyna, (2015), Evans (2014), Christiane (2015), Ifuero and Chijuka (2014) and Sufian and Chong (2008) and the findings of most of these studies were mixed, thereby leaving the subject matter unresolved. For instance, the study of Sara and Muhammad (2014) found not statistically significant relationship between macroeconomic variables and banks financial soundness in Pakistan. Using real GDP, real interest rate and inflation as macroeconomic variables, return on asset (ROA) as well as equity multiplier (EM) as financial soundness alternative or proxy, Mariusz and Katarzyne (2013) found significant relationship in European Union (EU) countries. Evans (2012) and Christiane (2015) found significant macroeconomic aggregates impact on Kenya Commercial Banks financial Soundness using real GDP, exchange rate, interest as well as inflation rate as macroeconomic variables and return on asset (ROA) as proxy for financial soundness. Ifuero and Chijuka (2014) found significant

relationship between macroeconomic variables on banks financial soundness in Nigeria. Sufian and Chong (2008) found insignificant relationship between macroeconomics and banks financial soundness in Bangladesh by using GDP, unemployment rate and interest rate as macroeconomic variables and return on asset (ROA) as a proxy for financial soundness.

Again, we noticed that in extant literature, ROA and equity return (ROE) were mainly employed as financial soundness proxies, without taking cognizance of the performing loans to Gross loans, which is the proportion of performing loan to aggregate loans and also one of the most important measures for financial soundness as it measures the effectiveness of a bank in receiving repayments on its loans. We also observed that empirical work on macroeconomic aggregates and financial soundness of American Banks is scarce. Thus, there is a gap in the literature to be filled.

The main research question we seek to address in this study is: what is the impact of macroeconomic aggregates on the financial soundness of U.S banks. The study's precise objectives are to: examine how unemployment rate affect banks financial soundness in US, evaluate the effect of broad money stock on banks financial soundness in US, determine the extent inflation rate affects banks financial soundness in US and evaluate the relationship between interest rate and bank financial soundness in US.

2.1 Literature Review

Conceptual framework

The relationship between the performance of macroeconomic factors and financial soundness of the banking sector has been a main issue for consideration by researchers in the academic circle. It is frequently assumed that a bank's financial soundness is dependent on some basic factors which are macroeconomic in nature (Omar & Rahman 2019). Khan (2012) indicated that Macroeconomic aggregates refer mostly to factors of general significance to the situation of a nation's economy that affect a very large percentage of the population. These factors are economic output, unemployment rate, inflation rate, savings and investment and they are diligently examined and checked by the governments in place since they are the major guide of economic performance activity. There is a general area of study in microeconomic, particularly the understanding of how this factors relate to one another and their interactive effect on the economy as demonstrated by Damena (2011). Whereas macroeconomics is a broad study of the economy as a whole, it is concerned with expounding specific group or company level factors that affect the choice making process (Evans 2014). Therefore, Macro-economic variables are thoroughly examined by the governments, consumers as well as the banking sector (Damena, 2011). Christiane, (2015) posits that GDP, foreign exchange rate, interest rates, inflation and market risk are the most impactful macroeconomic variables that define the soundness of the financial institutions.

Babu (2018), states that financial soundness of the banking sector generates a more satisfactory atmosphere for savers and risk-takers to create intertemporal contracts, upgrades the effectiveness of financial intermediation and helps create appropriation of real assets.

Bashir (2003) avers that as far as soundness of financial sector is concern, it is essential to separate the soundness of financial establishments from the soundness of financial markets. While the first indicates how much organizations experience their legally binding duties without disturbance or any external provision, the soundness of financial or monetary market is a precondition for macroeconomic soundness and financial development (Persson & Vingren, 2017). Ghazali, (2008) describes monetary soundness as a condition where the financial framework can endure stuns without influencing the total procedures which weakens the allotment of reserve funds to opening of businesses and the handling of repayments in the economy.

Mahrani and Soewarno (2018) states that financial soundness relates to nonexistence of real financial crises and the capacity of the financial institution to edge and deal

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with the occurrence of imbalances before they constitute a threat. Retnosari (2016) opined that financial soundness means that the financial system is healthy enough to contain instabilities in the economy, so that it is able to facilitate financing, carry out payments, and risk redistribution in an acceptable mode.

Theoretical Framework

This study depends on the production idea as propounded by Koutsoyianis (2003), which clarified that production capacity is a blend of factor sources of input required for the creation of one unit of output. Different strategies might be used to produce a ware, but the generation procedure as opined by Koutsoyianis (2003) incorporates a creation work which speaks to a specialized connection associating variable sources of input as well as output. As connected to this investigation, the production hypothesis holds that performance markers of macroeconomic - aggregates input sources would impact bank monetary soundness (factor yield), accordingly there is a practical connection between bank financial soundness and macroeconomic aggregates. This investigation utilizes Cobb-Douglas production function to denote the practical connection between factor inputs (macroeconomic aggregates) and factor yields (bank financial soundness) in America. The Cobb-Douglas production function is denoted as;

$Y = PC^{\alpha} B^{\beta}$

Where Y = Output

P = Total factor productivity

C= Capital

B = Labour

α and β = elasticity coefficients of capital and labor, respectively.

In the theoretical background, independent factors are theorized as macroeconomic aggregates. Macroeconomic aggregates indicators include: broad money stock (M2), inflation rate (INF), interest rate (INR) and unemployment rate (UMP). The dependent variable is bank financial soundness proxied by total-performing loan to total loans (TPL). The background suggests unswerving impact of macroeconomic aggregates on financial soundness in the United State of America. The connection in form of Cobb-Douglas production function is denoted as:

$TPL_t = PS_t U_t I_t^{\varepsilon} \iota_t \mu_{1t}$

Where,

TPL_t, = Bank total-performing loans to gross loans, P = Total factor Productivity, St = Broad money stock, U_t = Unemployment rate, $I t$ = rate of inflation, ιt = Interest rate, μ_{1t} = error term, □,□□,□□□ι□□= elasticity coefficients and t = 1985-2019 denoting time period.

Empirical Review

Several studies abound in the empirical literature on financial soundness of banks using various measures of financial soundness.

Olawumi and Oladeji (2017) evaluate financial deepening and banks soundness. The determining factors employed are Profit before tax, money supply ratio to GDP; private sector credits ratio to GDP as well as deposit liability ratio to GDP and covers the period of 1988 to 2012. The study utilized the descriptive statistics and discovered that increase in the proportion of money supply brings about increase in the level of banks profit increases and the asset of the bank becomes relatively robust.

Fapohunda and Eragbe (2017) ascertain guideline, development, and banks soundness in Nigeria. The variables employed are Cash reserve ratio, monetary policy rate, money supply to GDP, non-performing loans to total gross loans, return on equity and covers the period of 1985 to 2015. The study used the OLS Multivariate analysis and found that the level of monetary policy rate, proportion of cash reserve, financial soundness and developments essentially influence bank soundness both in the short and long-run.

Ayman (2017) examined if banking sector soundness enhances the development of economy. The indicators used are gross domestic product, deposit, profitability, credit facilities and covers the period of 2010 to 2016. The study employed the multiple regression model and found

that the measures of bank soundness, credit as well as deposits have positive significant relationship influence on economic growth.

Mamatzakis and Ongore, (2013) utilized structure-conduct-performance framework and tested 17 Greek business banks to develop outcomes of 1989-2000-year bank level data. Their discoveries show no huge relationship of CPI and real financing cost with ROA and ROE of banks. Athanasoglou, Brissimis, and Delis (2005) utilized GMM estimator method that demonstrated a critical positive influence of inflation and rate of interest on financial soundness of Greek banks.

Scott and Arias (2011) analyzed performance of five biggest banks in the US. They demonstrated that Gross domestic product did not straightforwardly influence the profit status of the U.S banking sector. Sufian (2011) investigated 11-29 Korean business banks in year 1992-2003. Linear regression outcomes show adverse effect of Gross domestic product on ROA, yet positive effect of inflation.

Damena (2011) analyzed financial soundness variables of Ethiopian banks and utilized 10 years data of 7 key banks and affirms positive effect of Gross domestic product, inflation and loan cost. In a related study, Davydenko (2011) utilized fixed effects estimation system and demonstrated that both Gross domestic product and inflation have a positive association with ROA of Ukrainian banks.

Sufian and Chong (2008) reviewed the banks in Philippines. Results of linear regression show sign of not statistically positive effect of Gross domestic product as well as market capitalization on ROA, even as inflation was negatively related. Vong and Chan (2009) utilized five banks of Macao balanced panel data. Linear model express firm effect of inflation on ROA, Gross domestic product and financing cost shows no impact. McDonald, Flamini, and Schumacher (2009) utilized 389 banks yearly data working in 41nations of Sub-Saharan Africa from 1998-2006. Linear regression model was employed and found positive influence of Gross domestic product development rate and CPI on resource yields, based on random effect estimation.

Moreso, Pasiouras and Kosmidou (2007) examined indigenous and external business banks in 15 European Association nations. Assessment demonstrates importance of macroeconomic conditions to ROA. Ghazali (2008) measured 6 years data of 60 Islamic banks working in eighteen nations and the outcomes shows that Gross domestic product and expansion positively sway the income of banks. Alper and Anbar (2011) investigated the financial soundness of Nigerian banks and inferred that both real loan cost and inflation have a considerable association with ROA and decidedly influence bank financial soundness.

Athanasoglou, Delis, and Staikouras (2006) evaluated year 1998-2002 unbalanced panel of 71-132 European banks of South-Eastern by linear regression. The outcome demonstrates great level of earnings in uttermost inflation times and no obvious influence of GDP. Later on, Havrylchyk and Jurzyk (2006) proved related outcome for Eastern and Central European banks.

Wong, Wong, Fong, and Choi (2006) employed feasible generalized least square (FGLS) method to estimate results and showed a significant impact of GDP and inflation on asset returns. Concentrating on Indonesian banking industry, Anwar and Herwany (2006) found significant relationships of economic growth, inflation rate and real rate of interest with ROA at 1% level but however not with ROE.

Staikouras and Wood (2004) reviewed the exhibition of European Financial industry for quite a long time 1994-1998. Using ordinary least square technique and fixed effect model. They settled that financing cost has a noteworthy positive effect, yet development of Gross domestic product exercise firm negative impact on ROA. Goddard, Molyneux, and Wilson (2004) in like manner assessed the monetary soundness of 583 European Association indigenous banks with cross sectional

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Vol. 7, No.12; December-2021;
ISSN (3466 – 7037);
p –ISSN 4242 – 405X
Impact factor: 6.34

regression and uncovered a significant positive impact of Gross domestic product on financial soundness.

Naceur (2003) studied the financial soundness of the Tunisian financial sector. Balanced panel data of ten noteworthy deposit banks was tested for 1980 - 2000 period and results demonstrated inconsequential impact of yearly development rate and loan fee on Tunisian banks.

Demirgüç-Kunt and Detragiache (1998) analyzed 45-65 developed and developing countries applying a multivariate logit model for a period 1980-94, results suggested a huge array of outside components triggering banking sector emergencies. Demirguc-Kunt and Huizinga (1999) utilized linear regression on 80 nation's bank data. Empirical findings brought up positive yet insignificant effect of factors of macroeconomic on monetary soundness of banks.

3.0 Methodology

The ordinary least squares (OLS) estimation technique is employed in this study. OLS technique is generally utilized in regression analysis fundamentally in light of the fact that it is initiatively intuitively appealing numerically and extensively simpler than other econometric methods (Gujarati, 2004). This investigation utilizes secondary data. The data sources include: World Bank database and international monetary fund (IMF) data sources.

3.1 Model specification

The study employed the Cobb-Douglas production function to determine the relationship between Macroeconomic aggregates and financial soundness of US banks. The Cobb-Douglas production when changed into natural logarithm becomes:

$\ln TPL_t, \square\square\square\square\square\square\square\ln S_t \square\square\square\ln U_t + \square 1n I_t + 1n l_t \square\square\square\square\square_{\square t\square}$

Where $\square_{1t} \sim$ IIDN (0, $\square^2$), as the natural log for μ_{1t} $\square$and $\square\square\square\square\ln P$

TPL = Bank total-performing loans to gross loans
S= Broad Money Stock
l = Interest rate
U = Unemployment rate
I = Inflation Rate
$\square$ = Error term
apriori = $\square\square_l > 0$, $\square\square\square < 0$

3.2 Operationalization and measurement of variables

Dependent variable:

Total-performing loans (TPL) = Total performing loan is the total debt on which the borrower has historically completed payments on time. It is measured as total loans - non performing loan/gross loans (World Bank data base, 2019).

Independent Variables

Macroeconomic aggregates indicators

Unemployment (U) = Unemployment rate (% of overall labor force). It denotes portion of the labour force without work yet accessible and searching for employment (World Bank data base, 2019).

Broad Money Stock (M_2) = This is the total assets that households and business can use to make payment or to hold as short-term investment such as currency, fund in bank accounts and anything of value resembling money. Broad money stock is calculated as savings deposit (SD) plus time deposit (TD) (World Bank data base, 2019).

Inflation Rate (I) = Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that

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may be fixed or changed at specified intervals, such as yearly (World Bank data base, 2019).

Real interest rate (%) Real interest rate is the loaning financing cost adjusted for inflation as estimated by the Gross domestic product deflator (World Bank data base, 2019).

□ = Error term

The study used descriptive statistics and multiple regression analysis to conduct data analysis. The specific techniques used include descriptive statistics, correlation matrix, and regression analysis techniques. Error correction method as well as Co-integration was employed to estimate short- run and long- run dynamic relationships between the independent and dependent variables. Oso and Onen (2009) opines that correlation is utilized when a researcher needs to depict the relationship between at least two factors as far as direction and size while regression examination is utilized when an investigation is about expectation of factors from other indicator factors. Data analysis was carried out utilizing econometric estimation software Eviews 8.1. Preliminary test included unit roots test. The data analyzed in this study are presented below on tables 1 to 6.

4.0 Analysis and Presentation of Results

This section presents and interprets the data analyzed.

4.1 Descriptive Statistical Analysis

Table 1

	TPL	INT	UMP	M_2	INF
Mean	1.676364	4.173611	5.953939	5.560971	2.614656
Med.	1.300000	4.539319	5.700000	5.508085	2.805420
Max.	5.000000	7.190871	9.630000	11.71349	5.397956
Min.	0.700000	1.161394	3.990000	-2.741149	-0.355546
Std. Dev.	1.048412	2.014013	1.452980	3.254289	1.234343
Skewness	1.894397	-0.035943	1.002421	-0.518146	-0.141920
Kurtosis	5.635124	1.468338	3.363358	2.901782	3.199666
Jarque-Bera	29.28590	3.232839	5.708200	1.489881	0.165593
Prob.	0.000000	0.198609	0.057608	0.474763	0.920538
Sum	55.32000	137.7292	196.4800	183.5120	86.28364
Sum Sq. Dev.	35.17336	129.7999	67.55679	338.8928	48.75526
Observations	35	35	35	35	35

The above table 1 shows the values of the descriptive statistics of the factors employed in the study. From the table, it can be deduced that the mean value of TPL is 1.67. That of M_2 is 5.56, INF is 2.61, and UMP is 5.95, while that of INT is 4.17. The median value of TPL is 1.30 while that of M_2 is 5.50. That of INF is 2.80, UMP is 5.70 and INT is 4.53. The closeness of the mean and median values shows consistency in the data structure. Maximum value for TPL is 5.0. That of M_2 is 11.7, INF is 5.3, UMP is 9.6 and INT is 7.1. The minimum value for TPL, M_2, INF

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UMP and INT respectively stood at 0.70, -2.74, -0.35, 3.99 and 1.6. The accompanying standard deviations are minimized at 1.04, 3.25, 1.23, 1.45 and 2.0 respectively for TPL, M_2, INF UMP and INT. These results show absence of outlier in the variable data, since standard deviation shows the extent to which the variables deviate from the mean. The skewness and kurtosis results are meant to test for the normality feature of the distribution of the data. Skewness is meant to test if the regressors and the regressand are normally distributed. Zero skewness implies normal distribution and if it is positive it means skewness to the right of the mean and negative means skewness to the left of the mean. Kurtosis tests for the closeness of data distribution to the centre. A zero kurtosis signifies that the data have a bell-shape (standard distribution). Also -3 and +3 skewness indicates normal curves of variables with tails leftward and rightward. Hence, skewness result of 1.8 for TPL, -0.5 for M_2, - 0.1 for INF, 1.0 for UMP and -0.0 for INT are close to zero to indicate normal distribution of the regressand and regressors because as the sample size get larger and closer to the true population size, then the mean and standard deviation approach normality. The Jaqua – Bera and probability results for TPL, M_2, INF UMP and INT of 29.2 and 0.00, 1.4 and 0.47, 0.15 and 0.9, 5.7 and 0.05, and 3.2 and 0.19 confirms the absence of outlier in the data of the respective variable. The number of observation is thirty five (35). This is sufficient enough to generate the required sample size and forestalling against possible problem of degree of freedom.

Table 2Correlation of Variables

Correlation t-Statistic Probability	TPL	M_2	INF	UMPLR	REER
TPL	1.000000 ----- -----				
M2	-0.272099 -1.574388 0.1255	1.000000 ----- -----			
INF	-0.327172 -1.927709 0.0631	0.072055 0.402231 0.6903	1.000000 ----- -----		
UMP	0.808348 7.645081 0.0000	-0.549782 -3.664584 0.0009	-0.214188 -1.220880 0.2313	1.000000 ----- -----	
INT	-0.416363	0.300476	-0.083454	-0.433230	1.000000

European Journal of Accounting, Finance and Investment
Vol. 7, No.12; December-2021;
ISSN (3466 – 7037);
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	-2.549732	1.754033	-0.466276	-2.676323	-----
	0.0159	0.0893	0.6443	0.0118	-----

Source: computation using E-view 8.1

The table above indicate variables correlation matrix. The table discloses that inflation rates (INF), real effective exchange rate (INT) and broad money stock (M_2) are negatively related to total-performing loans (TPL), while unemployment (UMP) is positively related to TPL. However, there exist weak relationship between the independent variables and TPL except in the case of UMP and TPL. Further examination indicates that except for TPL and UMP relationship with high correlation coefficient (0.80), the relationships between the independent variables show low correlation coefficients. Therefore, the independent variables are not extremely correlated which means that serial correlation existence between them is highly uncertain.

4.2 UNIT ROOTS TEST

Table 3 Unit Root Test @ Level

VARIABLE	ADF TEST STA.	ADF CRIT. VALUE @ 95%	INTEGRATION ORDER	REMARK
TPL	-2.7215	-3.5628	1(0)	Not Stationary
M_2	-3.0050	-3.5577	1(0)	Not Stationary
INT	-3.6004	-3.5628	1(0)	Stationary
INF	-4.3097	-4.2732	1(0)	Stationary
UMP	-3.1471	-3.5628	1(0)	Not Stationary

Table 4 Unit Root Test @ First Difference

VARIABLE	ADF TEST STA.	ADF CRIT. VALUE @ 95%	INTEGRATION ORDER	REMARK
TPL	-3.5930	-3.5628	1(1)	Stationary
M_2	-6.8507	-3.5628	1(1)	Stationary
INT	-3.8515	-3.5628	1(1)	Stationary
INF	-4.3059	-4.2732	1(1)	Stationary
UMP	-3.7601	-3.5628	1(1)	Stationary

Source: Data Computation by the researcher from E-view 8.1

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From table 3, unit root test outcomes indicate that at level, some variables were not stationary. However, table 4 demonstrates stationarity at first difference for the variables measured. That is, they are integrated at order one 1(1). Thus, transformed data regression analysis will generate results not spurious. Furthermore, analysis continues with the test of co-integration for long relationships with the variables.

4.3 Determination of Long-run or Equilibrium Relationship

The Co-integration test examines the long-run relationship between the dependent and the independent factors. First, we start with OLS regression analysis by regressing total-performing loans to total gross loans (TPL) on the independent variables. Subsequently, we extract the regression residuals and conduct unit roots test at level on them. Long- run correlation is assumed to occur between the dependent and independent variables if we have regression residuals stationary at level i.e. 1(O). Table 4 indicates the ordinary least square multivariate regression analysis.

4.4 Table 4: Long Run Result

Variable	Coeff.	Std. Error	t-Sta.	Prob.
C	-2.596809	0.684045	-3.796253	0.0009
INT	-0.082469	0.050086	-1.646554	0.1132
UMP	0.725892	0.077635	9.350106	0.0000
M2	0.108355	0.030628	3.537730	0.0018
INF	-0.117634	0.073079	-1.609698	0.1211
AR(4)	-0.477959	0.150970	-3.165930	0.0043

R^2	0.867773
Adj R^2	0.839028
F-sta.	30.18873
Prob(F-sta.)	0.000000
Durbin-W. stat	1.846777

The above table shows that Cochrane-Orcutt auto regressive procedure was used to correct the serial correlation problem after five (5) alterations with 31 observations included. The D.W statistics of 1.8 approximately 2.0 on table 4 above indicates the nonexistence of autocorrelation inferring that model is reliable for future prediction. The adjusted coefficient of determination (R^{-2}) was moderate at 0.83. This implies that the regressors or independent variables in the model explained about 83% of the systematic variations in bank financial soundness in America. The F-statistic was significant at 1% (Prb F-statistic 0.000000), an indication of linear relationship existence between the dependent and independent variables which denote overall goodness of fit. From the regression analysis, inflation rates (INF) and interest rate (INT) have long-run negative relationship with bank financial soundness. On the other hand, unemployment rate (UMP) and broad money stock (M_2) had a long-run positive relationship with bank financial soundness. While unemployment rate (UMP) and broad money stock (M_2) is statistically significant at 1% respectively, interest rate (INT) and inflation rate (INF) are not significant at 5%.

This implies that the independent factors used, only unemployment rate (UMP) and broad money stock (M2) remain the key elements of United State of America bank financial soundness. The result shows that a unit change in inflation rate and interest rate will cause 0.11 units, and 0.08 units decrease in bank financial soundness in US, just as a unit change in unemployment rate and broad money stock will cause 0.72 and 0.10 units increase in bank financial soundness in the United State of America. Next, residuals achieved from the regression result above named ECM are tested for unit roots at levels. Table 5 below denotes the summary of Augmented Dickey – fuller test output on ECM.

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Table 5: Augmented Dickey-Fuller Unit Roots Test on Ecm

ADF test sta.	critical values at 95%	Remark
-4.620320	-4.416345	Stationary

The table above indicates ADF test statistics of -4.620320is which is higher than 1% critical test -4.416345 (absolute value). Thus, signify that regression residuals are stationary and Con-integrated correlation exists between the dependent and independent variables with equilibrium long-run relationships. Hence, the existence of long run relationship between the dependent variable, ratio of total-performing loans to total gross loans (our proxy for bank financial soundness) and the independent variables – unemployment rate (UMP), broad money stock (M2), rate of interest (INT) and inflation rate (INF).

Next, we proceed to run the short run dynamic relationships among the dependent and independent factors of the model and the ECM.

4.5 Table 6: Short Run Result

Variable	Coeff.	Std. Error	t-Sta.	Prob.
C	-1.435231	0.986740	-1.454518	0.1765
DTPL(-1)	0.922456	0.292138	3.157603	0.0102
M2	0.052016	0.054491	0.954573	0.3623
M2(-1)	0.111264	0.043016	2.586553	0.0271
INT	0.172302	0.114099	1.510103	0.1619
INT(-1)	-0.113723	0.118778	-0.957443	0.3609
INF	0.099749	0.124256	0.802773	0.4408
INF(-1)	-0.358833	0.149054	-2.407406	0.0368
UMP	1.215991	0.215245	5.649327	0.0002
UMP(-1)	-1.038360	0.345898	-3.001931	0.0133
ECM(-1)	-0.641361	0.218298	-2.938000	0.0135

R^2	0.965722
Adj R^2	0.928017
F-sta.	25.61240
Prob(F-sta.)	0.000007
Durbin-W. stat	1.910070

The D.W statistics of 1.9 approximately 2.0 on table 6 above denotes autocorrelation absence which means that the model is reliable. The current and first year lag of broad money stock have positive relationship with bank financial soundness but only statistically significant at 5% in the first year lag as the current year is not statistically significant. The current year interest rate has positive relationship, while the first year lag has inverse relationship with bank financial soundness and both are statistically insignificant at 5%.While the current year of inflation has positive relationship, the first year lag of inflation rate has inverse relationship with bank financial soundness and significant statistically at 1% only in first year lag but the current year is not statistically significant. The current level of unemployment rate and the first year lag have positive as well as negative correlation with bank financial soundness respectively and both are statistically significant at 1% level. Adjusted R^2 of 0.92 indicates that the independent variables expound 92% changes in financial soundness in the US. The Prob(F-statistic) of 0.000007 indicates goodness of fit of the model and significant at 1% level. ECM was correctly signed as it carried a negative value and was significant at 1%. This shows that only disequilibrium in bank financial soundness in previous year is corrected in the current year at the rate 64%.

4.6 Table 7: Diagnostic Test

Breusch-Godfrey Serial Correlation LM Test:

F-sta.	0.618918	Proba. F(2,8)	0.5624
Obs*R^2	2.947920	Proba. Chi-Square (2)	0.2290

Sourch: Researcher's compilation from Eview 8.1

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-sta.	0.372178	Pro. F(10,11)	0.9347

European Journal of Accounting, Finance and Investment
Vol. 7, No.12; December-2021;
ISSN (3466 – 7037);
p –ISSN 4242 – 405X
Impact factor: 6.34

Obs*R^2	5.561773	Pro. Chi-Square(10)	0.8506
Scaled explained SS	0.872501	Pro. Chi-Square(10)	0.9999

Source: Researcher's computation employing Eviews 8.1

The diagnostic table above denotes that the Breusch-Godfrey LM Serial Correlation Test outcome of 0.2290 > 0.05 point out high order correlation nonexistence. The ARCH (Harvey) Heteroskedasticity test denotes the existence of homoscedasticity (0.8506>0.05), hence validating the continuous ordinary least square estimator variance assumption.

Long and Short Run Relationships

Table 4 and 6 above shows that unemployment rate (UMP) and broad money stock (M2) both have positive relationships with Banks total-performing loan (TPL) in the long and short-run, except the lag of UMP and both are statistically significant in the long and short - run, except the current level of M2 (Prob. Value 0.36). Similarly, rate of interest (INT) and rate of inflation (INF) have inverse relationships with TPL in both long and short-run except the lag of both and are statistically insignificant in the short as well as long run except the lag of INF (Prob. Value 0.03).

Discussion of Findings

We found from the outcome of our analysis, that the impact of INF on total performing loan (TPL) was negative in short run lag however has substantial effect on TPL and validates the theoretical anticipations and agrees with the results of Damena (2011). This means that inflation has impact on Banks total-performing loans. Secondly, it was observed that M_2 has significant as well as positive effect in the short run on TPL relationship which agrees with apriori expectations and also agrees with the anticipations and results of Demirguc-Kunt and Huizinga (1999). This implies M2 has expansionary effect on TPL. Again, our findings show that INT has a negative relationship in both long and short - run except the lag but not statistically significant influence on TPL in the short run. This is contrary to the positive theoretical expectations for INT and agrees with the result of Mamatzakis and Remoundos (2003). This implies that INT contribute negatively to TPL.

Finally, in the long and short-run, it was found that the UMP has positive and significant effect on TPL as against the negative theoretical expectations and confirms the findings from Demirgüç-Kunt and Detragiache (1998).

Summary of Findings

From the data analyses, the findings are:

1. The present broad money stock level indicates positive and statistically insignificant effect on bank financial soundness in the short-run. The effect on TPL was positive in the long-run and also statistically significant. This suggests that broad money stock is a foremost factor of TPL in the long-run.
2. The level of current inflation rate denotes positive and statistically not significant effect on TPL in the short-run, whereas the impact on TPL in the long-run is negative but not significant. This denotes that INF is not a major factor of TPL in both the long and short -run.
3. The present interest rate level shows positive and not statistically significant effect on TPL in the short-run, and the effect on TPL in the long-run is adverse and also not statistically significant. This indicates that INT does not contribute significantly to financial soundness in the US.
4. The present unemployment level denotes positive and statistically significant effect on TPL in the short-run, while the effect on TPL in long-run, also positive and statistically significant. Meaning UMP is a very strong determinant of bank financial soundness in the US in both the long and short - run.

Conclusion

In conclusion, these outcomes highly suggest that unemployment rate and broad money stock are the most potent indicators of bank financial soundness in the short

and also the long-run in the United State of America within the period of study (1985-2019). More so, the outcomes also indicates that the interest rate has no expansionary impact on financial soundness, just as the effect of inflation is mild.

5.3 Recommendations

From the findings of the study, it is recommended that;

1. Government should provide employment opportunities for more Americans that are able and willing to work.
2. America government should sustain current monetary policy measures that adequately control stock money supply that can control its inflation rate.

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