

Macroeconomic Determinants of Deposit Money Banks' Profitability in Nigeria: A Panel Data Analysis (2009-2018)

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Abstract

The objective of this study is to identify the macroeconomic determinants of profitability of deposit money banks in Nigeria. Five deposit money banks (UBA Plc, Access Bank Plc, Zenith Bank Plc, First Bank Plc, and Fidelity Bank Plc,) were randomly sampled out of the existing twenty-two (22) deposit money banks in Nigeria. Time series macroeconomic variables used for the study includes monetary policy rate, exchange rate, financial deepening, all share index, exchange rate, and rule of law index were obtained from the Central Bank of Nigeria Statistical Bulletin and the World Bank database for the period 2009 – 2018.. The panel data was analyzed using the Random effect and fixed effect model techniques. Findings reveal that exchange rate does not determine the profitability of deposit money banks [$p(t)$ for EXR = 0.9472]; one unit increase in exchange rate leads to a 0.00237 decline in the profitability of deposit money banks in Nigeria. Financial sector development does not determine deposit money banks' profitability [$p(t)$ for FSD = 0.7878]; one unit increase in financial sector growth leads to a 0.05 unit increase in the profitability of deposit money banks in Nigeria. Stock market development does not determine deposit money banks' profitability [$p(t)$ for LSMD = 0.1509]; one unit increase in stock market development leads to a 0.96 unit increase in the profitability of deposit money banks in Nigeria. Monetary policy rate do not determine money deposit banks' profitability [$p(t)$ for MPR = 0.0826]; one per cent increase in monetary policy rate leads to a 0.11 per cent increase in the profitability of deposit money banks in Nigeria. Rule of Law does not determine money deposit banks' profitability [$p(t)$ for RULEOFLAW = 0.8642]; one-unit improvement in rule of law and good governance leads to a 0.30 increase in the profitability of deposit money banks in Nigeria. The study recommends for an upward review of the lending-deposit ratio of banks from 65% to 75% so as to encourage lending by banks and increasing profits of deposit money banks.. Rule of law should be improved upon in Nigeria.

Keywords: Bank's profitability; determinants; panel data, deposit money bank

INTRODUCTION

The banking system is the life-wire of every economy. Banks have a strategic role to play in the nation's economic growth and development. The events of the Great Depression of the 1930s and the 2008/2009 Depression has attested to the fact that a strong banking system engenders economic progress in a modern society. This is hinged on their basic function as financial intermediaries, who mobilize savings from surplus economic units and channel the same to deficits units where they are used for specific objectives that will promote economic progress.

Efficient financial intermediation ensures improvement in profitability of banks, improves flow of funds and better-quality services for customers. Therefore, productivity and profitability of banks is vital, not just at the individual bank level, but also at the macroeconomic level (Aremu & Mejabi, 2013). In banking, factors that determine profitability are well noted and examined. This is because strengthening the foundations of domestic financial system has become a popular way to buildup flexibility for capital flow volatility.

Every business organization, deposit money bank inclusive, has the maximization of profit as its basic objective. Profitability can be defined as a result which arises out of the effectiveness of business operators and optimal utilization of resources at their disposal; subsequently, leading to reaping of higher return on resources employed. The management of any firm should be able to ascertain its strength limits and weak points. Management should be able to explore opportunities and tackle threats if it is serious about making profits (Adeusi, Kolapo & Aluko, 2014).

The factors that determine banks' profitability vary from one bank to another. This is because of differences in shareholder and managerial decisions and activities. That is why previous studies suggest that capital size, size of deposit liabilities, size and composition of bank's credit portfolio, interest rate policy, exposure to risk, management quality, labour productivity, bank size, bank age, ownership, ownership concentration, and structural affiliation, among others, influence bank profitability (Adeusi, Kolapo & Aluko, 2014). The variables are regarded as the sectoral of banks' specific variables that determine their profitability. On the other hand, banks operate in a macroeconomy where they interact with other sectors and variables. Previous studies have identified interest rate, inflation, exchange rate, etc. as macroeconomic variables that determine the profitability of deposit money banks in Nigeria. It is known that socio-political environment in an economy has a role to play in the activities of deposit money banks. An environment where there is high political instability and unrest does not promote deposit money banks' performance. However, what is lacking in research is a study that seeks to identify political or governance factors as determinants of deposit money banks' profitability in Nigeria.

Recent evidences from other countries show that macroeconomic dynamics play significant role in determining banks' profitability (Chidozie & Ayadi, 2017). However, nothing in literature has highlighted the role of social and public governance indicators on the profitability of deposit money banks in Nigeria. This study is premised on examining the role of rule of law in determining the profitability of deposit money banks in Nigeria. The motivation of this study is that it will serve as a policy guide in the Nigerian Banking Industry because there is no adequate and exhaustive information available for policy makers as it relates to banks' profitability in the country.

LITERATURE REVIEW

Adeusi, Kolapo & Alusi (2014) examine the factors that influence the profitability level of commercial banks in Nigeria. Panel data analysis technique was adopted in analyzing the panel data for the period 2000 to 2013, involving a sample of 14 banks. Findings reveal that asset

quality, management efficiency, and economic growth are the determinants of commercial banks' profitability. Asset quality was very significant; indicating that credit risk is a major factor determining commercial banks' profitability.

Akinkunmi (2017) explores the factors that accounts for banks' profitability in Nigeria using a panel dataset for the period 2001-2015. The techniques of Ordinary Least Square and Generalized Method of Moment techniques were employed for data analysis. Findings show that bank specific variables, such as, efficiency ratio, credit risk and capital adequacy are significant in determining banks' profitability in the long run. However, in the short run, the market concentration and real gross domestic product significantly affect the performance level in Nigeria's commercial banks. Musa (2015) examines the determinants of financial performance listed mega banks in Nigeria for a period of seven years. A total of 8 banks that met the criteria were duly selected as sample for the study. Findings reveals that capital adequacy, cost income ratio, the size of bank and income diversification are statistically in influencing financial performance of the banks used in the study.

Ani, Ugwunta, and Ibe (2012) employed industry related 10year period dataset to assess the determinants profitability of banks in Nigeria. Profitability was found to be associated with well-capitalized banks. Capital ratio has a positive significant relationship with Net Interest Margin. Bank size has a negative and significant relationship with Net Interest Margin. Asset composition has a positive but an insignificant relationship with Net Interest Margin. Liquidity has a negative and insignificant relationship with Net Interest Margin. Inflation has a negative and insignificant relationship with Net Interest Margin. Ani, Ugwunta, Ezeudu, and Ugwuanyi, (2012) explores the factors that determines the profits of deposit money banks in Nigeria. A dataset of 147 bank level observations for the period 2001 to 2010 relating to 15 banks was used for data analysis. The result of the Pooled ordinary least square regression result reveals that increase in size of banks may not necessarily lead to increasing profits as a result of diseconomies of scale. Higher capital-assets ratio and loans and advances contribute strongly to bank profitability.

Babalola (2012) examines some factors which are macroeconomic, financial and bank specific in nature were employed and to test their impacts on return on assets of banks. Findings summarily reveal that, in the short run, capital adequacy ratio is significant in determining banks' profitability in Nigeria. In the long-run, the bank size determine performance of banks. Chidozie & Ayadi (2017) examine the impact of macroeconomic variables on banks' profitability. It also seeks to examine the significance of microeconomic variables on banks' profitability. The estimation technique follows a panel regression. The results indicate that the ratio of cost to income market concentration, and crude oil price are negatively significant in determining changes in return on average equity while total assets is positively significant in explaining return on average equity (as a measure of profitability).

Olaoeye & Olarewaju (2015) examine the determinants of bank profitability in Nigeria, while looking at internal variables and macroeconomic factors. A panel of individual banks' financial statements between 2004 and 2012 was employed. Finding reveals that macroeconomic factors are insignificant in determining bank profitability. Inflation has adverse impact on profitability. Osamwonyi & Chijuika (2014) investigate the impact of macroeconomic variables on profitability of banks in Nigeria from 1990-2013. The Pooled Ordinary Least Square result indicates that the relationship between gross domestic product (GDP) and return on equity is positive. The relationship between interest rate, inflation rate and return on equity is negative. Inflation is insignificant in determining profit. The study by Osuagwu (2014) explores the determinants of bank profitability, while paying attention to bank specific, industry bases, and macroeconomic variables. Result shows that the profitability of banks is to a large extent determined by credit risk and organizational factors in the banks. Market concentration is vital

in determining profitability of banks. Exchange rate is significant in determining profitability of banks via return on equity and non-interest margin, but insignificant as regards to return on asset.

Owoputi, Olawal, & Adeyefa (2014) investigate the impact of bank-specific, industry-specific and macroeconomic indicators on bank profitability in Nigeria over the period 1998 - 2012, using random-effect model. The investigation reveals that credit risk and liquidity ratio have negative and insignificant impact on bank profits. Finally, as expected, inflation rate and interest rate are negatively and significantly related to bank profitability.

A review of empirical studies on the determinants of deposit money banks' profitability has shown that no known study has considered political or governance undertone in assessing or examining the determinants of banks' profitability. Rule of law concerns property rights, wealth and other assets. This aspect of looking at business is lacking in many studies. As a departure from previous studies, the present study seeks to capture the impact of rule of law in determining profitability of deposit money banks in Nigeria for the period 2009-2018. The choice of this period is due to non-availability of data.

Materials and Methods

Time series data for profitability were obtained from the Annual Reports of the various deposit money banks. Macroeconomic variables for the period of 2009 to 2018 were obtained from the 2018 Statistical Bulletin of the Central Bank of Nigeria. The time series data for rule of law was obtained from the World Bank database. The five (5) listed Deposit Money Banks (UBA Plc, Access Bank Plc, Zenith Bank Plc, First Bank Plc, and Fidelity Bank Plc). Ex-Post-Facto research design was adopted for the study. Pooled OLS, Fixed Effect and Random Effect panel models were used. The Eviews 9.0 econometric software was used for data analysis.

Model Specification

Similar models used by Owoputi, Olawal, & Adeyefa (2014) and Olaoye & Olarewaju (2015) were mirrored in formulating a linear model for this present study. For the purpose of our empirical analysis, the following model is specified to accommodate two new variables to incorporate stock market activities and institutional variable (Stock market development and the rule of law)

$$ROA_{it} = \beta_{1i} + \beta_2 MPR_{it} + \beta_3 EXR_{it} + \beta_4 FSD_{it} + \beta_5 SMD_{it} + \beta_6 RULEOFLAW_{it} + \mu_{it} \quad (1)$$

Where, β_{1i} is a random variable with a mean value of β_1 . The intercept value for an individual bank can be expressed as:

$$\beta_{1i} = \beta_1 + \mu_{1i} = 1, 2, 3, \dots, N \quad (2)$$

Where, μ_i is a random error term with a mean value of zero and variance of σ^2 . What we are essentially implying is that the five (5) banks included in our sample are drawn from a larger population of twenty two (22) Deposit money banks in Nigeria, and that they have a common mean value for the intercept (β_σ) and the individual differences in the intercept values of each bank are reflected in the error term ϵ_i . Substituting equation (2) into equation (1), we obtain:

$$ROA_{it} = \beta_{1i} + \beta_2 MPR_{it} + \beta_3 EXR_{it} + \beta_4 FSD_{it} + \beta_5 SMD_{it} + \beta_6 RULEOFLAW_{it} + \mu_{it} + \Sigma_{it} \quad (3)$$

$$ROA_{it} = \beta_{1i} + \beta_2 MPR_{it} + \beta_3 EXR_{it} + \beta_4 FSD_{it} + \beta_5 SMD_{it} + \beta_6 RULEOFLAW_{it} + Z_{it} \quad (4)$$

Where; ROA = measure of banks profitability (profit before tax), MPR = monetary policy rate (measure of Central Bank's policies), EXR = exchange rate, FSD = ratio of deposit money banks credit to the private sector to GDP, (financial sector development), SMD = all share index (measure of stock market development), RULEOFLAW = World Bank/Kaufman's index of rule of law. Z_{it} = composite error term

Apriori Expectations

$$f^1(\beta_2) > 0, f^1(\beta_3) < 0, f^1(\beta_4) > 0, f^1(\beta_5) > 0, ,$$

RESULT AND DISCUSSIONS

We begin by looking at the structure and features of the data used for the analysis. Table 1 shows the result of the descriptive statistics. The rule of law (RULEOFLAW) has the lowest mean value of -1.07200, while exchange rate (EXR) has the largest mean value of 197.49. The values for Jarque-Bera statistic were all above 2.0. Exchange rate (EXR) rate has the highest standard deviation value of 62.744, while, Rule of law has the lowest standard deviation with the value of 0.093061.

Table 1: Result of Descriptive Statistics

| | LROA | MPR | EXR | LSMD | FSD | RULEOFLAW |
|--------------|-----------|-----------|----------|----------|----------|-----------|
| Mean | 10.45254 | 11.42500 | 197.4882 | 10.26950 | 19.75968 | -1.072000 |
| Median | 10.69683 | 12.00000 | 156.4615 | 10.25270 | 19.64837 | -1.080000 |
| Maximum | 12.35313 | 14.00000 | 306.0829 | 10.62932 | 21.30726 | -0.880000 |
| Minimum | 7.295735 | 6.000000 | 147.3958 | 9.939368 | 18.23659 | -1.180000 |
| Std. Dev. | 1.219603 | 2.847948 | 62.74400 | 0.224158 | 0.913690 | 0.093061 |
| Skewness | -0.741706 | -1.077197 | 0.906110 | 0.014206 | 0.382841 | 0.716786 |
| Kurtosis | 2.948257 | 2.706740 | 2.076973 | 1.964735 | 2.471358 | 2.470994 |
| | | | | | | |
| Jarque-Bera | 5.507972 | 11.81854 | 10.34030 | 2.681452 | 2.164326 | 5.837437 |
| Probability | 0.063674 | 0.002714 | 0.005684 | 0.261656 | 0.338862 | 0.054003 |
| | | | | | | |
| Sum | 627.1527 | 685.5000 | 11849.29 | 616.1699 | 1185.581 | -64.32000 |
| Sum Sq. Dev. | 87.75842 | 478.5375 | 232271.8 | 2.964554 | 49.25499 | 0.510960 |
| | | | | | | |
| Observations | 60 | 60 | 60 | 60 | 60 | 60 |

Source: Author's Eviews 9 computations

The probability values of Jarque-Bera for MPR, EXR, and RULEOFLAW are less than 0.05. This means that those variables follow normal distribution. However, the probability values of Jarque-Bera for LROA, LSMD and FSD are above 0.05. Therefore, those time series do not follow normal distribution. There are 60 observations in all. The composite result of the different regression models is presented on Table 2 below.

Table 2: Composite Result of Cross section Regression Analysis

| Dependent Variable: | | | |
|---------------------|------------------|--------------------|---------------------|
| | Pooled OLS Model | Fixed Effect Model | Random effect Model |
| Variable | Coefficient | Coefficient | -0.000237 |
| EXR | -0.000237 | -0.000237 | 0.050481 |
| FSD | 0.050481 | 0.050481 | 0.959769 |
| LSMD | 0.959769 | 0.959769 | 0.105305 |
| MPR | 0.105305 | 0.105305 | 0.297608 |
| RULEOFLAW | 0.297608 | 0.297608 | -1.238595 |
| C | -1.238595 | -1.238595 | -0.000237 |
| R-squared | 0.132143 | 0.680437 | 0.272846 |
| Adjusted R-squared | 0.051786 | 0.615220 | 0.205517 |
| S.E. of regression | 1.187604 | 0.756527 | 0.756527 |
| Sum squared resid | 76.16173 | 28.04435 | 76.16173 |
| Log likelihood | -92.29175 | -62.31959 | |
| F-statistic | 1.644451 | 10.43344 | 4.052423 |
| Prob(F-statistic) | 0.164053 | 0.000000 | 0.003396 |

Table 2 presents the result of the pooled regression based on the method of Ordinary Least Squares regression, Fixed effect panel, and random effect model analysis. In the result of the pooled analysis, the study pooled all the 60 observations together, while ignoring the cross section and time series nature of the data. The coefficient of determination ($R^2 = 0.13$) for this model is very poor. The major problem with this model is that it does not distinguish between the various deposit money banks used in this study. In other words, this model denies the heterogeneity or individuality that may exist among the five banks. As a result of this defect, the study goes ahead to run the fixed effect panel regression to solve the problem of heterogeneity.

The term, fixed effect, is due to the fact that although the intercept may differ across banks, but intercept does not vary over time. It is time invariant. This model seems like a better one when compared with the Pooled OLS. The coefficient of determination (R^2), the F-ratio values (significant at 5%) and Durbin Watson shows better performance of the model. The probability of F-statistic (0.0000) shows that jointly, all the explanatory variables are significant in determining profitability of deposit money banks in Nigeria. Individually, they are not, except the monetary policy rate (MPR) which was weakly significant at 10%, with p value of 0.0832. This outcome is better than the pooled regression result. The study moves further to test for the random effect.

In random effect model analysis result, all the six firms share a common mean value for the intercept. In both models, none of the variables are statistically significant at 5%. Only the monetary policy rate is significant at 10%. Now, which of these two models (Fixed effect and Random effect) is appropriate for decision making? The answer is provided by the test of endogeneity- the Hausman's test. First, we formulate the null hypothesis

H₀: random effect model is appropriate

H₀: fixed effect model is appropriate

Decision Rule: reject H₀ if the P value of chi-sq. statistic < 0.05 . Otherwise, accept H₀.

The result of the Hausman's test is presented below in Table 4.5

Table 3: Result of Hausman Test

| Correlated Random Effects - Hausman Test | | | |
|--|-------------------|--------------|--------|
| Equation: Untitled | | | |
| Test cross-section random effects | | | |
| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
| Cross-section random | 0.000000 | 5 | 1.0000 |

The probability of the chi-sq. statistic in Table 3 above exceeds 0.05. This means that we do not reject H_0 . This implies that we accept random effect model as the appropriate for the study. The result of the random effect model is shown below:

$$LROA = -1.236 - 0.000237EXR + 0.0505FSD + 0.96LSMD + 0.1053MPR + 0.2976RULE\ OF\ LAW.$$

One unit increase in exchange rate of the Naira to the dollar, leads to a 0.00237 decline in profitability of banks. This means that exchange rate devaluation or depreciation increases the profitability of banks. One per cent increase in financial deepening in the financial sector, leads a 0.0505 increase in the profitability of banks. This is why the need to deepen financial inclusion is necessary in the financial system. One per cent increase in all share index in the stock market, leads a 0.96 increase in the profitability of banks. This outcome meets economic expectations. A strong capital market significant an efficient banking system. One per cent increase in money policy rate by the Central Bank, leads a 0.1053 increase in the profitability of banks. This implies that banks in Nigeria makes more profit as interest rate increases. This means that deposit money banks do not support the real sector. They are mainly engaging in rental activities. One per cent increase in rule of law in the economy, leads a 0.2975 increase in the profitability of banks. The implication is that rule of law has the potential of increasing banks' profitability.

Conclusion and Recommendations

The objective of this study is to identify the determinants of profitability of deposit money banks in Nigeria. Five deposit money banks were randomly sampled out of the existing twenty-two (22) in Nigeria. The study adopted the ex post factor research design. The panel data was analyzed using the Random effect model technique. Findings reveal that exchange rate, financial sector development, Stock market development, monetary policies and rule of Law do not determine deposit money banks' profitability. As a result, the study makes the following recommendation:

- i. First, the proxy for rule of law has a positive effect, though, not significant on deposit money banks' profitability. This implies that the process of deepening the rule of law in Nigeria should have the prospects in increasing and improving the profitability of deposit money banks. Therefore, all stakeholders in all sectors of the economy should encourage citizens to modify their behaviours and actions in accordance to the rule of law. Independent of the judiciary should not just be given a "lip service", but, guaranteed in all ramifications by every arm of government and the society in general.
- ii. There is a positive relationship between monetary policy rate and profits made by deposit money banks. There is a need for an upward review of the monetary policy rate by 5 % by the Central Banks in Nigeria. This will elicit a 50% increase in profits made by deposit money banks.
- iii. The relationship between financial sector development (proxied by the ratio of credit to the private sector to GDP) has the potentials of increasing deposit money

- banks' profitability. There is a need for an upward review of the lending-deposit ratio of banks so as to encourage lending and increasing profits.
- iv. The study recommends for an downward review of the lending-deposit ratio of banks from 65% to 60% so as to encourage lending by banks and increasing profits of deposit money banks..

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APPENDIX

Table 2: The Result of the Pooled OLS Regression Model

| | | | | |
|---|-------------|-----------------------|-------------|----------|
| Dependent Variable: LROA | | | | |
| Method: Panel Least Squares | | | | |
| Date: 11/11/19 Time: 22:20 | | | | |
| Sample: 2009 2018 | | | | |
| Periods included: 10 | | | | |
| Cross-sections included: 6 | | | | |
| Total panel (balanced) observations: 60 | | | | |
| | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| EXR | -0.000237 | 0.005584 | -0.042407 | 0.9663 |
| FSD | 0.050481 | 0.292887 | 0.172356 | 0.8638 |
| LSMD | 0.959769 | 1.034116 | 0.928105 | 0.3575 |
| MPR | 0.105305 | 0.093481 | 1.126490 | 0.2649 |
| RULEOFLAW | 0.297608 | 2.718254 | 0.109485 | 0.9132 |
| C | -1.238595 | 14.45343 | -0.085696 | 0.9320 |
| R-squared | 0.132143 | Mean dependent var | | 10.45254 |
| Adjusted R-squared | 0.051786 | S.D. dependent var | | 1.219603 |
| S.E. of regression | 1.187604 | Akaike info criterion | | 3.276392 |
| Sum squared resid | 76.16173 | Schwarz criterion | | 3.485826 |
| Log likelihood | -92.29175 | Hannan-Quinn criter. | | 3.358313 |
| F-statistic | 1.644451 | Durbin-Watson stat | | 0.520989 |
| Prob(F-statistic) | 0.164053 | | | |

Table 3: The Fixed Effect Regression Result

| | | | | |
|---|-----------------------|-----------------------|-------------|----------|
| Dependent Variable: LROA | | | | |
| Method: Panel Least Squares | | | | |
| Date: 11/11/19 Time: 22:25 | | | | |
| Sample: 2009 2018 | | | | |
| Periods included: 10 | | | | |
| Cross-sections included: 6 | | | | |
| Total panel (balanced) observations: 60 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| EXR | -0.000237 | 0.003557 | -0.066570 | 0.9472 |
| FSD | 0.050481 | 0.186575 | 0.270566 | 0.7879 |
| LSMD | 0.959769 | 0.658753 | 1.456948 | 0.1515 |
| MPR | 0.105305 | 0.059549 | 1.768374 | 0.0832 |
| RULEOFLAW | 0.297608 | 1.731582 | 0.171871 | 0.8642 |
| C | -1.238595 | 9.207128 | -0.134526 | 0.8935 |
| | Effects Specification | | | |
| Cross-section fixed (dummy variables) | | | | |
| R-squared | 0.680437 | Mean dependent var | | 10.45254 |
| Adjusted R-squared | 0.615220 | S.D. dependent var | | 1.219603 |
| S.E. of regression | 0.756527 | Akaike info criterion | | 2.443986 |
| Sum squared resid | 28.04435 | Schwarz criterion | | 2.827949 |
| Log likelihood | -62.31959 | Hannan-Quinn criter. | | 2.594175 |

| | | | |
|-------------------|----------|--------------------|----------|
| F-statistic | 10.43344 | Durbin-Watson stat | 1.414881 |
| Prob(F-statistic) | 0.000000 | | |

Table 4 Result of the Random Effect model

| | | | | |
|---|-------------|--------------------|-------------|----------|
| Dependent Variable: LROA | | | | |
| Method: Panel EGLS (Cross-section random effects) | | | | |
| Date: 11/11/19 Time: 22:28 | | | | |
| Sample: 2009 2018 | | | | |
| Periods included: 10 | | | | |
| Cross-sections included: 6 | | | | |
| Swamy and Arora estimator of component variances | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| EXR | -0.000237 | 0.003557 | -0.066570 | 0.9472 |
| FSD | 0.050481 | 0.186575 | 0.270566 | 0.7878 |
| LSMD | 0.959769 | 0.658753 | 1.456948 | 0.1509 |
| MPR | 0.105305 | 0.059549 | 1.768374 | 0.0826 |
| RULEOFLAW | 0.297608 | 1.731582 | 0.171871 | 0.8642 |
| C | -1.238595 | 9.215316 | -0.134406 | 0.8936 |
| Effects Specification | | | | |
| | | | S.D. | Rho |
| Cross-section random | | | 0.951375 | 0.6126 |
| Idiosyncratic random | | | 0.756527 | 0.3874 |
| Weighted Statistics | | | | |
| R-squared | 0.272846 | Mean dependent var | | 2.549063 |
| Adjusted R-squared | 0.205517 | S.D. dependent var | | 0.848755 |
| S.E. of regression | 0.756527 | Sum squared resid | | 30.90601 |
| F-statistic | 4.052423 | Durbin-Watson stat | | 1.283873 |
| Prob(F-statistic) | 0.003396 | | | |
| Unweighted Statistics | | | | |
| R-squared | 0.132143 | Mean dependent var | | 10.45254 |
| Sum squared resid | 76.16173 | Durbin-Watson stat | | 0.520989 |

HAUSMAN' TEST

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 0.000000 | 5 | 1.0000 |

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

| Variable | Fixed | Random | Var(Diff.) | Prob. |
|-----------|-----------|-----------|------------|--------|
| MPR | 0.105305 | 0.105305 | -0.000000 | NA |
| EXR | -0.000237 | -0.000237 | 0.000000 | 1.0000 |
| LSMD | 0.959769 | 0.959769 | -0.000000 | NA |
| FSD | 0.050481 | 0.050481 | -0.000000 | NA |
| RULEOFLAW | 0.297608 | 0.297608 | 0.000000 | 1.0000 |

Cross-section random effects test equation:

Dependent Variable: LROA

Method: Panel Least Squares

Date: 11/14/19 Time: 10:47

Sample: 2009 2018

Periods included: 10

Cross-sections included: 6

Total panel (balanced) observations: 60

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|-----------|-------------|------------|-------------|--------|
| C | -1.238595 | 9.207128 | -0.134526 | 0.8935 |
| MPR | 0.105305 | 0.059549 | 1.768374 | 0.0832 |
| EXR | -0.000237 | 0.003557 | -0.066570 | 0.9472 |
| LSMD | 0.959769 | 0.658753 | 1.456948 | 0.1515 |
| FSD | 0.050481 | 0.186575 | 0.270566 | 0.7879 |
| RULEOFLAW | 0.297608 | 1.731582 | 0.171871 | 0.8642 |

Effects Specification

Cross-section fixed (dummy variables)

| | | | |
|--------------------|-----------|-----------------------|----------|
| R-squared | 0.680437 | Mean dependent var | 10.45254 |
| Adjusted R-squared | 0.615220 | S.D. dependent var | 1.219603 |
| S.E. of regression | 0.756527 | Akaike info criterion | 2.443986 |
| Sum squared resid | 28.04435 | Schwarz criterion | 2.827949 |
| Log likelihood | -62.31959 | Hannan-Quinn criter. | 2.594175 |
| F-statistic | 10.43344 | Durbin-Watson stat | 1.414881 |
| Prob(F-statistic) | 0.000000 | | |