DETERMINANTS OF BANKING PROFITABILITY IN THE PHILIPPINES

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ABSTRACT

A stable banking industry is one of the main pillars of our financial security and this can be attributed to their increasing profits. In order to know how banks are affected by certain shocks, this study identified the determinants of banking profitability in the Philippines from 2008 to 2016 and estimated the long-run and short-run relationship of these determinants to banking profitability, by banking group. Autoregressive Distribution Lag (ARDL) and Error Correction Model (ECM) was employed in the analysis. Results showed that among those 5 banking groups, universal bank provided evidence for long run and short run relationships with its determinants. Generally, in the short run, bank efficiency, money supply and government securities have a positive and significant effect to banking profitability.

Keywords: Autoregressive Distribution Lag Model, Bank efficiency, Bank size, Error Correction Model, Government securities, Inflation rate, Money supply

INTRODUCTION

Background of the study

Bank is a certified financial institution that accepts deposits and offer loans. Banks offer various services such as savings accounts and checking accounts. They can also offer investments, financial advice and counseling, and safe deposit boxes. Its basic function is to accept deposits from the public for lending loans to the public and invest the amount in securities. The banks also provide safe deposit locker facilities and safe custody services to the customers.

In addition, banks have 3 common ways in making money, these are retailing, lending bank to bank and through charging fees. In terms of retailing, Philippine commercial banks encourage the customers to deposit their money with them and pay them in return a small amount of money (interest). These deposits are used as the bank’s source of income in terms of loans. Further, in terms of lending, the bank can also lend to each other at a huge scale usually will not exceed up to three (3) months and this may be done when a bank has an available surplus of liquid asset. Most retail and commercial banks also charge for specific services, for example, in processing checks and for unauthorized borrowing. Investment banks earn as well huge fees for advising large companies and public institutions on issuing bonds and shares (securities). These are the most common ways that a certain bank manages to sustain its growth (www.bsp.gov.ph)

Banks also engaged significant strategies in developing their ability to run-through better services and different needs of their stakeholders and one of which is increasing customer base. Banks enhanced credit underwriting and as well as the administration practices which cultivate a good governance to offer loans and strengthen their capacity to absorb losses under negative shocks. Lastly, bank strengthens their capital base through feedback not only to regulatory reforms that cause capital implications but also to the prime themselves in anticipation ASEAN banking integration which will serve as an usher to withstand increasing market
competition whose funding source might slowly turn into non-bank financing mainly those made obtainable by capital markets.

Philippine banking industry has always played a substantial role in economic growth of the country. The entire banking sector is supervised by the Central bank of the Philippines which is currently regulated five (5) different bank groups namely; commercial bank, universal bank, thrift bank, rural bank and cooperative bank. Table 1 shows different services offered by each banking group. Commercial bank is a profit-based financial institution that grants loans, accepts deposits and offers other financial services, such as overdraft facilities and electronic transfer of funds. Universal bank is a large financial service of combined financial corporations which consists of retail, wholesale and investment banking services under one roof and reaping collaborations between them. Thrift bank provides short-term working capital and long-term financing to businesses engage in agriculture, services, industry and housing, and diversified financial and associated services and to their selected markets and constituents, particularly small and medium enterprise and individuals. Rural bank is a privately-owned bank that promotes and expands the rural economy by giving financial services to the people in the rural communities. This bank supports farmers on the stage of production. And lastly, cooperative banks which are organized or owned by cooperatives or federation of cooperative. Table 1 presented the different services offered by each banking group in the Philippines.

Table 1. Services Offered by each Banking Group.

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<th>Bank type</th>
<th>Rural financial services</th>
<th>Retail setting</th>
<th>Investment</th>
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It is reported that the Philippine financial institutions sustain its growth momentum and deliver a remarkable performance in 2016. It shows further strengthening of banks’ balance sheets with double-digit growth in assets, loans,
deposits and capital, during this year, banks maintained sufficient liquidity to meet their operational requirements and related funding needs. There is also notable rebalancing of banks’ portfolio particularly in cash and credit related accounts and banks likewise sustain their profitability arising from strong core revenue and lending activities (bsp.gov.ph).

However, there are numbers of changes occur in the Philippine banking sector, because of its adaption to new conditions such as the deregulation of the national markets and the level of competitiveness internationally. In the national level, the Bangko Sentral ng Pilipinas is actively pushing for reforms to accelerate the development of the domestic capital market as an alternative funding source for the economy. Since it is reported that about 98% of the local companies in the Philippines are supplied by the banks while 2% comes from the capital market. This reform may have capital implications on banking profitability due to increasing market competition.

Figure 1 shows the annual total assets, loans and deposits from the different bank group namely; Universal Bank, Commercial Bank, Thrift Bank, Cooperative Bank, and Rural Bank in the Philippines from 2008 to 2016. The domestic banking sector reports a profit of 13.94 percent year-on-year growth in 2016 to ₱154,215 billion from ₱135,341 billion on continuous rise in loans, assets and deposits.

Profit serves as a life blood of the bank of which bank plays as the foundation of the Philippine economy and performs a significant financial intermediary role thus, its health could affect the health of the general economy in its entirety. Moreover, it is essential that a bank will look at the determinants of its profit for them to ensure if they are performing optimally with the continuous increase on loans, assets and deposits.

Figure 1. Annual total assets, loans and deposits of different bank group, Philippines, 2008 to 2017

Source: Bangko Sentral ng Pilipinas
RATIONALE

Banking profitability is the most volatile component in strengthening the health of banks in meeting up economic developments and level of competitiveness, locally and internationally. The expansion of economic activities by corporations and the government are usually supported by the banking sector. About 98% of the credit requirement of the local companies in the Philippines are supplied by the banks, while only 2% comes from capital markets. In this case, the Bangko Sentral ng Pilipinas at the national level is actively pushing for reforms to accelerate the development of the domestic capital market as an alternative funding source for the economy and these developments posed great challenges to banking profitability in the Philippines (bsp.gov.ph).

This reform may have capital implications on banking profitability due to increasing market competition. As funding source is slowly turning towards non-bank financing mainly those in the capital markets. Because of this, it also affects the size of the bank as it may face difficulties in controlling the costs differences and risk modification. With this situation, it is considered that a bank operates inefficiently. Apparently, inflation rates may cause fluctuations to banking profitability, which depends on how the inflation rate affects both salaries and other operating cost of the bank (Revell, 1979). Thus, it is reasonable that earnings are required for banks to stabilize solvency and wealth.

Given the aim for bank stability, profitability is a requirement for a more competitive financial institution, as it contributes to economic expansion. The problem of unstable bank profit is a major issue for managers, policy makers and the bank clients. Hence, identifying the determinants affecting bank profitability will aid us on having gauge on how to control bank operations and address certain concerns and issues affecting banking institutions’ customers and shareholders.

SIGNIFICANCE OF THE STUDY

The results of this study will provide more information that will serve as the basis for decision making of banks, investors, policy makers and bank clients. For the banks, this will serve as their guide on how to control and manage their bank operations given their target for bank profitability. For investors and other stakeholders, this study will give them some information on certain factors affecting banking profitability that will aid them in managing their investments, as this can be a reference for banking supervision and regulations for protecting and stabilizing money cycle. For the central bank, this will give them more information on what strategies to take, given the identified factors that will affect banking stabilization, which will aid in crafting monetary policies that will boost bank profits. Furthermore, this study may also give more information for depositors because this will give them ideas on how they can manage their banking portfolio.

OBJECTIVE OF THE STUDY

The general objective of the study is to identify and analyze the determinants of banking profitability in the Philippines. Specifically, it aims:
1. To present the trend of banking profitability and its determinants in the Philippines;
2. To estimate the determinants of banking profitability; and
3. To determine the short-run and long-run effects to banking profitability by banking group.

SCOPE AND LIMITATIONS

This study focused only the determinants of banking profitability to the different bank group namely; commercial bank group, universal bank group, rural bank group, cooperative bank group and thrift bank group within the Philippines. This study utilized quarterly time series data of money supply, efficiency of the bank, government securities, bank size and inflation rate.

CONCEPTUAL FRAMEWORK

This study traces the relationship of banking profitability and its determinants as outlined in Figure 2. Figure 2 illustrates the conceptual framework of the study with the associated theories drawn above the determinants of banking profitability such as; Efficiency of the bank, economy money supply growth, government securities, bank size and inflation rate.

Figure 2. Determinants affecting Banking Profitability in the Philippines.

VARIABLES OF THE STUDY

The following are the variables used in the study:

a) Net profit \(\textit{NETP}_{it}\)
   - Net profit is measured as the total amount earned per bank group and it is located at the end part of its financial statement. It is in million pesos unit for quarterly period.

b) Money supply \(\textit{MS}_{it}\)
   - There are 4 compositions of money supply however this study would use only M3 since it covers total liquidity comprises deposits substitute, which are promissory note and commercial paper. It is measured in million pesos of the total amount money supply in the Philippines quarterly.

c) Efficiency of the bank \(\textit{BE}_{it}\)
   - The asset turnover ratio is an efficiency ratio that measures a banks’ ability to generate income from the asset by comparing net operating income with the total assets. It is measured wherein interest income divided by average total assets of the different bank groups.

d) Government Securities \(\textit{GS}_{it}\)
- Bond or other type of debt obligation that is issued by a government with a promise of repayment upon the security’s maturity date. It is measured as an overall rate of return of the investor’s money.

e) Bank size ($BS_n$)
- It assesses the level of capital, stability of funding and more market-based activities. It also assesses the fragility of a bank. It is measured by the total assets, total loans and total deposits of the bank (Bourke, 1989) quarterly. Its unit measure is at of million pesos of the different bank groups.

f) Inflation rate ($IR_t$)
- Inflation rate is the percent increase or decrease of prices during a specified period. It is in free unit measure in a quarterly period.

DATA SOURCE
This study used secondary data taken from the quarterly reports of Bangko Sentral ng Pilipinas, of each bank group from 2008-2016. The data of the banking profitability (NETP), government securities (GS) and bank size (BS) are expressed in peso. Bank’s efficiency (BE) and Inflation rate (IR are in unit free measure. The data of economy money supply growth shall be collected from the World Bank.

STATISTICAL METHOD

A. TIME SERIES ANALYSIS
Time series are analyzed to comprehend the underlying structure and function that produce the observations. Observations are made repeatedly over 20 or more time periods. It is concerned with the past behavior of variance in order to predict its future behavior. It allows a mathematical model to explain the data in such way that prediction, monitoring, or control can occur. In addition, it is a collection of quantitative observations that are evenly spaced in time and measured successively. (www.sfsu.edu)

A.1 TEST FOR STATIONARITY

A common assumption in many time series techniques is that the data are stationary. A stationary process has the property that the mean, variance and autocorrelation structure do not change over time. Stationarity can be defined in precise mathematical terms, it means a flat looking series, without trend, constant variance over time, a constant autocorrelation structure over time and no periodic fluctuations (seasonality) (www.itl.nist.gov).

A stochastic time series $Y_t$ is said to be weakly stationary or covariance stationary, if and only if:

(a) $E(Y_t) = \mu$ ($Y_t$ has a constant mean);

(b) $\text{Var}(Y_t) = \sigma^2 = y0$ ($Y_t$ has a constant variance);

(c) $\text{Cov}(Y_t, Y_{t-k}) = Y_k$ for all k (the covariance between any two of the terms of the series is a function of the distance between them).
If one or more of the above conditions are not satisfied, then the series is said to be nonstationary. Conditions (a) and (b) are self-explanatory. Condition (c) says that covariance between any two observations depends only on how many periods they are apart and not on the time of occurrence. Stationarity means that the stochastic properties of the series remain unchanged over time (Danao, 2002).

In the estimation process, standard unit root test is significant to conduct on each variable. If the data shows a trending behavior or non-stationary then a form of trend removal is required (Danao, 2002). Furthermore, stationary refers to a condition wherein the series is constant. Augmented Dickey Fuller (ADF) unit root test is used to examine the stationary properties for time series variables. Augmented Dickey Fuller (ADF) test is based on equation given below (Arif and Suleman, 2014):

$$\Delta Y_t = \alpha + \beta T + \gamma Y_{t-1} + \sum_{j=1}^{k} \delta \Delta Y_{t-j} + \epsilon_t$$

(1)

Where:
\begin{itemize}
  \item $\Delta Y_t$ = for the first difference of the time series $Y_t$,
  \item $\alpha$ = the constant,
  \item $\beta$ = the coefficient of time trend,
  \item $k$ = the maximum lags order of the autoregressive process
  \item $\epsilon_t$ = the error term also known as white noise.
\end{itemize}

ADF test provides cumulative distribution of ADF statistics. Augment Dickey Fuller (ADF) test determines whether the estimate $\gamma = 0$ or $\gamma < 0$. The $\gamma = 0$ indicates the presence of a unit root test, differencing is needed to attain stationary. When difference applied this means the time periods changes so that its first difference would be the stationary time series $\Delta Y_t - Y_{t-1}$. While $\gamma < 0$, the series contains the data is stationarity. The series is said to be stationarity if the test statistic is less than the critical values from fuller table (Arif and Suleman, 2014).

Pesaran et al. (2001) introduced the ARDL model in order to incorporate I(0) and I(1) variables in same estimation so if your variables are stationary I(0) then OLS is appropriate and if all are non-stationary I(1) then it is advisable to do Vector Error Correction Model (VECM) also known as Johansen Approach as it is much simple model.

In such situation, the application of ARDL approach to cointegration gives realistic and efficient estimates. ARDL approach to cointegration helps in identifying the cointegrating vector(s). That is, each of the underlying variables stands as a single long run relationship equation. If one cointegrating vector (i.e the underlying equation) is identified, the ARDL model of the cointegrating vector is reparameterized into error correction model (ECM). The re-parameterized result gives short-run dynamics (i.e. traditional ARDL) and long run relationship of the variables of a single model. The re-parameterization is possible because the ARDL is a dynamic single model equation. Distributed lag model simply means the inclusion of unrestricted lag of the regressors in a regression function. This cointegration testing procedure specifically helps us to know whether the underlying
variables in the model are cointegrated or not, given the endogenous variable. However, when there are multiple cointegrating vectors ARDL Approach to cointegration cannot be applied. Hence, Johansen and Juselius (1990) approach becomes the alternative. The next sections expose the requirement for using this approach and its application (Nkoro and Uko, 2016).

The terms autoregressive distributed lag (ARDL) model with the optimal lag structure ARDL \((p,1,...,qm)\) as shown in below:

\[
y_t = \alpha + \sum_{k=1}^{p} y_{t-k} + \sum_{j=1}^{m} \sum_{i=1}^{q} \delta_{ji} X_{j,t-1} + \epsilon_t
\]

(2)

Where:

- \(p\) = optimal lag of dependent variable
- \(q_j\) = optimal lag of \(j^{th}\) independent variable

The ARDL is an infinite lag model that is both flexible and parsimonious than other traditional techniques such as Engle-Granger (1987), Johansen and Juselius (1990) and Philips and Hansen (1990) (Shahbaz et al., 2011). Model selection such as the Akaike Information Criterion (AIC) or the Schwarz Bayesian Criterion (SBC) is used for the optimal lag structure for ARDL. ARDL cointegration method is used to examine the long run relationship between terrorism and stock market (Arif and Suleman, 2014).

In this model, the short run or impact multiplier of the \(j^{th}\) independent variable is given by the estimated coefficient. ARDL long run coefficients estimates are shown in the following formulas:

Long run intercept:

\[
\beta_0 = \frac{\alpha}{(1-\sum_{i=1}^{p} y_{k})}
\]

(3)

Where:

- \(\beta_0\) = the coefficient of time trend,
- \(\alpha\) = the constant,
- \(k\) = the maximum lags order of the autoregressive process
- \(p\) = the optimum order

Long run multiplier of the \(j^{th}\) independent variable:

\[
\beta_j = \frac{\sum_{i=1}^{q} \delta_{ji}}{(1-\sum_{i=1}^{p} y_{k})}
\]

(4)

Where:

- \(\beta_j\) = the coefficient of time trend,
- \(k\) = the maximum lags order of the autoregressive process
- \(p\) = the optimum order
\[ q_j \quad = \text{optimal lag of } j^{th} \text{ independent variable} \]
\[ \delta_{ji} \quad = \text{estimated coefficient} \]

MICROFIT software that sets data automatically and conveniently selects an optimal ARDL lag structure for each of several model selection criteria after the maximum lag length (Pesaran and Pesaran, 1997). An additional advantage of the MICROFIT approach is that it can be applied without needing to know the order(s) of integration of the variables even when the variables are a mixture of I(0)'s and I(1)'s (Obben and Nugroho, 2003).

At the first stage the existence of the long-run relation between the variables under investigation is tested by computing the Bound F-statistic (bound test for cointegration) to establish a long run relationship among the variables. This bound F-statistic is carried out on each of the variables as they stand as endogenous variables while others are assumed as exogenous variables. It is essential to test the existence of long run relationship before estimating long run parameters and error correction coefficients. For the purpose, Ordinary Least Squares (OLS) method is employed to locate the value of F or Wald Statistic for the joint significance of the parameters of lagged variables i.e. (Obben and Nugroho, 2003).

\[
H_0 = \beta_1 = \beta_2 = \beta_3 = 0 \quad \text{(No Cointegration)}
\]
\[
H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq 0 \quad \text{(Cointegration)}
\]

The null hypothesis exhibits that lagged variables have no long run relationship whereas the alternative hypothesis shows the long run relationships (Sheikh, 2013).

If long run relationships exist, the long run coefficients can be calculated by employing the following equations:

\[
\text{NETP}_t = \alpha + \eta_1(\text{MS})_{t-1} + \eta_2(\text{BE})_{t-1} + \eta_3(\text{GS})_{t-1} + \eta_4(\text{BS})_{t-1} + \eta_5(\text{IR})_{t-1} + \varepsilon_t \quad (5)
\]

The short run dynamics can be estimated by this equation:

\[
\Delta\text{NETP}_t = \alpha + \sum_{i=1}^{p1} \lambda_i \Delta(\text{MS})_{t-i} + \sum_{i=0}^{p2} \lambda_2 \Delta(\text{BE})_{t-i} + \sum_{i=0}^{p3} \lambda_3 \Delta(\text{GS})_{t-i} + \sum_{i=0}^{p4} \lambda_4 \Delta(\text{BS})_{t-i} + \sum_{i=0}^{p5} \lambda_5 \Delta(\text{IR})_{t-i} + \omega \text{ECM}_{t-1} + \varepsilon_t
\]

where:

- \text{NETP} = Net profit of the bank at the period \( t \)
- \text{MS} = Money supply at the period \( t \)
- \text{BE} = Bank efficiency at the period \( t \)
- \text{GS} = Government securities at period \( t \)
- \text{BS} = Bank size at the period \( t \)
- \text{IR} = Inflation rate at the period \( t \)
- \( \alpha \) = denotes the intercept form
- \( \eta \) = denotes the long run
\( \Lambda \) = denotes the short run

\( \varepsilon \) = stand for error term

After determining that a long run relationship exists between the variables the process moves to the second stage where the ARDL selection is applied and interpretations made about the resulting short run and long run coefficients (Obben and Nugroho, 2003). Thus, this study entails the MICROFIT ARDL procedure.

**A.2 STABILITY TEST**

Cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests are used in examining the stability of the short run and the long run coefficients. The CUSUM and CUSUMSQ statistics are plotted against the break points. When the CUSUM and CUSUMSQ statistics were stay within the critical bonds at 5 percent level of significance thus, null hypothesis of all coefficients in the regression are stable and significant (Arshed, 2014).

**A.3 DIAGNOSTIC TEST**

Jarque-Bera normality test for residual were conducted to see residual are normally distributed and Breusch-Godfrey and Durbin-Watson with LM test and F-test were conducted to check the serial autocorrelation in the model. Autoregressive conditional heteroscedasticity (ARCH) were conducted to check the autocorrelation in the variance of error term. (Arshed, 2014).

**B. EMPIRICAL MODEL**

This study will undergo 5 estimation process associated by 5 different bank group, hence it entails 5 empirical models as well. Moreover, to assess the effects by relative or proportional changes of the key factors namely; Economy money supply (MS), banking efficiency (BE), government securities (GS), bank size (BS) and inflation rate (IR), with the following theoretical long run equilibrium model:

\[
\exp(\text{NETP}_t) = MS_t \beta_1 BE_t \beta_2 GS_t \beta_3 BS_t \beta_4 IR_t \beta_5
\]

simplified to

\[
\ln(\text{NETP}_t) = \beta_0 + \beta_1 \ln(\text{MS}_t) + \beta_2 \ln(\text{BE}_t) + \beta_3 \ln(\text{GS}_t) + \beta_4 \ln(\text{BS}_t) + \beta_5 \ln(\text{IR}_t) + \varepsilon_t
\]

where \( \varepsilon_t \) is the random error term, consequently, it can be inferred that the theoretical ARDL \((p, q_{MS}, q_{BE}, q_{GS}, q_{BS}, q_{IR})\) long run model can be shown with this equation:

\[
\Delta \ln(\text{NETP}_t) = \alpha + \eta_1(\text{MS}_t) + \eta_2(\text{BE}_t) + \eta_3(\text{GS}_t) + \eta_4(\text{BS}_t) + \eta_5(\text{IR}_t) + \sum_{i=1}^{p_1} \lambda_i \Delta \ln(\text{MS}_t) + \sum_{i=0}^{p_2} \lambda_2 \Delta \ln(\text{BE}_t) + \sum_{i=3}^{p_3} \lambda_3 \Delta \ln(\text{GS}_t) + \sum_{i=4}^{p_4} \lambda_4 \Delta \ln(\text{BS}_t) + \sum_{i=5}^{p_5} \lambda_5 \Delta \ln(\text{IR}_t) - \omega \text{ECM}_{t-1} + \varepsilon_t
\]

where:

- \( \text{NETP} \) = banking profitability in pesos at period t in a certain bank group i.
- \( \text{MS} \) = Economy money supply in pesos at period t in a certain bank group i
- \( \text{BE} \) = banking efficiency in free unit measure at period t in a certain bank group i
- \( \text{GS} \) = government securities in pesos at period t in a certain bank group i
- \( \text{BS} \) = banking size in pesos at period t in a certain bank group i
IR = Inflation rate in percentage at period t in a certain bank group i
A = signifies the intercept term
η = signifies the long run coefficients
λ = indicates the short run coefficients
Ω = signifies the coefficient or error correction term
P = indicates the lag length selected using t which represents the lag order
ε = represents as the error term

The estimated coefficient values are in percentage, since all the data will be transformed into logarithms hence, it is interpreted as elasticities.

C. ESTIMATING PROCEDURE

Economic methods were used to determine which of the variables in the hypothesized profitability function connected to banking profitability and their relative importance in explaining the profit variation. This study used a complete and comprehensive econometric software that could explain statistical analysis. This software is the Microfit 5.0, adapted from M.H Pesaran and Bahram Pesaran. This study follows 7 guidelines for the estimation procedure and these were discussed below:

1. Using the Augmented Dickey-Fuller (ADF) unit root test, test the stationarity of the variables at only I(0) or I(1).
2. Using the ordinary least square (OLS) method, test the long run relationship between variables. This can help to locate the value of F or Wald statistics results of which it must be greater than or at least one of these results must be greater than the critical bound levels.
3. Checking the model, if it passes the four tests such as; serial correlation, functional form, normality and heteroscedasticity, using the diagnostic tests these are; Jarque-Bera normality test, Breusch-Godfrey test and Durbin Watson test, and Autoregressive conditional heteroscedasticity (ARCH).
4. In ensuring the stability of the model, this study employs cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests. These statistical tools plotted against the break points and rationalized recursively. If the plots of CUSUM and CUSUMSQ statistics stay inside the critical bonds at 5 percent level of significance, thus the null hypothesis associated by the coefficients in regression are stable and must not rejected.
5. Next is the selection of optimal lag structure using the Schwarz Bayesian Criterion (SBC). MICROFIT 5 program was automatically selects an optimal ARDL lag structure for each of several model’s selection criteria after the maximum lag length is set.
6. With the use of ARDL model, this would help to obtain the long run estimated coefficient values.
7. Lastly, after obtaining the long run estimates, short run coefficient of the model with error correction term can be obtain. This study used the short run error correction estimates of ARDL model. Furthermore, the coefficient of the error term must be negative (greater than -1 but less than 0) and significant.

RESULTS AND DISCUSSION
TREND OF BANKING PROFITABILITY IN THE PHILIPPINES

Figure 4 presents the profit trend of the different banking group in the Philippines. It shows that in 2013 majority of the 5 banks increase their profit from 2008 which shows the lowest profit level over the years. This is because 2013, deposit mobilization was focused of which industry deposits in the country increases and loans as well increases. In 2016, banks were performing well since net interest income in this year rose by 3.3%. This is aligned with the study of Mwinlaaru and Ofori (2016) about the negative relationship of non-performing loans to bank’s profitability and Khan (2014) about the positive relationship of interest income and bank’s profit as well.

![Figure 4. Annual net Profit of different bank group, Philippines, 2008 to 2016.](source: Bangko Sentral ng Pilipinas)

TRENDS OF BANK EFFICIENCY, MONEY SUPPLY, GOVERNMENT SECURITIES, BANK SIZE AND INFLATION RATE OF THE PHILIPPINES

Figure 5 presents the bank efficiency of the 5-banking group in the Philippines. It shows that in 2008 and 2009 Thrift bank was on the higher rank among the 5. During these years different small enterprises were established and most of them need funding assistance from the bank via loans or mortgages (www.rncos.com). In this case, thrift bank can earn more through the interest return of loans with a lesser cost. This will fall to the Albertazzi (2009) perspective of cost to income ratio.
Figure 5. Annual Bank Efficiency of different bank group, Philippines, 2008 to 2017  
*Source: Bangko Sentral ng Pilipinas*

Figure 6 presents the trend of Money supply in the Philippines. It was reported that it increased to P 10.64 million in December 2017 from P10.35 million as of November of 2016. This is because banks change its reserve position one of which is increasing number of asset in its portfolio. This would fall to the theory of portfolio choice of Zimmerman (1996) about positive relationship of money supply to changes of reserve positions of the bank.

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Figure 6. Annual Money Supply in the Philippines, 2008 to 2017  
*Source: Bangko Sentral ng Pilipinas*

Figure 7 shows the annual government securities in the Philippines which was reported that there was 0.14 percent increase in 2016 from 6.71 rate of return of the investor’s money in the previous trading session. Historically, the Philippines Government Bond 10 years reached an all-time high of 16.40 in January of 2001 and a record low of 3.04 in May of 2013. This is because in 2013 the government wants to invest their funds to the public for economic expansion in the country.

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Figure 7. Annual Government Securities in the Philippines, 2008 to 2017  
*Source: Bangko Sentral ng Pilipinas*
Figure 7. Annual Government Securities in the Philippines, 2008 to 2017  
*Source: Bangko Sentral ng Pilipinas*

Figure 8 presented inflation rate in the Philippines. Inflation rate variation was due to consumer prices in the country which increased by 4 percent year-on-year in January of 2018, accelerating from a 3.3 percent rise in previous month and above market expectations of a 3.5 percent gain. It was the highest inflation rate since October 2014, as cost of food, transport flowed, salaries and operating cost in the business' point of view and as well as cost of housing continued to increase. Core inflation rate went up to a near 5-year high of 3.9 percent in January 2018 from 3 percent in December 2017. This situation will fall to quantity theory of money's perspective for the industry's point of view which states that inflation rate has a negative impact as it increases salaries to the workers and other operating cost (Revell, 1979).

![Figure 8. Annual Inflation Rate in Philippines, 2008 to 2017](image)
*Source: Philippine Statistics Authority.*

Figure 9 shows constant increasing trend of bank size of each bank group in the Philippines. this is due to the number operating banking units from 9,410 December 2012 to 9,935 in 2017. This is also because of the increasing loans, assets and deposits of the banks. In this case, banks showed efficiency and fall to
the comparative advantage perspective in producing intensive assets and financial services that could boost up the size of the industry (Akhavein, 1989).

Figure 9. Annual Bank Size of different bank group, Philippines, 2008 to 2017  
Source: Bangko Sentral ng Pilipinas

EFFECT OF DETERMINANTS TO BANKING PROFITABILITY

STATIONARY TEST

The test statistic results of Augmented Dickey-Fuller unit root test on the variables per bank group at their level and difference values. As a summary of the results, all the variables per bank group are non-stationary in the level data. However, it turns to be stationary after conducting the same test on the first difference of the variables to ensure that none of the variables is integrated of order two I(2) or beyond. As this may cause an invalid computed F-statistics of the bounds test because according to Chigusiwa et al. (2011) they are based on the assumption that the variables should be at I(0) or I(1) or mutually cointegrated.

AUTOREGRESSIVE DISTRIBUTION LAG AND ERROR CORRECTION MODEL RESULTS

After determining the order of integration of each of the variables, F-test showed a long run relationship among the variables. There is a cointegration when natural logarithm of banking profitability is the dependent variable and the long run variables are natural logarithm of bank efficiency, money supply, government securities, bank size and inflation rate. This is true looking at the computed $F_{NETP}(\text{NETP}/ \text{BE, MS, GS, BS, IR})$ of each of the bank group, which were greater than the upper bound at 95% or 90%. This implies that the null hypothesis of no co-integration is rejected and it exists co-integration relationship among the variables. Results were just an assumption that there would be at least long run and short run relation among these variables thus, results in this stage considered as preliminary.

The maximum lag order is at 9 which means this maximum lag order would adjust the sample period along with the analysis, from March, 2010 to March 2017.
This could also save the degrees of freedom since the available sample period in the analysis is a little bit small. The diagnostic test of commercial bank, universal bank, thrift bank, rural bank and cooperative bank, showed that only commercial and thrift banks pass the test for auto-correlation, functional form, normality, and heteroskedasticity to both LM version and F version which resulted insignificant coefficients among the four issues. The functional form is insignificant (no issue) looking at the results of universal bank. This simply means, that the short run model passes the four tests. Thus, results specify that there is no autocorrelation, no multicollinearity and no sign of heteroscedasticity as well and there is no apparent issue of each of the bank group models.

In the long run elasticities, money supply has a positive relationship to banking profitability, specifically on commercial bank, rural bank and cooperative bank. The long run impact of money supply on banking profitability is about 3.61%, 1.5% and 0.29%, respectively, and statistically significant at 5% level. This means that a 1% increase in the money supply would lead a 3.61% 1.5% and 0.29% increase on banking profitability of commercial bank, rural bank and cooperative bank group, respectively. This means that when the supply of money in the Philippines increases, this could generate more money and boost up its profit through lending and earning interest. Furthermore, commercial and rural bank groups were more responsive, while cooperative bank was less responsive to the changes in money supply in the Philippines.

On the other hand, universal bank, thrift bank, rural bank and cooperative banks have common long run elasticities in bank efficiency. Results indicated that bank efficiency has a positive and significant relationship to banking profitability. The long run impact was about 3.51%, 1.29%, 1.1% and 0.03%, respectively. This implies that a 1% increase in bank efficiency would lead to the increase in banking profitability by 3.51%, 1.29%, 1.1% and 0.03%, respectively. Thus, when a bank has higher expenses for a given level of output, it is consistently associated with higher profits. Furthermore, the results revealed that banking profitability in the case of universal bank, thrift bank and rural bank group, were more responsive and cooperative banks are less responsive to the changes in bank efficiency. Lastly, results showed that only cooperative banks has long run elasticities on government securities, indicating a positive and significant relationship. Its long run impact is about 0.37%, implying a 1% increase in government securities. This will lead to a 0.37% increase in banking profitability but it is less responsive to the changes of government securities.

In the short run, money supply has a positive relationship to banking profitability in commercial bank, universal bank and cooperative bank at 5% significant level, with estimated coefficients of 3.39, 0.16 and 0.76, respectively at lag 7. On the other hand, universal bank, thrift bank, rural bank and cooperative bank have common positive and significant variable, which is bank efficiency (dBE), with the estimated coefficients of 0.38, 1.29, 0.46 and 0.49 respectively, at lag 4. This indicates that when the bank efficiency increase by 1%, there would be an increase to banking profitability of four banks after 4 quarters. Lastly, government securities significantly affects profitability of universal bank and cooperative bank with the estimated coefficients of 0.18% and 0.19%, respectively at lag 7. This indicates that when government securities increased by 1%, there would be a minimum increase to banking
Having a negative error correction coefficient, relatively more efficient way of establishing cointegration (Bannerjee et al., 1998). With this notion, results revealed a correct sign, which implies an equal rapidity in adjusting back to its equilibrium, following short run shocks. Disequilibria happened on the previous quarter’s shock, which converge back to the equilibrium in the current quarter and the deviation from the long-term equilibrium is corrected quarterly. The CUSUM and CUSUMSQ were used to test the stability of the estimated model.
SUMMARY, CONCLUSION AND RECOMMENDATIONS

SUMMARY AND CONCLUSION

This study assessed and analyzed the long run and short run relationships of bank efficiency, money supply, government securities, bank's size and inflation rate to banking profitability in the Philippines from 2008 to 2017. There were fluctuations between the net profit and to its determinants over time. There is an indication of long run relationship between the variables. Results showed that among those 5 banking groups, universal bank provided evidence for long run and short run relationships with its determinants. Generally, in the short run, bank efficiency, money supply and government securities have a positive and significant effect to banking profitability. Based on the SBC criterion, the generated optimal lag order is 9. The significant determinants to banking profitability are bank efficiency, money supply, government securities, bank size and inflation rate.

RECOMMENDATIONS AND AREAS FOR FUTHER STUDY

Given Bangko Sentral’s three pillars for banking stabilization, adjustments in monetary policy should be sustained for price stabilization. Hence, results of the revealed that there is a need to enhance banking supervision and regulations.

The following are some of the areas for further research:

1. Inclusion of additional variable such as Gross National Income, interest rate and foreign exchange rate to determine the cause of banking profitability.
2. Employ other methodological techniques such as Vector Auto Regression (VAR), Full-Modified Ordinary Least Square (FMOLS), and by Pedroni’s (2004) test for panel cointegration.
3. The use of longer time series data to explain supplementary effects of the variables measured on banking profitability.

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